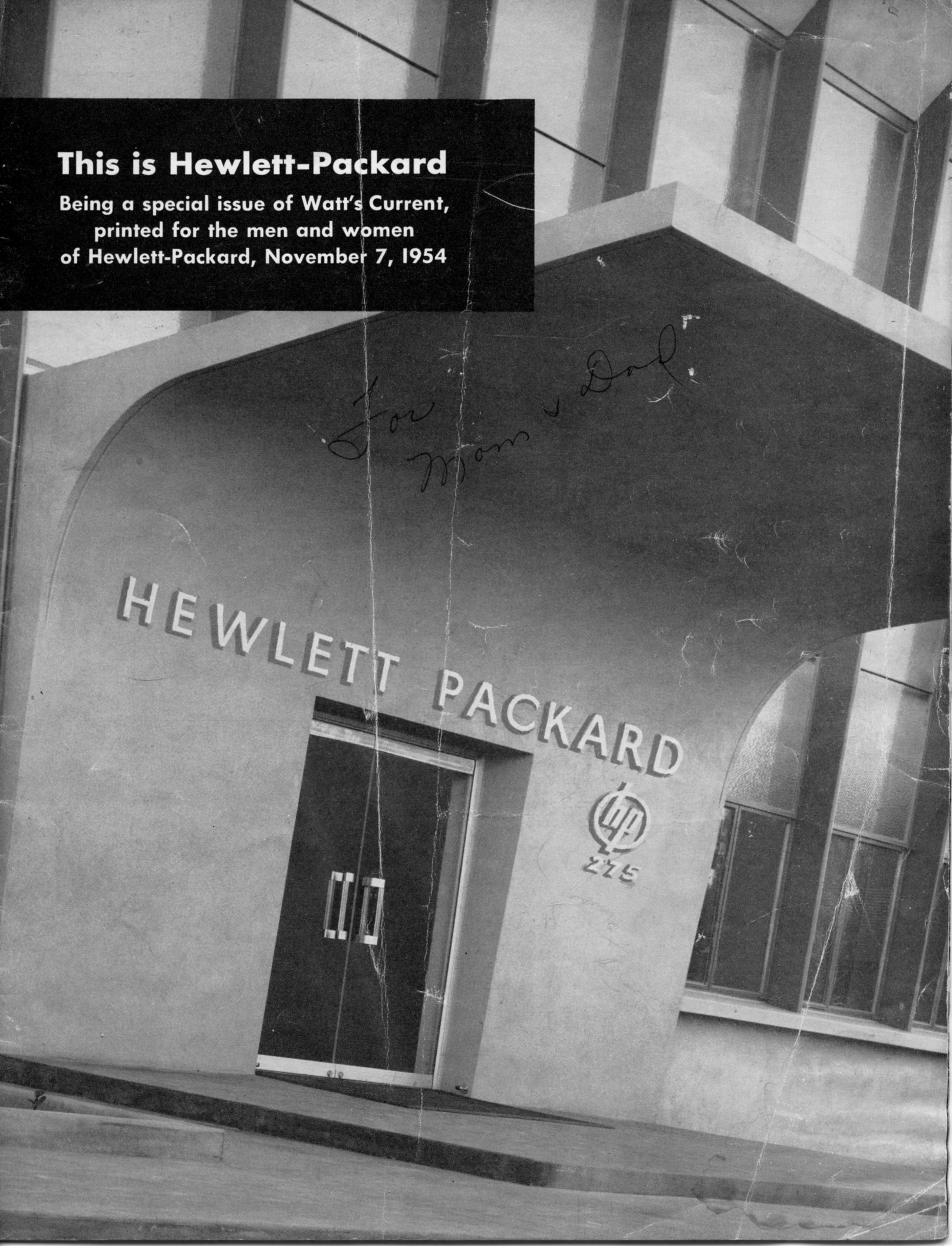


This is Hewlett-Packard

Being a special issue of Watt's Current,
printed for the men and women
of Hewlett-Packard, November 7, 1954

For Mom & Dad

HEWLETT PACKARD



A special foreword to the men and women of Hewlett-Packard

As you have already noticed, this issue of Watt's Current is different from those we regularly print. There are two reasons for this.

First, this issue appears simultaneously with the Open House and other festivities observing our 15th year. It seems like an appropriate time to take a look at where we have been, what we have done, and where we're going.

Secondly, with increasing frequency we receive requests from customers, our sales representatives and others not actually members of Hewlett-Packard, for the background of our company—what we are and why.

This autumn of 1954 seemed like a good time to have our story put in print. So we asked someone who knows us well to write it. We didn't tackle this ourselves because, well, people a little bit outside a company can often see it as a whole more clearly and in better perspective than any individual "inside."

A lot of extra copies of this Watt's Current have been printed and will be supplied to those who ask about us. Extra copies are available for the asking.

We hope you will enjoy reading the story of Hewlett-Packard. It is the story of the things we have achieved—all of us, together. It is a story of which we can be very proud.

It is not uncommon today for the heads of companies, when reflecting on the stature of the "Body Corporate," to intone, "the story of our success is the story of our people."

The story of Hewlett-Packard is, also a story of people—at first, just a handful, and now over 700.

But the real story of -hp- definitely involves "something more."

This "something more" can perhaps best be described as an uniformity of attitude, a community of interest, and a common desire to pioneer, to excel, and to better the best. It is, actually, a living spirit—the spirit of the -hp- people themselves. It is something which has contributed, more than anything else, to the growth and achievement of the Company. It is something in which every person at -hp- can take all the pride in the world.

The spirit of -hp- did not come into being overnight. Nor did it suddenly exist because the Company came into existence at a certain time and under certain conditions; or because milestones common to all successful businesses were passed.

Actually, it began with a basic philosophy. This philosophy embraced many things. One was the concept of daring pioneering, leading the way in a new, highly technical, unknown and yet most demanding field. Another was the concept of value, one of the most fundamental of all Hewlett-Packard creeds. Instruments must be good—the best. But they must also be producible at a price fair and reasonable and within the reach of all. Efficiency, too, ranked high in the list of "musts" this philosophy encompasses.

As this philosophy began to prove its worth, and Hewlett-Packard grew, more tangible evidences of this



Fifteen years ago, Bill Hewlett (left) and Dave Packard designed their first instrument, the revolutionary RC resistance capacity oscillator, and founded the Hewlett-Packard Company. Today, both remain active in the development of new -hp- instruments, although Hewlett is 1954 President of the Institute of Radio Engineers and Packard, among other duties, is a Trustee of Stanford University.

