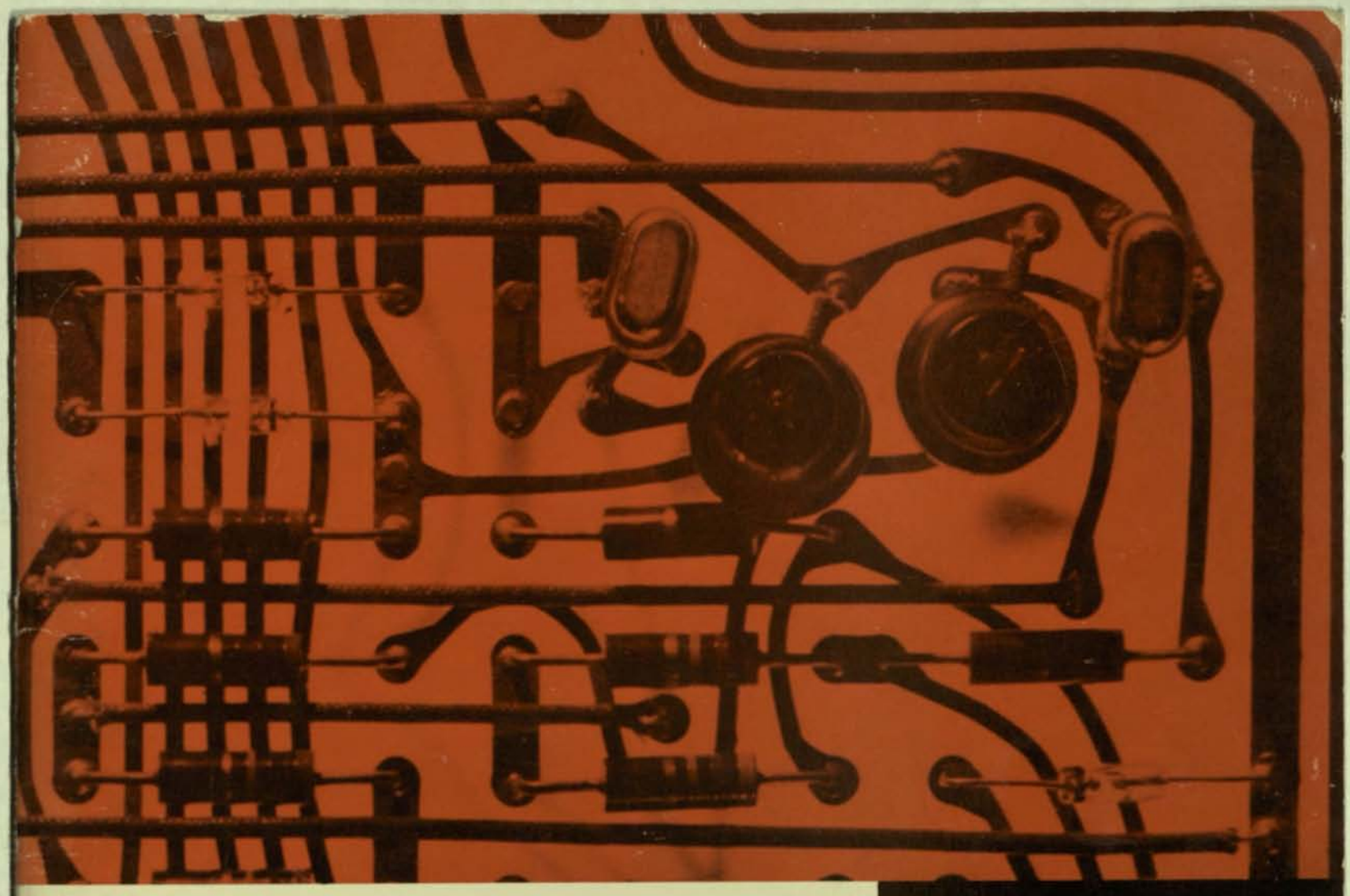
