May 1965

Measure

In this issue

Those curious, creative industrial designers

THE HP INDUSTRIAL DESIGNER is an elusive fellow to describe. He is an artist . . . and yet he is more than that. He is "mechanically minded" and has a good general understanding of a multitude of engineering problems. He knows manufacturing procedures, materials, and he is cognizant of the needs of the HP people who sell to customers. He must, in short, be a man of many talents because he serves many masters.

□ As Industrial Design Manager Al Inhelder puts it, HP industrial designers are "curious and creative." A natural curiosity is necessary because the designer must study hard to find the why and how of any material, component, or instrument he is asked to work with. He then applies this knowledge creatively to develop practical design solutions to problems.

The central industrial design department at Palo Alto is staffed with nine men. In addition, there are six designers attached to divisions—two with Microwave and one each with Dymec, Colorado Springs, Sanborn, and Moseley. The central group works on corporate projects, coordinates the design efforts of the divisional designers, and provides a complete service for the divisions which have no designers.

□ At least fifty major projects are handled by central industrial design each year and approximately that many by the designers associated with divisions. These can range from new cabinet concepts for instruments . . . to new jewelry for service awards. They can last for weeks, months, or sometimes a year or two, depending on their complexity. Often one man carries a project from start to finish, but when the occasion demands, several HP designers may pitch in.

Before drawings for a new product are finalized, the designers sometimes have HP model-shop people construct a prototype such as this.

A design project normally starts with library research and conferences with engineers.

THE COVER

Human engineering is a vital part of product design work. Jack King is shown performing a tactile test to determine optimum size and "feel" for an instrument front panel knob.

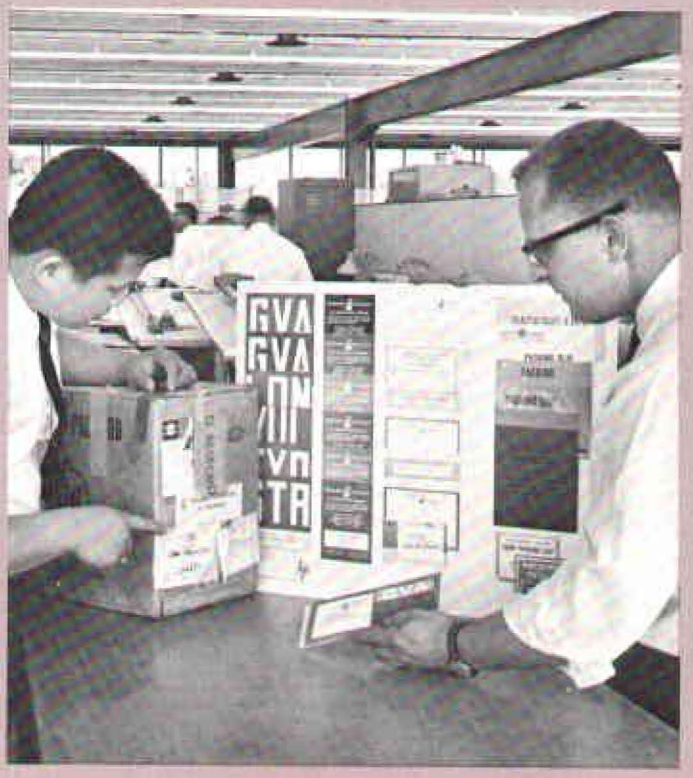
Typically, the designer is working on three or four totally unrelated projects at one time—a situation requiring organized work habits.

A project may originate with a field engineer who gets a suggestion from a customer, or it may be generated from within the department or other segments of the corporation. Once the need for a design effort is established, the project gets underway with an intensive study. If the project involves a product, the men assigned to it read related technical literature, investigate competitive products, and confer with company engineers to make certain they understand the function of the system, instrument, or component.

They want to know where and how the product is to be used . . . who will use it and what are its operator requirements. In short, they seek any information which will help define the problem.

Next they turn to the drawing board, where they will make three or four rough layouts or perspective drawings to illustrate solutions to the problem at hand. In the case of major assignments, the designers will often render full-color chalk drawings to serve as an economical method of depicting what the proposed product would look like.