The -hp- plant at Palo Alto occupies an 8 acre site and contains over 140,000 square feet of laboratory, factory and office space. The new administration and laboratory building (left) incorporates such ultra-modern features as an all-glass front wall measuring 180 feet long by 25 feet high, electrostatically filtered air, electronically compensated temperature control and 200 to 300 foot candles of natural light in all areas.





This small garage in a quiet residential section of Palo Alto was the first Hewlett-Packard "plant". Here in 1939 the first -hp- instruments were designed and built. Within a very few months the tiny plant was outgrown, and -hp- moved to larger quarters on Page Mill Road in South Palo Alto.



Here's the first -hp- electronic test instrument, the Model 200A resistance capacity audio oscillator that established new performance and value standards for this basic type of laboratory equipment. A number of these instruments produced fifteen years ago are still in operation.

thinking have been installed. Each step forward, each triumph of engineering or manufacture or sales and service, meant that the Company could do more of the things it wanted to do. Each step forward meant that -hp- was a better place to work, and the work that -hp- did was better.

But to see how all this came about, it is best to know the things that took place along the way. So, here is how it happened.

In the beginning, as everyone knows, there were two Stanford students. Their names were Bill Hewlett and Dave Packard. The time was 1934, and these two young electrical engineers were about to take their A.B. degrees and step into a business world that was far from eager to receive any more young men looking for work. For some time Dave and Bill had given considerable thought about going into business for themselves.

The two undergraduates laid their ideas before Frederick E. Terman, Stanford's world-famous dean of Electrical Engineering. Dean Terman told them of the advisability of obtaining additional experience and furthering their knowledge before they tangled with the business world.

This they did. Dave Packard went into the vacuum tube research department of General Electric at Schenectady.

Bill Hewlett spent a year doing Graduate work at Stanford; went to Massachusetts Institute of Technology and then returned to Stanford to do some practical research and prepare for this degree in Electrical Engineering. By now Packard had also returned to the Palo Alto campus on a research fellowship.

Three years of additional work and experience had only heightened the conviction of both men that there was a real and immediate future for a new kind of company which would specialize in one product—electronic test instruments. The plans now began to jell. Bill Hewlett moved into a garden cottage in the rear of a sedate, brown-shingled home where the Packard's had set up housekeeping. The big house had a small, one-car garage that was not in use; this became the first -hp- laboratory and factory.

On a spare-time basis (both men were still in school), the two informal partners began building various devices which were about 50% experimental and 50% for income. They developed a diathermy machine which the Palo Alto Clinic bought—this was the first -hp- product ever sold. They assembled a thyatron drive to permit accurate setting of a telescope for Lick Observatory. Some other innovations included an electronic device for tuning harmonicas, air-conditioning controls, a foul-indicator for bowling alleys, and a reducing machine which worked by applying an electric shock to the offending areas.

Simultaneously, Bill Hewlett was finishing his EE thesis on the resistance tuned oscillator. From all information at hand, it looked as if this instrument would maintain better stability, cover a greater frequency range and have less distortion than any other oscillator heretofore marketed. Further, it looked like the oscillator could be assembled of inexpensive parts, quickly

and easily since one of its prime features was simplicity.

So, the first -hp- oscillator was built in the little garage behind the brown-shingled home. Perhaps "assembled" is a better word—all the parts were standard. The first "-hp- grey" paint job was baked onto the finished cabinet in the Packard kitchen stove.

The first instrument, and then several others, were sold to friends in electronics by the simple expedient of mailing out data sheets and pictures. Promptly, users began to compare vocally and enthusiastically the equipment with the cumbersome, expensive instruments offered by competitors. Bill Hewlett presented the new oscillator at the 1938 I.R.E. meeting in Portland. The Chief Sound Engineer for Walt Disney Studios heard the story and bought nine oscillators, for the stereophonic sound presentation of "Fantasia."

This "big" order did it. Hewlett's and Packard's theories were proving out; and their ideas about their own company to make such products seemed valid. So, in January, 1939, Dave and Bill flipped a coin to see whether it was to be Packard-Hewlett or vice versa. Hewlett-Packard won, and the company came formally into existence as a partnership.

The new oscillator, dubbed "200A because the number sounded big," began to pay off immediately. The first profits were cranked back into the business; nothing was taken out that didn't just have to be. The two new partners concentrated on development of new instruments to broaden the base of the business.



The first real -hp- plant was located in rented quarters on Page Mill Road. Above, Dave Packard and the company's first secretary catch up on paper work. Below, part of the -hp- engineering staff at work on the development of new instruments.



In 1942, the rapidly expanding company had outgrown rented quarters, and the first -hp- plant and office building was completed. Located at 395 Page Mill Road, the structure until 1954 housed Hewlett-Packard's administrative offices and laboratory, and is still in use.

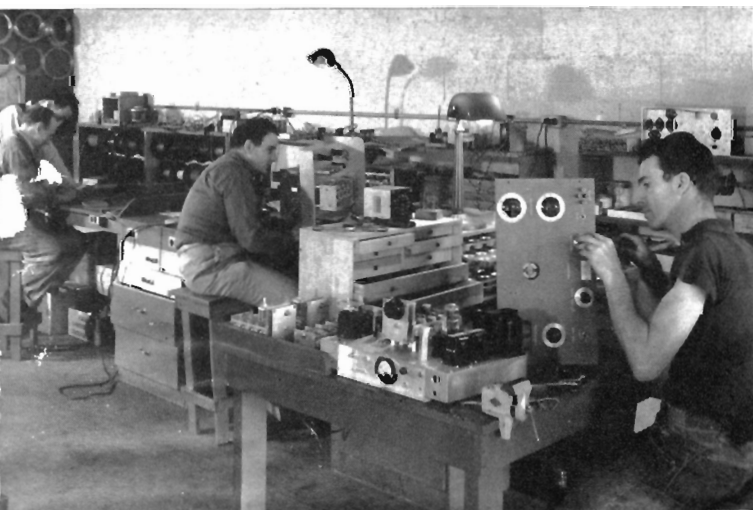




Hewlett-Packard's research and development facilities increased apace with manufacturing facilities. Here Bill Hewlett checks operation of a new audio signal generator.



In 1944, -hp- received the first of four Army-Navy "E" awards earned during World War II years. Meantime (below) manufacturing of both military and commercial instruments went forward with steadily increasing volume.



Both Lu Packard and Flora Hewlett worked like Trojans during this critical period to keep things going. If anyone had faith, they did.

Then, the Pacific Gas and Electric Company needed a harmonic wave analyzer; -hp- produced and sold it. A square wave generator was developed. The first -hp- sales representatives, Neely Associates for the West and Crossley Associates for the Midwest, were appointed to sell the infant firm's products.

And now look at the wheels begin to turn!