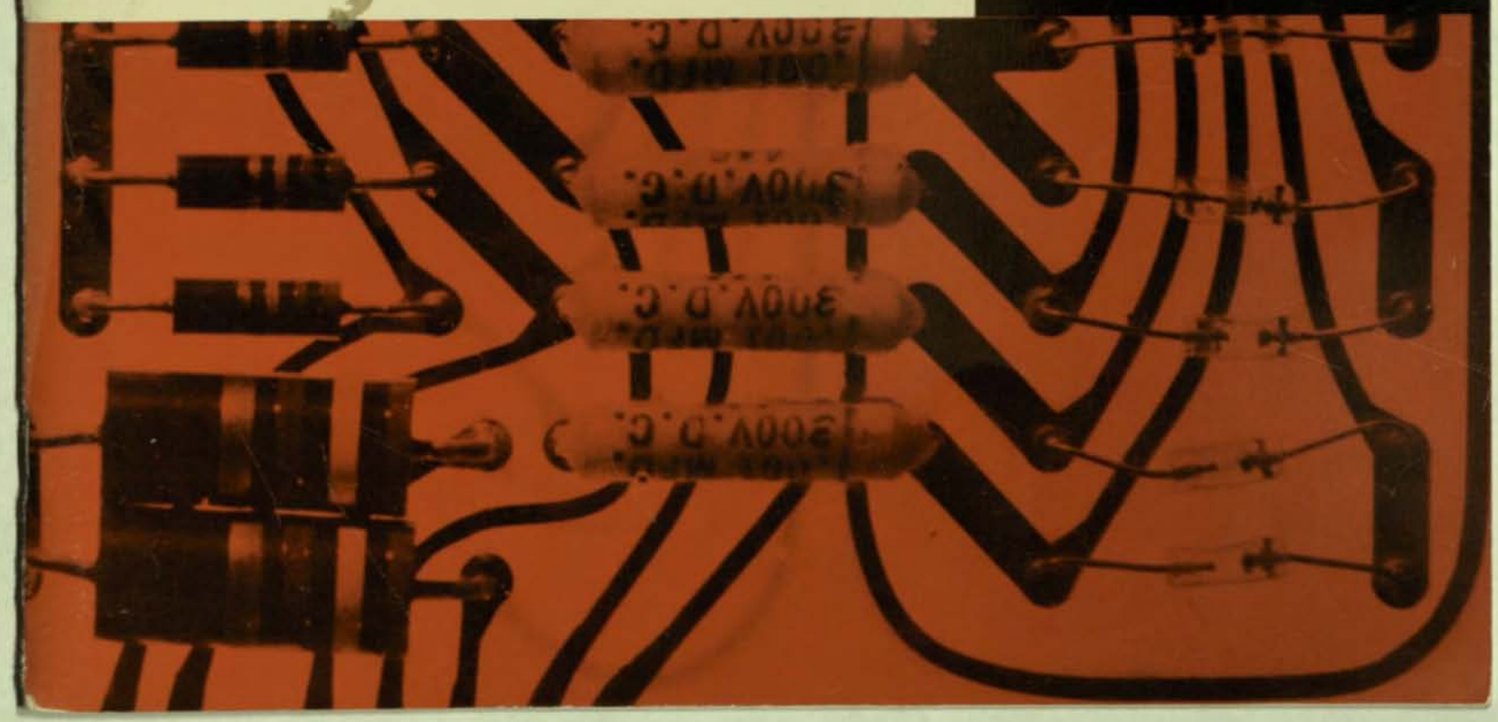