These drawings are reviewed carefully by the people most concerned with the product in research and development, manufacturing, and marketing. Their combined suggestions are worked into a new set of engineering drawings, and from these a mock-up or prototype is created. The designers make mock-ups from a variety of materials, but most often they use clay or cardboard. They are remarkably skilled at making their models look like finished products.



A program to organize graphics on packages is being developed. Here Roger Lee points to package after shipment. Al Inhelder displays printed materials attached to packages in various parts of the world. The envelope he holds would gather shipping papers and certain stickers in one spot.

Designers study materials. Laurance Plaskan gets printing information from paper salesman.

After designer formulates idea to solve a problem, he often makes color illustration.

Finished engineering drawings by Kail Peterson (right) are checked by Dick Payne.

(continued from page 3)

Prototypes—or working models—are made from the materials specified for the finished product. This requires that they be fabricated by people in one of HP's model shops. In general, a prototype is made when a project is particularly complicated. After it has been evaluated and modified, final drawings are produced and the new product is ready to be adapted for manufacturing.

☐ The company's industrial designers have made many important contributions to electronic instrument design—both from the standpoint of beauty and performance. They have taken instruments out of the black box class, giving them a pleasing appearance while engineering them better for operator performance. The development of modular units was of particular significance, as was the standardization of front panel designs.

Perhaps the biggest undertaking at present involves, as Inhelder describes it, "a company-wide product identification program." This includes a new trademark for HP products and a manual which will guide divisions in the use of the trademark.

☐ Related to this is a nearly completed project to standardize the uses of labels, stickers, trademarks, and whatnot on all shipping containers. Inhelder's group has made a lengthy study of what happens to HP packages shipped from various parts of the world, and the results are amazing if not appalling. A package more often than not leaves the plant looking neat enough but arrives at its destination plastered with a great variety of little pieces of paper. The HP industrial designers have worked out a system which will "clean up the boxes" and organize most of the required slips of paper in a sturdy plastic envelope on the side of each container.

This particular program is an example of where the industrial designer stresses a thing's workability over its appearance—or as the old saw goes, form follows function. "Aesthetics are important to us," says Inhelder, "but everything we do must be tempered by the practical aspects of the problem." ◁

Don Pahl (left) and Roy Ozaki discuss new product trademark program. Ozaki is assistant department head in Palo Alto.

Component parts are sometimes mocked-up in clay before they reach final stage of design.

Here Rich Hoogner checks a cardboard mock-up of a proposed instrument readout panel.

AROUND THE CIRCUIT . . .

Are we in a ground floor era?

ALL OF US HAVE SEEN COMPANY FORECASTS. In a sense they predict the future of the business in terms of sales, employment, new buildings and equipment, and other such guideposts. Although these figures are important, they don't tell us much about what might be in store for those already on board.

What can you and I expect five years or so hence?

In the assembly area, for example, integrated circuits will be in "style," like the printed circuit board of today. The tiny integrated circuit shown in the illustration can perform all of the functions of the larger printed board. Very probably, the assembly job of the future will be to install many of these small-packaged silicon chips on one circuit board so that the instrument of the future can perform many additional functions, in less space, with greater reliability.

The machinist in the years ahead will be skilled at programming. A large percentage of our fabricating machines will have digital electronic controls, allowing us to make more accurate parts at lower cost. Of the machine tools produced in the U.S. this year, 15 percent will have digital controls. The usage will grow, particularly as integrated circuits develop and are applied to machine tool controls—so machinists, sheet metal men, and tool and die makers will all be programming their jobs on paper before any metal is removed.

Those in testing will also see changes over the next several years. The complicated instruments of the future will do more than just measure electrical phenomena. They will also measure other scientific and medical parameters. In addition, the information will be processed through built-in computers and will provide data to the user in a manner which will eliminate calculations, conversion charts, and even some manual data recording.

A good example of this is Dymec's new thermometer. The instrument has a temperature-sensitive crystal oscillator, a frequency counter, and a digital display unit that indicates the temperature reading to within 1/1000th of a degree in either Centigrade or Fahrenheit scale.

Adjusting and testing units such as this will be the challenge of our test people. Instruments will become systems, and highly sophisticated ones at that.