By 1940, the little garage was badly outgrown, and part of a small building on Page Mill Road in South Palo Alto was rented. The first plant's equipment was primer by today's standards—benches, a few shop-tools, painting and bright-dipping tanks. But the work was turned out. The first -hp- people came on the job to help with production. By year's end, -hp- had spread out to occupy the entire building. An audio signal generator, other audio oscillators and a distortion analyzer were added to the line.

Physical expansion took place rapidly into 1951. More people joined the -hp- "gang." The 400A volt-meter, to become with the 200 series oscillators one of the most broadly used instruments in all electronics, was brought onto the market.

By mid-1941, too, the Military had recognized the potential of this little partnership growing up in a California college town. The first government order came from Wright Field. It was for six signal generators, but this was nothing to what lay ahead.

With Pearl Harbor, the trickle of military orders turned into a stream, and then a flood. By 1942, sixty people were in the -hp- fold, and the emphasis was now on production. Nevertheless, development continued, and a new distortion analyzer and electronic frequency meter were added. At the same time, -hp- built the first of its own buildings, a 10,000 square foot office, laboratory and factory at 395 Page Mill Road.

By 1943, the company's production for war was in high gear. One hundred people, working two shifts, were producing a dollar volume of instruments that was closing on the \$1,000,000 mark.

Production still was the major objective; but development was not neglected. During 1943, the 100 Series Secondary Frequency Standards were introduced, and a further refinement of the 205 Audio Signal Generator appeared. Development's main contribution, however, was in the microwave field. It was during this year that the groundwork for Hewlett-Packard's dominance of the signal generator field was laid.

-HP- was awarded a Navy contract for producing a radar counter-measures device — the highly secret "Leopard." Fulfillment of the contract required a production instrument ready to sell by mid-1945. The pilot model was tested in February, 1945, on Chesapeake Bay. It was a real job of work to bring the equipment to production status in the remaining four months of the contract. But the spirit was willing, and the job was done. This on-time performance indicated that -hp- meant it when it promised delivery. Government contracts have continued ever since.

On its fifth birthday in 1944, -hp- production had reached \$1,500,000 annually. Personnel was stabilized at about 100 people, and continued so to the end of the war.

During the war years two other remarkable things happened. Hewlett-Packard was awarded the Army-Navy- "E" for Efficiency honors on four different oc-

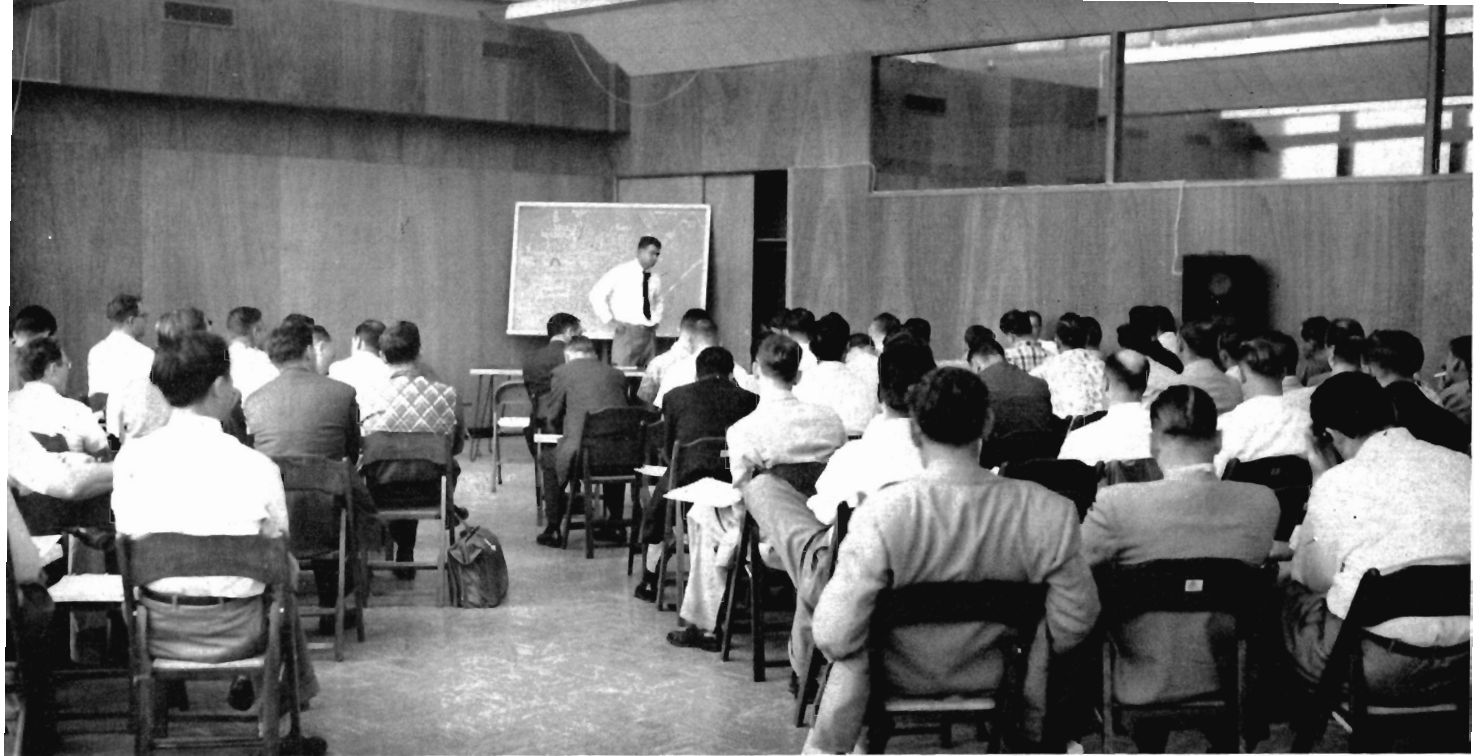


Today, -hp- manufacturing facilities are among the most complete in the test instrument industry. In addition to a fully-equipped machine shop (above), -hp- also has its own plating shop (below).



Hewlett-Packard production lines are designed for speed, efficiency, and optimum working conditions. Production buildings are light- and air-conditioned, with broad aisles and plentiful work and bench space.





Hewlett-Packard sales engineers know -hp- instruments thoroughly. Frequently the 80-man sales force returns to the Palo Alto plant for an extensive seminar bringing them up to date on newest instrumentation and latest operating techniques.



An important part of the training of -hp- sales engineers is the actual operation of -hp- equipment. Here teams of engineers conduct actual measurements they will later demonstrate to customers in the field.