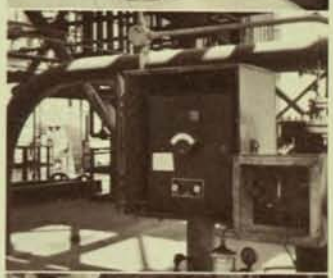
Beckman / *Instruments, Inc.*

INSTRUMENTATION
ELECTRONICS



SYSTEMS

COMPUTERS



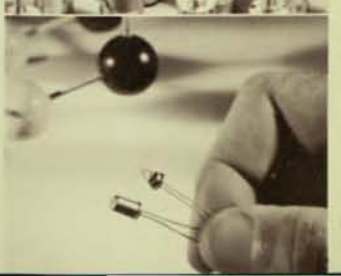
PROCESS INSTRUMENTS

LABORATORY INSTRUMENTS

MEDICAL/CLINICAL INSTRUMENTS

ELECTRONIC TEST INSTRUMENTS

COMPONENTS



SEMICONDUCTORS

## *The language of the electron*

Elusive, sensitive, infinitely variable... the electrical impulse is capable far beyond human mind and patience of sensing, measuring, analyzing, recording, remembering and controlling. It can extend knowledge — reduce drudgery — increase accuracy — improve quality — save time, money and effort.

The Beckman organization has been making important contributions to the technology and practical use of electronics since 1935. Beckman components, instruments and systems are rendering important service to science, industry, education and the military — today. The physical and human resources of Beckman Instruments, Inc., are devoted to even better understanding and use of this "language of the electron" — in the years ahead.