All of us in the company today are on the ground floor of a period of growth and technological development. Knowledge is advancing rapidly and all of us must continue to study both on and off the job. The advance is so rapid that if we hesitate we can hardly catch up again.

Forecasts indicate that there will be twice as many people in the company by the 1970-75 period. And so, in addition to the new challenges of our individual jobs, we also have the responsibility of training new people. It will be part of your job and mine to teach them, in a few short years, everything that has been learned in the company during the past twenty.

We have plenty to do.

Ralph Lee, Vice President, Corporate Manufacturing

HP Perspective:
Frequency & Time Division

The big division with the small shop spirit

F&T management staff members pose with some representative division products. Left to right: Jack Petrak, manufacturing, with 5245L Counter; Dan Lansdon, engineering, with three new instruments for nuclear measurements; General Manager Al Bagley with a 562A digital recorder; Ed Smith, marketing, with cesium beam standard; and Leo Olsen, accounting, with frequency synthesizer.

"Everybody here is working like he had a small business—and we'd like to keep it that way." Thus Frequency & Time Division Manager Alan Bagley offers one explanation of why his division is first in sales among all HP divisions.

The individual competitive spirit is undoubtedly an important reason for the division's enviable record of growth and profit, but there are other factors to be considered. For one thing, there is a closeness which is unusual for a group this size—nearly 750 people. Good communications seem to have brought about good understanding of the division's objectives, and the figures show pretty clearly that everyone is pulling together.

One other thing that should be mentioned is the fact that the division has been fortunate in being at the right place at the right time with the right people. The first instance of this was in the beginning 1950's—some ten years before Hewlett-Packard formally gave birth to the F&T division. At that time, a handful of ambitious young engineers (headed up by Bagley, who was just out of Stanford) were successful in developing the first electronic counter with digital readout which could exceed 10 mc. There was a growing need in nuclear research and other sciences for just such a high-speed measuring device. The counter was named the 524A, and in spite of this it revolutionized the art of frequency measurement in the following years. It was such a remarkably well-engineered product that today—nearly 15 years later—its great-great grandchild, the 524D, is the second best selling instrument in the entire Hewlett-Packard line.

Engineers in frequency synthesizer section talk over technical problem. Synthesizer development proved one of most extensive projects ever undertaken by HP.

Of Division's nearly 750 people, 500 are employed in various phases of manufacturing. Total working space occupied by F&T in Palo Alto's Stanford complex exceeds 100,000 square feet, or about the size of two football fields.

Marketing people use latest teletype equipment to process orders.

Manufacturing quality plus rigid testing and control have built highest reputation for F&T products. Here test line leader Dave Keller inspects group of 5245 counters being operated under elevated temperatures.

Guess which product is number one in the line? The F&T 5245, of course. This transistorized distant relative of the original counter has a rather interesting story of its own. Instead of being the first transistorized counter to hit the market, it was chronologically one of the last. But it was a superior instrument produced with superior skill by the division's manufacturing people. Soon it was paid the supreme compliment, as other companies tried to copy it.

The frequency synthesizer is one of the more recent victories for the division. It is way ahead in its field and opens new areas for HP in communications and physics. Once more, close cooperation between engineering and manufacturing paid off with resounding success. The synthesizer was one of the most complicated instruments HP ever put into production, but manufacturing from the beginning went smoother than in many lesser projects.

The cesium beam standard (of round-the-world flying clock fame) shows great promise as a means of keeping ultra-precise time. There is a good possibility that the method of synchronizing time by flying the clocks to time centers around the globe will become a commercial service.

As for future plans, the division is determined to hold its position of leadership. To do this, in Bagley's opinion, the division must continue to grow through diversification. The move into nuclear instrumentation is one example of this. These products, such as scintillation detectors, scalers, and scaler timers, will be available for sale in a month or two. They will find use in medical diagnosis, atomic research, metallurgy, and for analyzing archeological finds, to mention just a few of the more diverse applications.

Another major new area for F&T is in the field of integrated circuits which the division will develop and produce. Aside from the fact that these circuits will help reduce the size of instruments—a somewhat minor consideration—they will improve instrument performance and perhaps prove more economical than conventional printed circuits.