Continually throughout the year, -hp- instruments are taken to cities, manufacturing plants and government facilities in every part of the nation. Here -hp- sales engineers Bob Morgan and Norm Neely demonstrate -hp- microwave equipment to a visitor at one of the famous Neely "roadshows" which tour the Western states.



casions. Four awards—where one was par, and any at all were hard to come by.

The other was that Bill Hewlett held up his end of the business almost, one might say, by "mail order." At the outbreak of the war, Bill had been called to active duty as an Army officer. He wound up a Lt. Colonel, and a member of the elite Evaluation Committee sent to Japan at the war's end to assess the achievements of Japan's scientific people.

By 1946, the readjustment from war to peacetime economy was completed. The Company was now in better position to apply the invaluable experience gained during the pell-mell war years, and begin development of new instruments for science—and for industry. For even at this date, Packard, Hewlett and others at -hp- were convinced that the future of electronic measuring instruments lay not entirely in electronics itself or its allied markets, but in the big manufacturing and processing industries.

Still, however, the electronic prime market was not overlooked. In 1947, -hp- introduced an FM monitor, 650A Test Oscillator, and the important new 616A UHF Signal Generator. The same year the second major plant building was begun—a 21,000 square foot steel and concrete structure. Also, in 1947, the firm incorporated. Sales were again at the 1944 peak of 1½ million dollars.

In 1948, new instrument development emphasized microwave equipment, and at the I.R.E. show in New York a new slotted line standing wave indicator and microwave power meter were introduced.

The following year, still more new instruments were unveiled—including a distributed amplifier, low pass filter and the 618A Signal Generator reaching into the



Hewlett-Packard engineers have the most efficient and ideal working conditions possible. Pictured here is one part of the ultra-modern laboratory in the new administration and laboratory building. Like other parts of the -hp- plant, the lab is sound-, light- and air-conditioned.



Maximum light, maximum comfort and maximum quiet characterize office spaces in the new Hewlett-Packard administration building. At noon time and during "coffee breaks", -hp- people relax in the attractive patio (below) between office and factory structures.



super-high frequency range of kilomegacycles. Through 1950, the new instrument parade continued; -hp- is now developing and bringing onto the market new products at the unheard of rate of 20 new instruments per year.

1951 saw the completion of another factory building, a 21,000 foot twin to the 1948 structure. The same year, -hp- also entered the waveguide field in earnest, with a complete line of waveguide "plumbing." Sales continued to climb. The -hp- "gang" had increased to almost 500 people, and two-shift operation was resumed.

By 1953, sales volume of -hp- products had reached and surpassed the \$1 million per month mark, and -hp- had assumed a position of dominance in the field of electronic measuring instruments. Over 225 instruments now made the -hp- line the world's most complete—coverage was offered of all frequencies from 0.01 cps to 10,000 mc. During 1953 and early 1954, 28,000 square feet of additional factory space were added, and in 1954, the new 44,000 square foot administration building was completed.

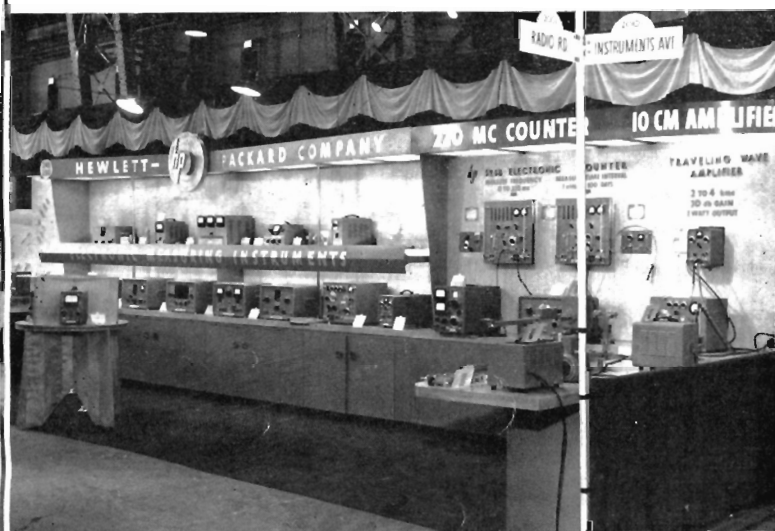
Today, Hewlett-Packard instruments are sold in every major city of the U.S. by the nation's largest and best trained group of electronic sales engineers. In many lands overseas, other skilled men are giving -hp- world-wide coverage of all the free nations. There are today some 250 distinctive -hp- instruments—truly, the most complete coverage of electronic measuring instruments ever offered by any manufacturer. Today there are also over 700 employees, and the sales volume is nudging upward steadily.

New instruments such as the Traveling-Wave Tube Analyzers, 400D Voltmeters, the 521A and 524B Counters, and the AC-4A Decade Counters promise to increase -hp- leadership still further.

The 1954 plant occupies an eight acre site, with



Hewlett-Packard was one of the founders of the West Coast Electronic Manufacturers' Association, and many -hp- people have served as WCEMA's leaders. Here Noel Eldred, Bill Hewlett and Noel Porter join other leaders in the electronic industry to receive Past-Presidents' awards from the association these men helped found.



Annually, WCEMA co-sponsors the giant WESCON, now the nations' second largest electronic equipment trade show. Pictured here is a Hewlett-Packard display booth which is used not only at WESCON but at New York's Institute of Radio Engineers show and many others.

almost four acres under roof. The new administration building and laboratory incorporates the most ultra-modern features. Here are some facts about this unique structure:

Basically of saw-tooth design, this building contains some radical improvements over conventional commercial construction. In the first place, the 25-foot-high front wall—all along its 180-foot length—is glass. Actually, there are over 13,000 square feet—13 tons of glass, in the building.

To prevent direct sunlight from entering the glazed wall and clerestory windows, the entire structure is oriented exactly 5 compass degrees west of true North. As a result, on an average day there are at least 200 foot candles of natural light throughout the building. On the few foggy or rainy days in Palo Alto, automatic electronic controls trigger lighting circuits which maintain this same perfect illumination artificially.

Here are some other unusual things about the new building. The combined use of Westinghouse precipitators and Minneapolis-Honeywell electronic compensators maintains humidity and air purity at precisely the desired state. Ceiling and walls above the paneling are covered with $\frac{3}{4}$ " thick Fiberglas sound tile.

In addition to large offices and laboratory space on the main floor, a big basement contains Publication facilities, lab-shop, maintenance, environmental testing, boiler and apparatus rooms. Connecting the new Administration Building and the Production area are fiberglas and aluminum canopies protecting the walkways. Between the new administration building and the nearest production wing is found an open-air recreation and lunch patio equipped with redwood benches, brick floors, ping-pong tables and other features to make meal time and coffee breaks more enjoyable.