Beckman

## PORTRAIT OF A COMPANY

*... committed to progress in the fields of instrumentation electronics.*



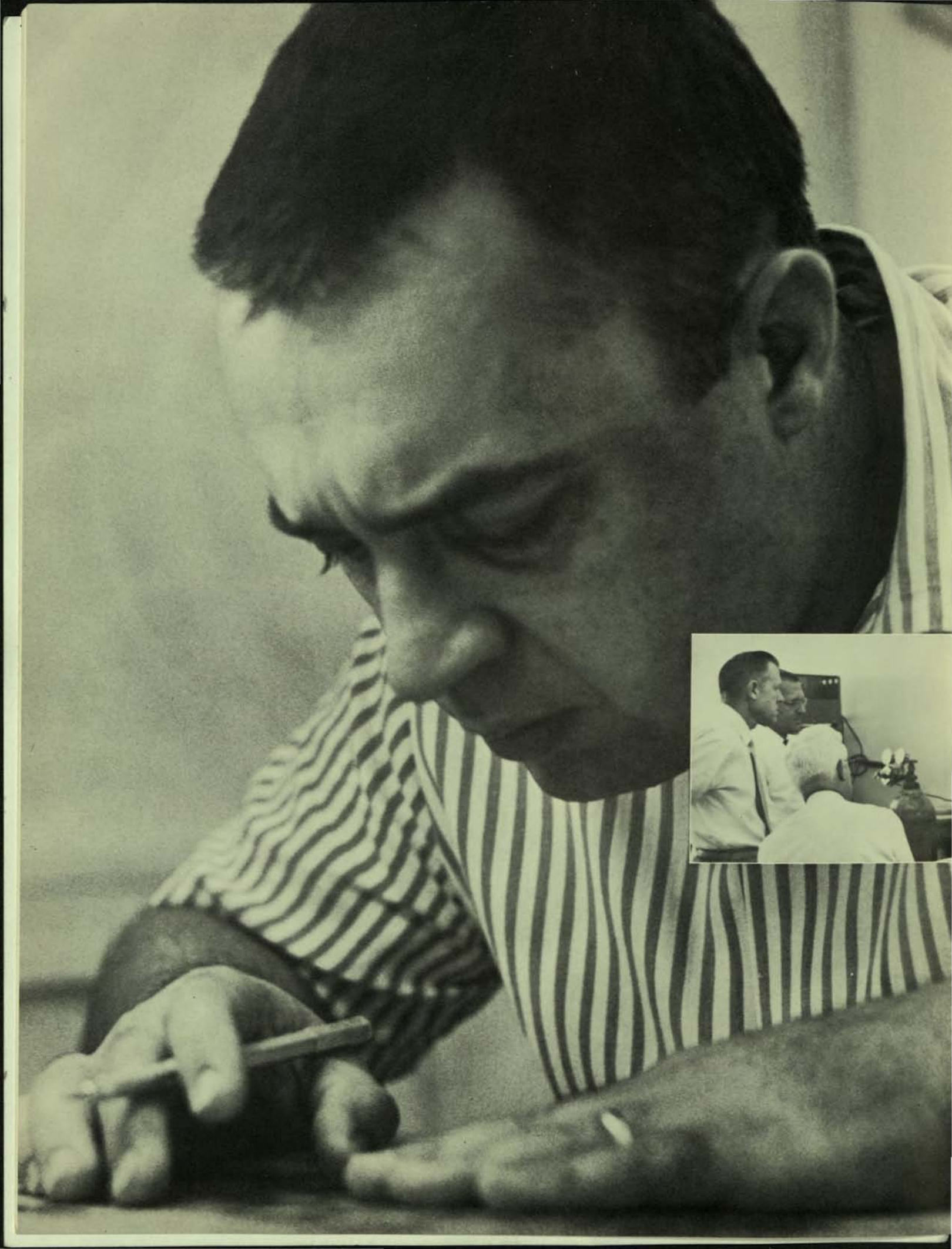
Beckman

## PRODUCTS AND SERVICES

*... solving problems, cutting costs, improving quality ... around the world.*



Beckman



# **PEOPLE** . . . *with skills*

Man-power and brain-power are the most important assets of any company in today's fast-moving technology. Beckman has established a record of developing, attracting and keeping men of outstanding ability in the scientific and technical fields. Of the total staff of more than 3,000, about twelve per cent are engineers, many with advanced degrees. They represent many fields of specialized knowledge and experience (see the list below). In addition, approximately 500 are skilled craftsmen, representing a wide variety of trades (see below).
The turnover rate among all Beckman personnel is among the lowest in the electronics industry. Why? Careful screening and selection, of course. But even more, because people are important at Beckman. They are busy, well paid. They have opportunities to think, create and advance. They are stimulated by accomplishment.

**THE SKILLS WHICH COMPRISE BECKMAN INSTRUMENTS**

**Scientific Fields:**
ASTRONOMY
BIOLOGY
CHEMISTRY
- Industrial chemistry
- Biochemistry
- Organic chemistry
- Physical chemistry