Entry into such new areas, says Bagley, means that some of the division's people will be walking on unfamiliar ground for awhile. But that's how the division got started . . . and it's a safe bet that's how it will continue marching ahead.

Two new government, industry roles for Hewlett

Bill Hewlett, HP president, was recently named to serve on an important new government committee and only weeks later was elected to the board of a major manufacturing corporation.

Toward the end of March, President Lyndon Johnson announced the establishment of the General Advisory Committee on Foreign Assistance Programs. The new group will be headed by Dr. James A. Perkins, president of Cornell University, and Hewlett is one of thirteen committee members. In their first meeting at the White House, President Johnson told the members that the government "is in constant need of new ideas and mature judgment from private citizens" to help it devise the most effective and most efficient assistance programs.

On May 3, FMC Corporation of San Jose, California, announced the election of Hewlett to its board of directors. He fills a vacancy created by the death of James Black, former chairman of Pacific Gas and Electric Co.

PEOPLE ON THE MOVE

HP PALO ALTO

George Abbott, supervisor reports and statistics, Palo Alto accounting—to Palo Alto accounting manager.

Pete Grady, Palo Alto billing supervisor, Palo Alto accounting—to supervisor reports and statistics, Palo Alto accounting.

Austin Marx, marketing planning — to office of corporate planning.

Cliff Jones, Western Service Center—to marketing training.

Al Napolitano, finance manager, Sanborn Division—to corporate finance staff.

John Veteran, administrative assistant, corporate operations office—to supervisor, management statistics.

Peggie Webber, cashier, Palo Alto accounting—to corporate cashier.

FREQUENCY & TIME

Ed Hilton, manager, photoconductor engineering and manufacturing, HP Associates—to head of integrated circuit prototype shop, F&T Division.

Ed Smith, sales engineering—to marketing manager, F&T Division.

HP ASSOCIATES

Malcolm Ogle, Huggins Lab staff — to manager, photoconductor engineering and manufacturing, HP Associates.

HP (ENGLAND) LTD.

Mike Heimoz, corporate finance staff—to finance staff, HP Ltd.—Bedford.

INTERNATIONAL OPERATIONS

George Fredrick, engineering manager, Oscilloscope Division—to International Operations staff.

SANBORN

Jack Carlozzi, F&T service manager, Boonton Division—to manager of production assembly methods, Sanborn Division.

George Hoefler, materials engineer, materials engineering—to supervisor, materials receiving and inspection.

Bob Hungate, Palo Alto accounting manager—to finance manager, Sanborn Division.

Vincent Morana, electronic technician, materials engineering—to materials engineer.

John Olivieri, parts sales manager—to materials handling manager.

Stephen Wells, programmer—to manager of data processing.

BOONTON

Jim Barbera, Weston Instruments, Newark, N.J.—to service engineer, Eastern Service Center.

Tony Scozzafava, Vuolo Real Estate & Insurance Agency — to management trainee, Eastern Service Center.

Rudy Thurnes, Thiokol Chemical Corp., Reaction Motors Division—to cost accountant, Boonton Division.

HP (CANADA) LTD.

Tony Johnson, National Research Council, Ottawa—to field engineer, Ottawa office.

Telemetry and command console (foreground) is seen during checkout by Early Bird simulator. Majority of instruments in the simulator (rear) were produced by HP divisions. In addition, a Boonton FM-AM signal generator is used as modulator/transmitter for TV sound channel at Andover.

Word from outer space

AS EARLY BIRD WAS LIFTED FROM THE LAUNCH PAD at Cape Kennedy last month—maneuvering into a near-perfect orbit 22,300 miles above the Atlantic—the public in general and 130,000 Comsat stockholders in particular heaved a sigh of relief.

Understandably, those directly involved shared a sense of accomplishment because this was the first act of a history-making effort to tie the world together by means of commercial communications satellites. Staging an event of such dramatic importance required imagination, creative planning, and long hours of rehearsal.

The planning stages began three years ago when Congress authorized the creation of the Communications Satellite Corporation to operate as a private entity. At the time, Comsat's purpose was simple to state, but seemingly overwhelming in concept. The organization was dedicated to setting up a commercial communications system using space satellites to relay telephone and teletype messages, computer data, and television signals around the globe.