Thus, the history and the physical description of the Hewlett-Packard Company in 1954. During the past decade and a half, much has been achieved.

Men and companies who succeed spectacularly at-



Panoramic view of 1954 WESCON, which overflowed vast Pan-Pacific Auditorium in Los Angeles. Hewlett-Packard exhibit was at center of the show (middle background). More than 23,000 engineers and technical people from all over the U. S. attended the three-day convention.

1954 WESTERN ELECTRONIC SHOW
Pan Pacific Auditorium
Los Angeles, California



A tradition stemming from the early days of -hp- history is the "Coffee break". Twice daily, -hp- people get together over coffee and doughnuts "on the house".

tract honors of both a personal and industrial nature, and Hewlett-Packard's people are no exception.

In addition to the quartet of Army-Navy "E" awards, Bill Hewlett and Dave Packard have long been Fellows of the Institute of Radio Engineers; and Director of Research Barney Oliver has recently also received this honor. Bill Hewlett served as the 1954 President of the Institute of Radio Engineers, the second westerner ever to head the 40,000 strong international association of radio engineers. (The first was Dean Terman of Stanford.)

Hewlett-Packard people helped start the West Coast Electronic Manufacturer's Association, Sales Manager Noel Eldred was one of the WCEMA's first presidents and -hp- has always had a representative among the elected management of this group. (Ed Porter has recently been elected Chairman-elect of the 1954 WESCON to be held next in San Francisco.) Bob Sundberg serves as Secretary of the Purchasing Agents Association of N. Calif., and National Chairman of the Electronic Manufacturers' Buyers' Group of the National Association of Purchasing Agents. Similarly, other -hp- people are ranking officers in other business and trade associations.

In civic life, too, -hp- people have played a prominent role. Officials of the company have been or are members of the local Board of Education, Public Works and City Council. Hewlett-Packard's General Manager

Noel Porter is vice mayor of Palo Alto. Bill Hewlett is a former Palo Alto City Council member. Dave Packard, a member of the Palo Alto Board of Education and former president of same. Frank Cavier has been active along the line of local United Crusade Drives, as well as serving on Palo Alto's new Golf Course Committee.

An additional honor came recently to Dave Packard when he was named to the Board of Trustees of Stanford University. Packard thus becomes a member of a group whose roster is a virtual Who's Who of leading industrial, civic, financial and professional figures in California. If you have read this far, you now have at your finger tips the brief history of Hewlett-Packard, as far as the facts, the sequence of events are concerned. But still the whole story has not been told. To really know -hp-, it is well to understand *why* what happened, happened.

When Bill Hewlett and Dave Packard went into business, they were young in years and young in the ways of industry and commerce. But they realized that they could not build a successful enterprise single handed, or even perform, themselves, all the mental gymnastics the years ahead would require. They also had very definite and advanced ideas about the people who would work for the new concern.

Very simply, it was their idea to have only good people in the new company. Then, to give these people

leeway, freedom for initiative to act; and also a voice in the company. Finally, it seemed obvious that if everyone shared in the success there would be materially greater individual and collective incentive.

At -hp-, morning coffee breaks are a tradition, and more. It's a clearing house for information between people, and between departments. Long, ponderous, procedural conferences are not indulged in at -hp-. Many decisions at the management level are reached during the 15-minute coffee breaks. At these times, Hewlett and Packard, the general manager, sales manager, purchasing chief and others gather, without formal signal or prearrangement, at the same central spot.

Problems are presented, questions asked, and decisions made. Action is taken. Few follow-up memos are written; it's assumed the man responsible will have the fundamental intelligence to carry through.

In fact, one of the delightful things about Hewlett-Packard is the almost complete absence of that famous device for passing the buck, the inter-office memo.

The -hp- policy of encouraging initiative and inventiveness has paid off in other ways. Not the least important of these are the specialized machines -hp- people have "imagineered" to help make research and production, faster, better or more efficient.

There's the Kingman machine for an example. The late Rufe Kingman was one of -hp-'s pioneer engineers; he kept his brainstorm to himself until he was pretty sure they would work. But Rufe was an efficient guy, and he chafed at the slow way -hp- —and the industry— was manufacturing resistor boards. So, he thought mightily and the Kingman card machine was born. It worked fine; cost virtually nothing, and cuts resistor board fabrication time to about one-sixth.

Still another example of the inventiveness that prospers when the mental wraps are removed is the precision lathe for winding. This home-grown machine handles wire 3 times finer than a human hair. It winds it with exactness and loving care, while producing flawless resistors adjusted to better than 0.1%.

Now, it's obvious that the -hp- man or woman's attitude of mind, particularly when it's the prevailing thing rather than the exception, is not achieved by the parties of the second part without some tangible inspiration and instigation from the people who head the company.

Dave Packard and Bill Hewlett, have, through the years, implemented their ideas about people who work for -hp- with uniformity, generosity and a deep human understanding.

Hewlett and Packard have the only "private" offices in the plant. But their doors are almost never closed. Any employee, without working upward through the chain of command, can walk in and state his problem.

On the surface, it would appear that the president and vice-president's day would be thus occupied with many individual or personal matters. Actually, this direct access to top management is not abused. It is not, for the simple reason that the genuine delegation of authority means almost all matters can be resolved at other levels.