MATHEMATICS
MEDICINE
METALLURGY
PHYSICS
- Solid-state
- Nuclear

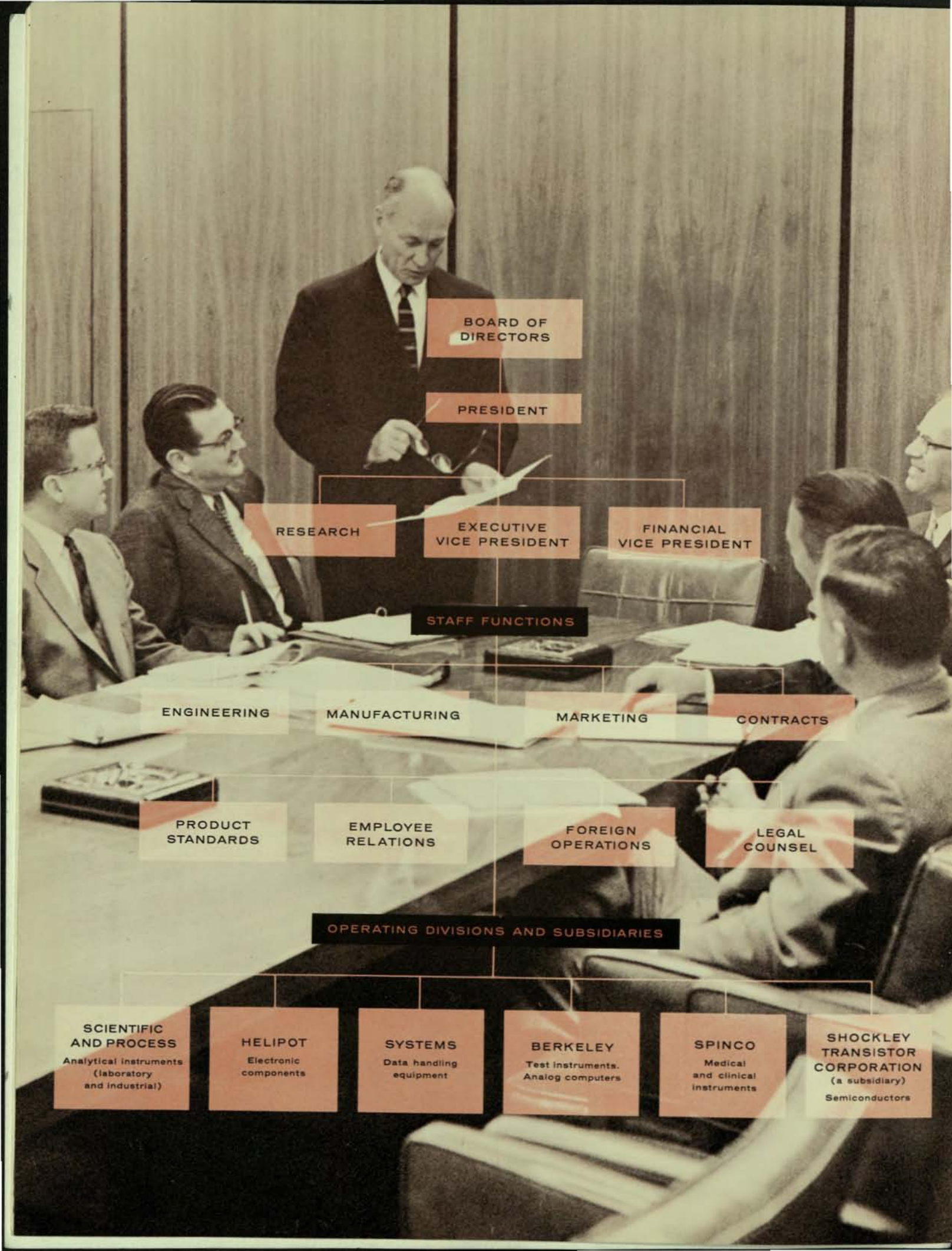
**Engineering Fields:**
CHEMICAL
ELECTRICAL
ELECTRONIC
INDUSTRIAL
MECHANICAL

**Special Technologies:**
CENTRIFUGATION
CERAMICS
CIRCUITRY
COMMUNICATIONS
CHROMATOGRAPHY
COMPUTERS
- Analog
- Digital

CRYSTAL GROWING
DESICCATION
DIP SOLDERING
ELECTRON MICROSCOPY
ELECTROPHORESIS
FLAME PHOTOMETRY
GLASS CHEMISTRY
INDUSTRIAL DESIGN
ILLUMINATION
MAGNETICS
MASS SPECTROMETRY
MICROWAVE
MICROWELDING
OPTICS
pH
PHOTOMETRY
PLASTICS
PLATING
PRINTED CIRCUITRY
RADAR
SERVOMECHANISMS
SOLID-STATE CIRCUITRY
SPECTROSCOPY
- Ultraviolet
- Infrared

SYSTEMS DESIGN
TECHNICAL WRITING
TITRATION
VACUUM
X-RAY

**Skilled Trades:**
CRYSTAL GRINDING
DRAFTING
ENGRAVING
GLASS BLOWING
MACHINING
MODEL BUILDING
MOLDING
PLATING
SHEET METAL WORK
WELDING


BOARD OF DIRECTORS
PRESIDENT
RESEARCH
EXECUTIVE VICE PRESIDENT
FINANCIAL VICE PRESIDENT
STAFF FUNCTIONS
ENGINEERING
MANUFACTURING
MARKETING
CONTRACTS
PRODUCT STANDARDS
EMPLOYEE RELATIONS
FOREIGN OPERATIONS
LEGAL COUNSEL
OPERATING DIVISIONS AND SUBSIDIARIES
SCIENTIFIC AND PROCESS
Analytical instruments (laboratory and industrial)
HELIPOT
Electronic components
SYSTEMS
Data handling equipment
BERKELEY
Test instruments. Analog computers
SPINCO
Medical and clinical instruments
SHOCKLEY TRANSISTOR CORPORATION
(a subsidiary)
Semiconductors