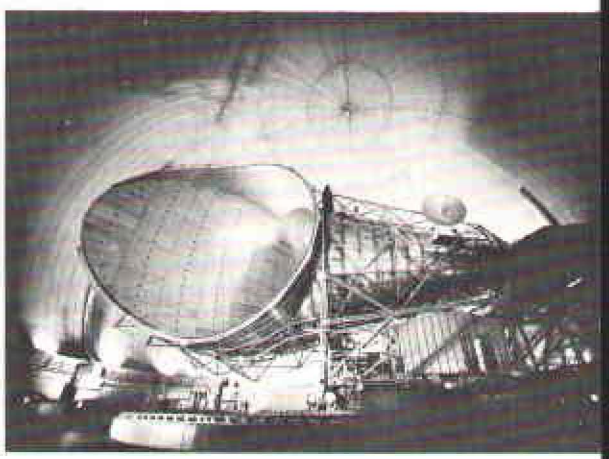
The first satellite planned for launching was appropriately named Early Bird. It would be a synchronous type, which meant that its orbital position in relation to the earth would remain the same. Other Comsat satellites, perhaps of different types, would follow, but Early Bird would be the first to provide a commercial communications link between North America and Europe.

After months of hard work, the Early Bird project was ready for dress rehearsal. At this point, Hewlett-Packard played an indispensable role by providing an array of instruments assembled to serve as a satellite simulator.

The simulator was a system of instruments which performed at ground level many of the functions of the satellite in orbit. It was used to check out Early Bird's North American communications terminal and ground station at Andover, Maine. Included in the system were two Hewlett-Packard UHF signal generators, a Boonton FM-AM signal generator, a Dymec oscillator synchronizer . . . and HP microwave frequency converters, counters, a power meter, and a vacuum tube voltmeter.

With the preliminaries completed, Early Bird was launched into space where it remains permanently perched above the world, signalling a new era in global communications. ◁

The Early Bird satellite (above), built by Hughes Aircraft, is powered by 6,000 solar cells. The giant horn reflector (below) at A.T. & T.'s Andover ground station is tremendously sensitive to satellite signals.



(Photo courtesy A.T. & T.)

New Paeco plant underway

Construction of a new 44,000-square-foot plant to house the Paeco manufacturing facility was begun earlier this month on a 3¼-acre site in Stanford Industrial Park, Palo Alto. The $739,290 construction contract was awarded to Williams & Burrows, Inc., of Belmont, Calif.

In addition to Paeco, the building will house the Frequency & Time Division's printed circuit operation. Paeco is currently sharing a building with HP Associates on Page Mill Road in Stanford Industrial Park. Completion is scheduled for October 15.

Eastern international office

The company has announced that it will open an East Coast International Operations Office on September 1. Located at the Boonton Division facility in Rockaway, N.J., the new office will provide a commercial service function including order processing and shipping coordination for European markets.

Details for the office were completed late last month when John Beyers, Palo Alto international traffic manager, and Warren Hoffman, commercial manager of HPSA, Geneva, held meetings with representatives from the Department of Commerce, air freight forwarders, and with individuals from major air carriers.

The speed and efficiency of the HP domestic TWX order processing system will be combined with jet transportation to provide additional service in the delivery of instruments to European sales offices.

Latest fund matching amount

A total of $10, 810.65 was sent to 74 colleges and universities by Hewlett-Packard last month to match the school donations of 185 employees since November, 1964. This brings the grand total of company donations to nearly $84,000 since the funds-matching program was started in 1955. Over 80 schools have benefited during that time.

In the funds-matching program, Hewlett-Packard offers to match any gift, up to $500 a year, which an employee may wish to give to a four-year accredited college or university.

Oliver addresses Soviet group

Six distinguished IEEE scientists and engineers from the United States have just completed a meeting in Moscow with the Russian Popov Society. Barney Oliver, HP's vice president of Research & Development, and current president of IEEE, was among the American contingent and addressed the entire assembly on May 15, the last day of the convention.

Dr. Oliver spoke on "Ideologies Versus Ideas in Human Progress," a discussion making note of the common grounds of scientific thought between the two nations and the changing nature of political ideologies. Four other members of the American group presented scientific papers.