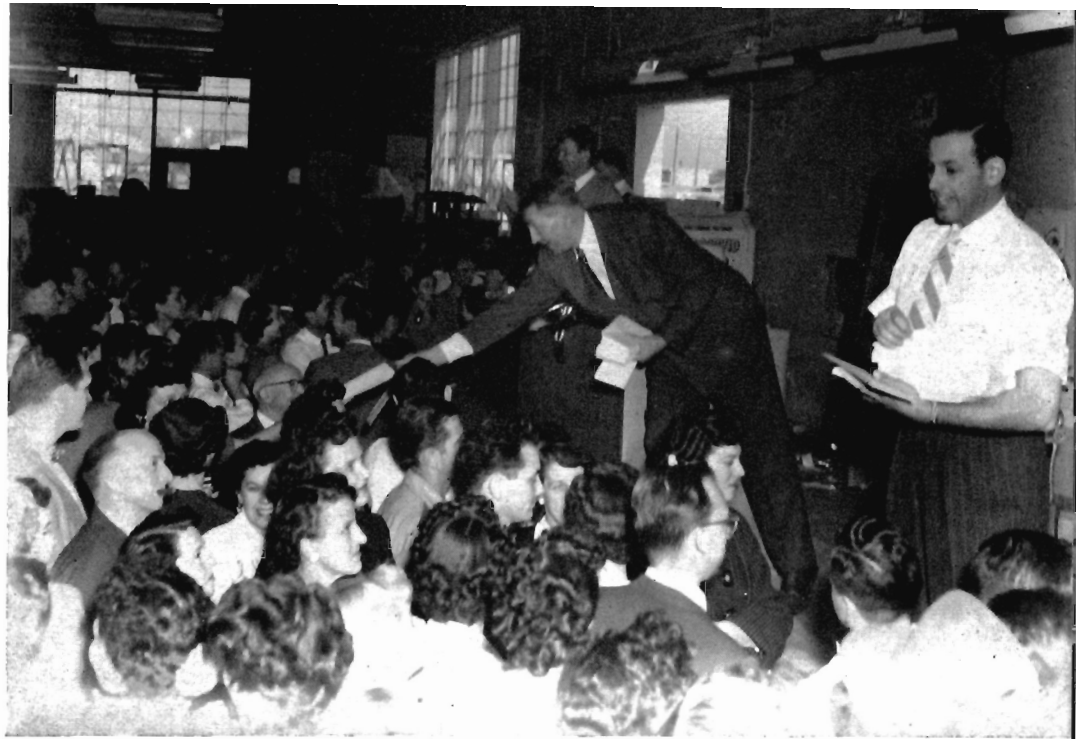


In electronics as in other young fast-growing industries, new and different machinery must often be designed to meet manufacturing problems never before encountered — or to do a job better and faster. Here's the Kingman machine, "imagineered" by the late Rufe Kingman to speed manufacture of terminal boards.

Another example of -hp- ingenuity in developing new machines to do difficult jobs easily is this precision lathe for winding resistors. The lathe handles wire three times finer than human hair and turns out resistors adjusted to better than 0.1%.



A red-letter day at Hewlett-Packard is the Christmas Party, a highly significant feature of which is the distribution of the bonus checks. Here Noel Porter, Bill Hewlett, Frank Cavier, Dave Packard, and Noel Eldred officiate at this pleasant ceremony.



Then, there's the practical problem of locating either Hewlett or Packard. Their secretary swears neither occupies his office more than 10% of any day; and that only on exceptional days, their time being consumed on the job about the plant.

Of course, one of the substantial contributors to the spirit of -hp- is the bonus plan. In its basic form, this plan is almost as old as the company—it was installed in 1940, when Hewlett-Packard was a year old fledgling with 7 people to receive the bonus.

Calculated monthly on the basis of the ratio between the preceding three months sales and labor the bonus applied originally only to production people. However, later the bonus was extended to include all employees. There is no ceiling on bonuses; they are a direct function of the effectiveness and productivity of -hp-'s people.

At the same time the first bonus plan was installed, the company adopted the traditional two-weeks-with-pay vacation plan.

Among the excellent employee benefits at -hp- there is an outstanding group insurance program. Very substantial life insurance and hospital benefits, including medical catastrophe coverage, are furnished at no cost to the employee. Also, the employee can secure family coverage at a fraction of the actual cost of this valuable protection. These features together with disability benefits make our insurance program certainly one of the best obtainable.

In 1948 a pension plan was inaugurated which provides a generous pension at retirement age plus considerable life insurance coverage to protect the employee's family during the long years prior to retirement. The pension is in *addition* to any social security benefits available and the life insurance is in *addition* to the coverage supplied each employee under the group insurance program mentioned above. Best of all,



Each year, various -hp- departments compete in the building of Christmas decorations. Pictured here is an animated display by the Machine Assembly department. While Christmas music filled the air, tiny figures of men and women moved in and out of the scale-model church.



Another -hp- tradition is Harmony Plotters, a group founded in the early days of -hp- to do just what its name implies—promote inter-departmental harmony. The Harmony Plotters dance remains an important function on the -hp- extra-curricular calendar.



Another important event in the -hp- year is the -hp- picnic. Each year some 2,500 -hp- people and their families enjoy a day's outing as guests of the company, complete with planned activities for children, sports events, and a savory steak dinner with all the trimmings.

this program is entirely paid for by the company.

In addition to these formal benefits which mean much to both the -hp- individual and his family, there are other things the Company provides which are not found elsewhere.

The coffee breaks, of course, are important.

Then, there's the Harmony Plotters—an internal organization that came into being back in the "old days" when Hewlett-Packard occupied three different buildings. Initially, Harmony Plotters purpose was to get the "boys in the West wing to meet the boys in the East wing"; to arrange intra-company affairs, help weld the three departments that then existed into a cohesive unit. In the beginning, Harmony Plotters also had benevolent aspects; it took care of office gifts for departing employees, greetings to newcomers, and so on. Since the war, with -hp- at once growing larger and more departmentalized, the function of Harmony Plotters has become largely social. But effectively so; and another ramification of -hp- that contributes powerfully to the spirit that prevails.

There are two other "extra-curriculars" that -hp- people look upon with anticipation and relish.

One of these is the annual Christmas Party, an affair

that is accompanied by distribution of bonus checks and entertainment of a caliber not soon to be forgotten.

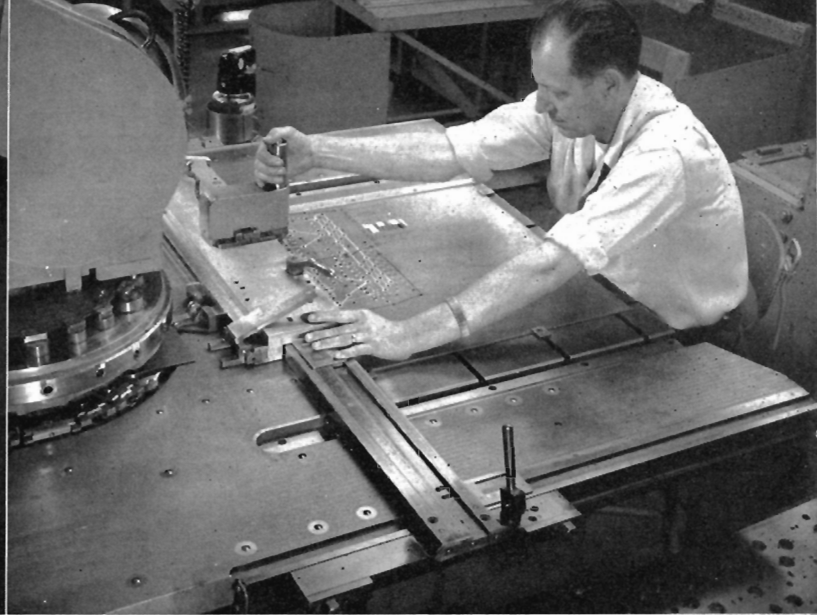
The other is the annual summer picnic.