## ORGANIZATION ... *geared for action*

Through its six operating divisions and subsidiaries and a strong corporate staff, Beckman Instruments, Inc., is geared for action... either in specialized fields or on broad fronts requiring many different technologies and many different kinds of equipment. Each operating division and subsidiary is responsible for manufacturing and marketing specific products. The corporate staff is responsible, on a company-wide basis, for the key functions shown on the accompanying organization chart. Committees on management, research-and-engineering, and operations assure both flexibility and co-ordination of the activities, facilities and man-power of the entire company. Dr. Arnold O. Beckman, president, founded the company in 1934 to produce the first commercial pH meter. It has enjoyed a steady and solid growth through both the development of important new products and the acquisition of other companies. Beckman has been listed on the New York Stock Exchange since 1955 and has successfully attracted the funds needed for its rapid expansion in recent years. There are now more than 5,600 individual stockholders, represented by an able board of directors and a capable management staff.

**THE CORPORATE STAFF** meets weekly at Fullerton headquarters to co-ordinate and give direction to the activities of the six operating divisions and subsidiaries. Dr. A. O. Beckman, president, is shown at head of table, left, Robert Erickson, executive vice president, right.

# **FACILITIES** . . . *for volume production*

Beckman plants in the U.S. and abroad provide approximately 700,000 square feet of area, more than two-thirds company owned. More important than footage are these facts on how the space is used: for research, 20 per cent; basic fabricating and processing, 20 per cent; assembly, 25 per cent; storage, 10 per cent; office, 25 per cent. Beckman production, assembly and testing facilities are among the finest in the electronics industry... and are constantly being improved and expanded. Here are some of the processes performed in company plants: precision machining—optical grinding—glass blowing—microscopic welding—ultrasonic cleaning—plastics extrusion and molding—ceramic compounding and fabricating—vacuum encapsulation and vacuum impregnation—plating and anodizing—automatic coil winding—controlled-atmosphere assembly. Special methods and equipment have been developed by Beckman for many of these operations to assure compliance with rigid standards. The company fabricates a high proportion of critical parts internally, to control quality and to meet delivery schedules.