The invitation to visit Russia came as the result of an American invitation to Popov Society members to attend the IEEE convention in New York last March. Seven Russians were in that group. The Popov Society is somewhat similar to the former Institute of Radio Engineers, with emphasis on radio communications and electronics.

Medical instruments are displayed at shows in Mexico and Peru

Hewlett-Packard Inter-Americas recently completed its maiden voyage in the art of product exhibits with displays in Mexico City, Mexico, and Lima, Peru.

The Mexico City display of Sanborn instruments was held late last fall in conjunction with the 8th International Congress on Diseases of the Chest sponsored by the American College of Chest Physicians and attended by 2,000 medical men. The opening address was by Mexican President Lopez Mateos.

HP's medical sales representative firm in Mexico, Equipo Para Hospitales, designed and manned the booth along with Tom Christiansen and Tom Breitbart from HPIA, Palo Alto.

The Lima exhibit was held this spring in connection with the Peruvian Cardiological Congress. Federico Wakeham of the H. W. Kessel firm, which distributes HP medical products in Peru, is shown at left in earnest discussion at the booth. Tony Malo, HPIA, Palo Alto, helped with this product showing, in addition to Christiansen.

from the chairman's desk

ONE OF OUR BASIC COMPANY OBJECTIVES is to provide the opportunity for HP people to share in the company's success. Down through the years we have implemented this policy with various benefit programs, including our retirement plan and our cash profit sharing plan.

With the rapid expansion of our company in recent years, it is important that we continually review these programs to make sure that they are applied equitably and with benefit to all our people. This is not a simple matter because we have transferred people and products to other locations such as Colorado, to Europe, and to companies such as Sanborn. These actions have a direct effect on profit sharing plans because they arbitrarily affect the activities where profit is generated. In addition, many of the companies which have joined us have their own benefit program which must be considered when changes are made.

Our ultimate goal is twofold. First, is to encourage the most efficient performance for the company as a whole, for a successful and profitable company will make possible the largest benefits and the greatest security for us all. We think it is important to encourage complete cooperation among all units of the company. It is the old story—in unity there is strength. The second goal is to have everyone in the HP family participate fairly and equitably in the success which they helped to make possible.

An important step in this direction was taken over a year ago when we extended the HP retirement program to all divisions and subsidiaries in the United States.

We are now broadening our cash profit sharing plan, with gradual extension to all of our U.S. manufacturing divisions. This plan, which has been in effect in Palo Alto and in our Colorado divisions, provides a semiannual cash payment to our people. The amount of the payment is based on a formula tied directly to our profits for the preceding six-month period.

Effective November, 1964, the beginning of our current fiscal year, we added Sanborn and Boonton personnel to our cash profit sharing plan. This month we expect to extend the plan to Moseley, Delcon, and Mechrolab personnel. Datamec and F&M are expected to be included shortly after the acquisition proceedings become final.

By putting our cash profit sharing on a broader corporate basis, we are assuring a more equitable and a more efficient arrangement among our various divisions, enabling more people through internal cooperation to have a stake in the continuing growth and progress of our company. It is always a problem, especially in a large and complex organization such as ours, to equalize these things and to be fair to everyone, but the objective of sharing in success is basic to our personnel relationships.

As I mentioned in the March issue, all signs point to a steady expansion of our markets, our facilities, and our opportunities. We expect everyone associated with the Hewlett-Packard organization to contribute to this progress. At the same time we want all of you to attain satisfaction from your accomplishments, and to benefit from the company's continuing growth and success.

David Packard

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Measure

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"I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind . . ."
LORD KELVIN (1824-1907)

Do, Re, Mi goes electronic

THERE ARE STRANGE SOUNDS emanating from a laboratory at Colorado College these days, and they very well may signal the advent of a new musical system. Carlton Gamer (left) professor of music, and Robert Phelps, a physics junior at the college in Colorado Springs, are developing an electronic musical "organ" with a 19-tone scale instead of the conventional 12. The results are eerie but pleasing, and permit musical compositions of greater flexibility and subtlety than formerly possible. When each key of the organ is pressed, it closes a circuit that produces a tone on a sine wave oscillator. This tone is amplified and heard through a speaker. Gamer and Phelps are using several HP instruments in operating the organ and keeping it in perfect pitch.