It is traditional for employees of large corporations to have an annual outing. Sometimes this is an affair arranged for and financed by employees or employee welfare groups. Sometimes the Company chips in for the beer and watermelon. Once in a while, the body corporate does the whole job.

The -hp- annual picnic is in the latter category. It's literally a party for -hp- people and their families, given by the Company. And what a party!

Refreshments in limitless quantities, all day long. An intelligently conceived and well executed program for the children—ranging from "penny hunts" and pony rides to competitive games and sports for youngsters in their teens.

Then, the food—a gourmet's selection! Everything is handled by the employees from the initial ordering of necessary supplies to the actual preparations thereof. Mechanized barbecue racks have been developed allowing for multiple grouping of steaks to be simultaneously turned. This is a necessity since around 2,500 people must be fed in about 60 minutes.



To insure maximum speed and efficiency in the manufacture of instruments, -hp- employs the most up-to-date machinery and equipment available. Pictured above are new units for welding and brazing, and a press for stamping perforations in instrument chassis. Also illustrated are sections of the -hp- assembly and wiring, and shipping departments.

Even in the preparation of the meal, -hp- inventiveness is evident. The latest in a parade of ingenious picnic gadgets is the four-barreled coffee percolator designed and built by one of -hp-'s foremost electronic engineers. This amazing device has a 40 gallon capacity; and when "perking" looks and sounds like all the coffee pots in the world gathered together and operating at once.

Feeding 2,500 guests also involves some statistics. Approximately 3,000 pounds of meat. 2,900 ears of corn. 600 loaves of French bread. 100 gallons of ice cream. 90 gallons of chili beans. 1,800 ice cream bars. 5,000 paper cups, etc., etc., etc.

Picnics and Christmas parties, bonuses, pensions and insurance, Harmony Plotters and paid vacations—these are all the things which contribute tangibly to the spirit of -hp-.

But there is still another factor—one which has been at work since the very early days of the Company. This is the very real thrill of being a part of a leader in industry.

And -hp- is indisputably a leader. First, by the measurable yardsticks — new product development, product line, distribution, and total sales — all well ahead of the field and busy widening the gap.

Secondly, there is the matter of reputation among the men of science and industry using -hp- equipment. Hewlett-Packard's distribution is 100% through sales representatives. These men like to sell -hp- instruments. They like to sell them because they are accepted as a standard of quality in electronic test instruments. They like to sell them because in doing so they offer the product of a manufacturer noted for the highest kind of business conduct.

working. One of the best proofs are the reports from the sales force—reports which show that sales to industry are coming easier today because a growing number of customers know, recognize and appreciate -hp- and -hp- instruments.

Further proof is provided by the McGraw-Hill Publishing Company—America's foremost publishers of industrial and business magazines. McGraw-Hill surveys show conclusively that in the initial years of this special advertising program, the recognition of -hp- and -hp- instruments increased over 400% among leaders in the manufacturing industries.

Parenthetically, it might be mentioned that the other part of the -hp- advertising program—that directed exclusively to engineers in all fields of industrial and scientific research and development—is the world's largest program of its kind.

Proof of its effectiveness came recently when *Proceedings of the Institute of Radio Engineers*, a leading publication in electronics, asked its readers whose advertising they found most interesting and helpful. In five of seven identical surveys, -hp- ads led the list.

Then, there is the -hp- *Journal*, a vitally important way Hewlett-Packard helps sell engineers on the usefulness and advantages of -hp- products. The *Journal* is today one of the largest regular publications maintained by any Company in the electronic field. It is regularly read and valued by almost 40,000 engineers, physicists, chemists, educators and engineering students across America.

It is interesting to note that engineering students—many of them—are included in the circulation of the *Journal*. These young men are not today in a position to buy, or even influence the purchase of, Hewlett-Packard equipment.

But again, -hp- is looking toward tomorrow, when these men graduate and enter the scientific and industrial worlds. When in short months or years thereafter they do reach positions where they can buy or specify electronic test equipment, it is only logical they will think first of the company that helped them with information when they were in college—and the company that has been established in their minds as the leader.

The Hewlett-Packard Sales Seminar points up one of the most important efforts made by the Hewlett-Packard Company in providing up-to-the-minute-training in the design and application of -hp- instruments for our Sales Representatives. This group Hewlett-Packard is proud to say, is "The Largest and Best Trained Electronic Instrument Sales Organization in the World." One week every summer, during the month of July, they are to be found in attendance at our Company's Annual Indoctrinational Sales Seminar. Here the apt pupils improve their knowledge of our Company's intricate products and Hewlett-Packard in turn is educated on customer reaction. The Seminar Program comprises a concentrated schedule of lectures and laboratory sessions complete with a very comprehensive final examination.

There are still other ways Hewlett-Packard is look-

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Advanced Performance in
Two New VHF Signal Generators

IN ORDER for an amplitude modulated signal generator to be suitable for testing high-performance receivers, one of its most important requirements is that it have a low order of incidental fm. The reason for this is that appreciable fm in a signal generator usually causes serious errors in evaluating receiver performance and further leads to misalignment of the receiver. Although untoward noise presents an troublesome proposition in lower frequency generators, incidental fm tends to be a significant problem in vhf generators, especially when orthogonal modulation methods are used.

In the design of -hp- signal generators, freedom from incidental fm has always been an important consideration. It has led to the use of master-oscillator-power amplifier type designs for the -hp- generators that operate in the vhf, uhf and lower shf regions. The advantage of the MOPA arrangement is, of course, that the rf oscillator circuit in the generator does not have modulation applied to it. As a result, modulation voltages do not cross on the oscillator and incidental fm is of a low order.

The MOPA circuit arrangement has quite naturally been followed in the design of two new signal generators which have been developed for the vhf to lower shf range. The more technically refined of these new generators, the Model 608D, operates from 10 to 420 megacycles, is capable of sine-wave or pulse modulation, delivers a maximum of 0.3 volt across 50 ohms, and incorporates a 0.01% tolerance crystal calibrator to permit unusually high accuracy of output frequency.

The second generator, the Model 608C, operates from 10 to 400 megacycles and provides a maximum output of 1 volt across 50 ohms. It is generally similar to the Model 608D except that it does not include a crystal calibrator and that some of its characteristics have not been refined to such a high degree as in the 608D.

RF SECTION
Circuit arrangements for the two new generators are shown in block form in Fig. 2. The rf oscillators in both generators are essentially the same and use type 3675 pencil diodes operating in modified Colpitts circuits. In both generators the oscillators cover their respective ranges in 5 bands as shown in the accompanying table. Each band has a calibrated scale length of approximately 10 inches, giving an overall scale length of some 50 inches for the complete range. The tuning capacitors are de-




FIG. 2. Model 608C (left) and Model 608D (right) signal generators. The Model 608C is a master-oscillator-power amplifier type generator covering 10 to 400 megacycles. The Model 608D is a master-oscillator-power amplifier type generator covering 10 to 420 megacycles.