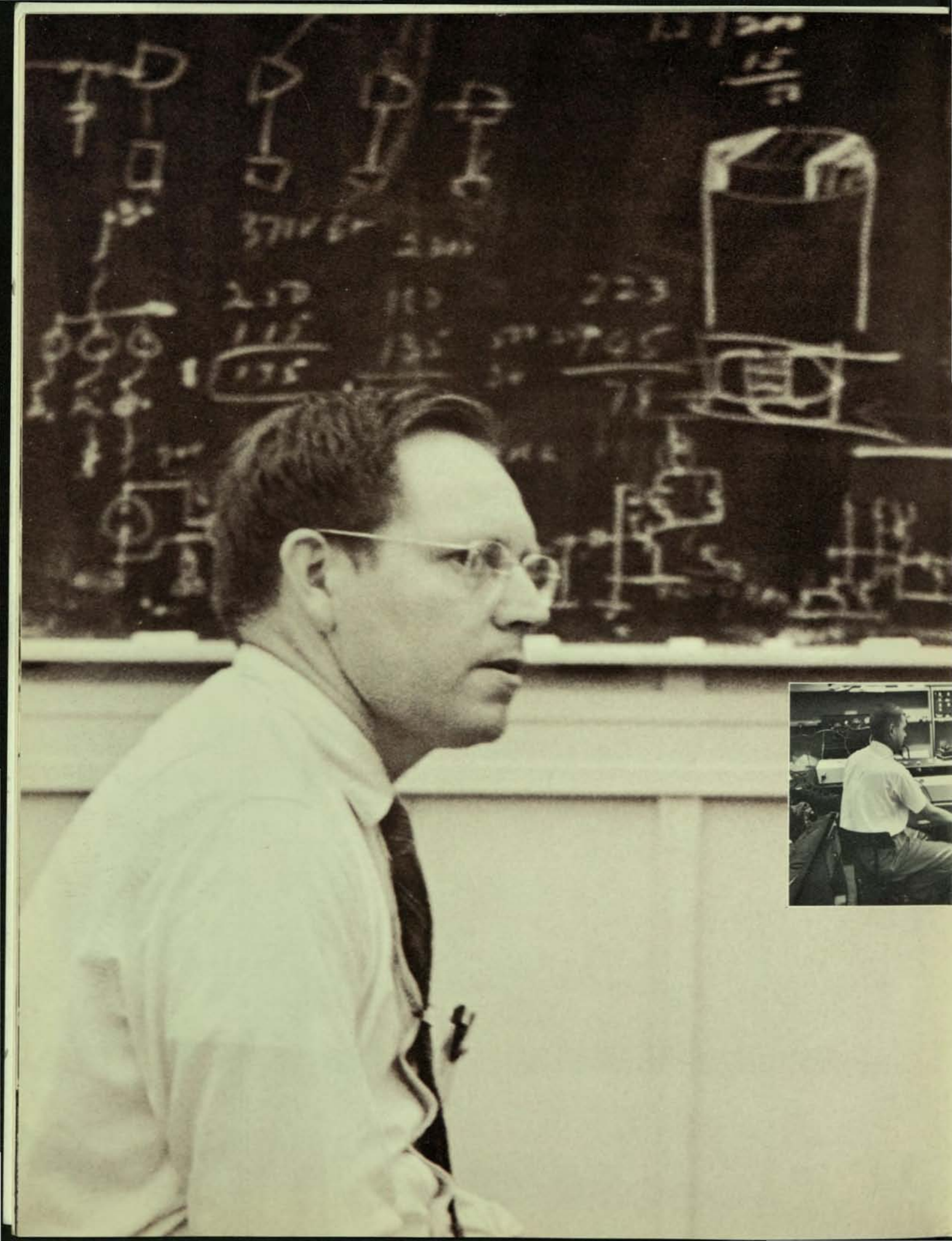
**THE HOME PLANT,** Fullerton, California, is located on a 57 acre tract amid orange groves. Provides 328,000 square feet of efficient, modern plant and office space – with room to grow.

**1. ASSEMBLY AND INSPECTION** areas, like this one at the Berkeley Division, occupy 25% of Beckman's total plant space.

**2. OPTICAL FACILITIES** are among the finest in the nation. Optics is one of the many basic manufacturing processes performed internally at Beckman plants.

**3. PRODUCTION LINE ASSEMBLY** of potentiometers, utilizing conveyor belt, is characteristic of Beckman's progressive manufacturing methods.

**4. MACHINE SHOPS** at all principal plants turn out models and prototypes – in addition to a major portion of production needs.



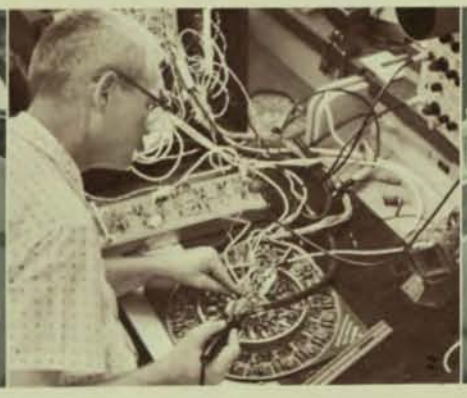
# **RESEARCH** ... *for the new, the better*

Through orderly searching, testing and evaluating... Beckman scientists and engineers have scored a significant number of commercial "firsts": the pH meter—quartz spectrophotometer—infrared spectrophotometer—oxygen analyzer—ultracentrifuge—high speed EPUT (events-per-unit-time) meter—4-layer transistor diode—fully transistorized data processing system. These and other Beckman developments have made important contributions to medical research—automatic monitoring and control of plants—design of aircraft, missiles and vehicles for outer space—air pollution control—atomic power development.