Regularly throughout the year, electrical and electronic engineers receive and save for future reference copies of the -hp- Journal. Each issue of the Journal reports to the industry on the new -hp- equipment, and presents new measuring techniques to speed and simplify electronic measurement.

At nearby Stanford University and other leading colleges throughout the nation, -hp- scholarship contributions give a helping hand to deserving undergraduates as well as graduate engineering students.





Recently Hewlett-Packard made possible a wing of the new Electronic Instruction Laboratory at Stanford University. Here Dr. Frederick Terman, Stanford's world-famous Dean of Electrical Engineering, greets Dave Packard and Bill Hewlett at the opening of the new laboratory.

ing to the future, helping insure continued growth and again, helping insure and enhance the jobs of -hp- people.

This is through the various scholarship programs in which -hp- participates.

Almost from the beginning Hewlett-Packard has taken an active interest in furthering the education of promising young people. Examples of this interest are the Hewlett-Packard Fellowship in Engineering, and the Honors Cooperative Program at Stanford, the West Coast Electronic Manufacturers Association Scholarships, and the Hewlett-Packard Company Employee's Scholarship Fund. Substantial financial support is given to each of these programs thus providing the funds necessary to allow worthy and talented individuals to obtain higher education. The Hewlett-Packard Company Scholarship Fund is the major project of this type and provides scholarships for high school graduates for use in their first year of college. The winners of these awards, either boys or girls, may attend any accredited college or university and follow any course of study they may choose. The other scholarship programs are confined to the Electrical Engineering or closely allied fields of training.

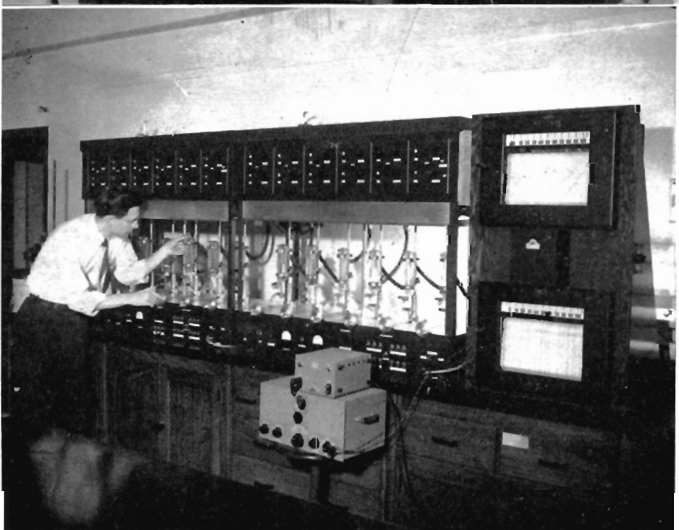
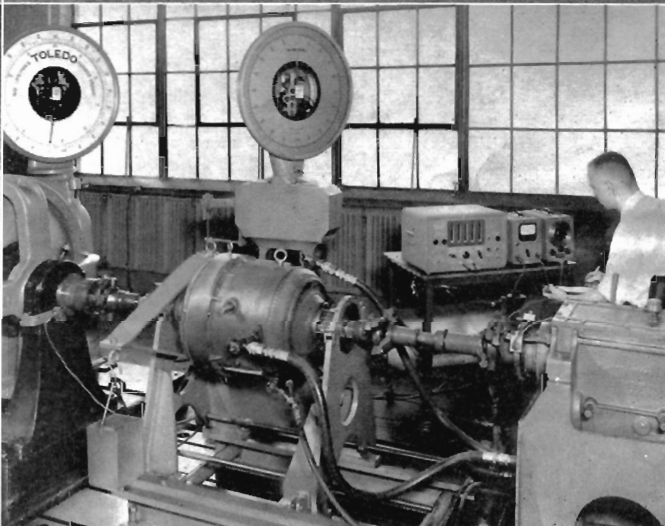
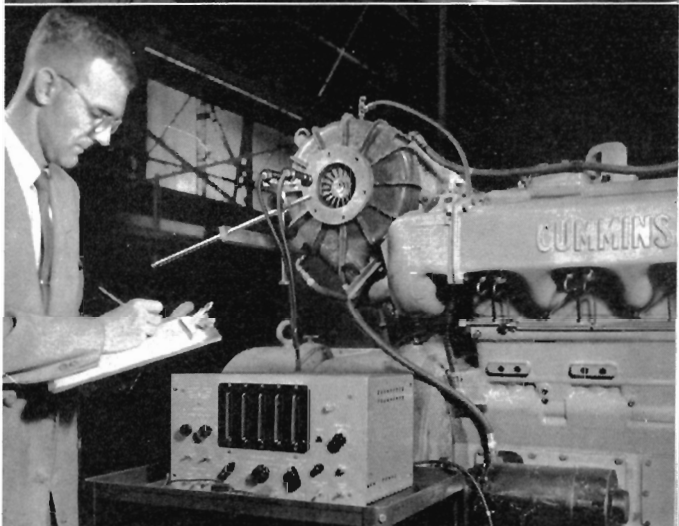
The -hp- Fellowship provides one or two fellowships annually in the Stanford University School of Engin-

earing which are awarded to outstanding engineers doing graduate work in the field of electronic instruments and electronic measuring equipment. The W.C.E.M.A. Scholarships, to which the company contributes, go to college freshmen and sophomores and are essentially confined to physical science students. The Honors Cooperative program provides the opportunity to some of our qualified engineering personnel to obtain a degree at Stanford while employed here.

The Hewlett-Packard wing of the new Stanford University Electronics Research Laboratory serves as another example of the company's helping hand in the electronics world. The timely gift, made through Dave and Bill, provides space for offices, a shop for student use, an instruction laboratory, and reading and conference rooms as well as a student research laboratory and one of the finest lecture rooms of moderate size on the campus.

Thus, Hewlett-Packard, and the place in the world it has reached this Autumn of 1954. The -hp- story is, by every standard, a truly unique and a great story. It is a moving story of the things men and women can do when there is freedom, incentive and a common goal. The people who have brought this about are you—you who have made, and who are -hp-.

-hp-instruments in use . . .



In addition to extensive application in electronics, -hp- test instruments are used more widely each day in industrial manufacturing. Illustrated above are but a few of the ways -hp- instruments serve such companies as Friden Calculating Machine Co., Inc., Ford Motor Company, Cummins Engine Company, Twin Disc Clutch Company and United State government research facilities.