Such a record is not a coincidence. It is planned. Beckman regularly invests 10 per cent or more of its gross revenue in research.

Twenty per cent of the total plant area and 90 per cent of the company's professional personnel are devoted to research and development.

Dr. Beckman, president, personally heads the corporate research committee. Research and development contracts are undertaken for private industry, government and the armed forces, with facilities and personnel ideally qualified to pursue investigations into advanced electronic phenomena and applications.



**1. CHECKING, CHECKING, CHECKING,** at every step, assures that the finished model will meet or exceed all exacting requirements.

**2. RELIABLE CIRCUITRY** is developed by thorough experimenting in the pilot model stage.

**3. TRIAL RUNS** in the laboratory confirm the accuracy and reliability of Beckman equipment.

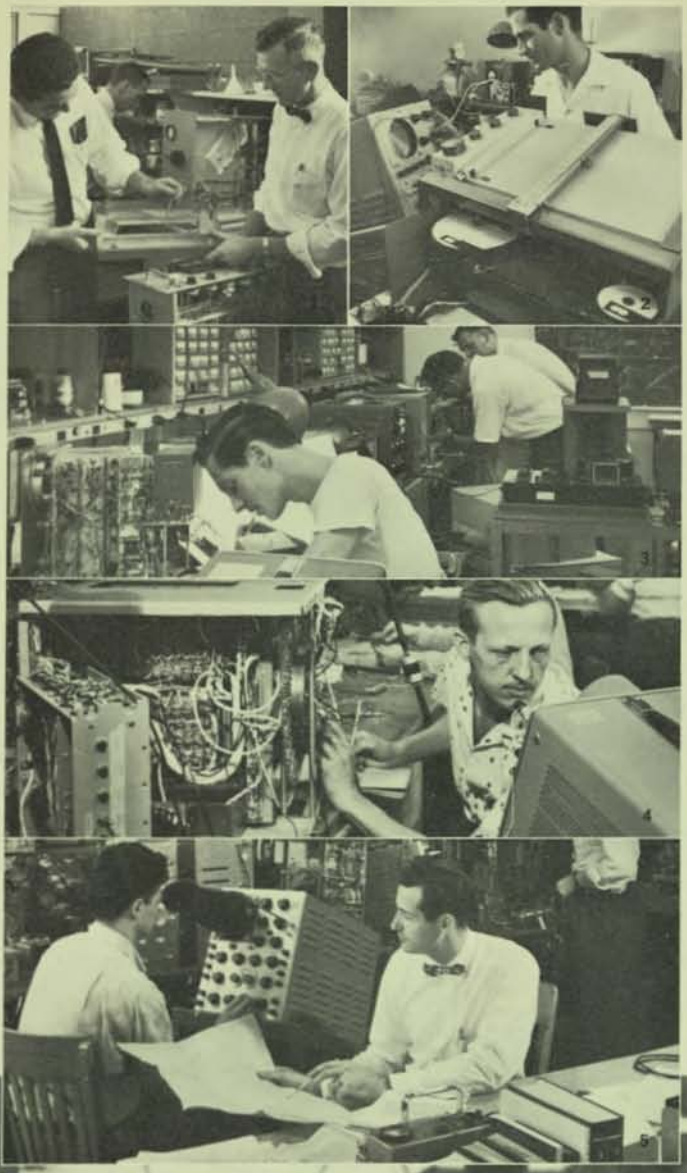
**4. RELENTLESS ENVIRONMENTAL CHAMBER** gives a positive "yes" or "no" to the question of meeting rigid military specs.

**PICTURE OF PROGRESS...HAPPENING:** Beckman scientists and engineers think and work their way through a problem, to a solution.

## **ENGINEERING** ... *for reliability and value*

Converting the discoveries of research into reliable components, instruments and systems is the job of Beckman design and production engineers, headed by a corporate Director of Engineering. They have built Beckman's reputation for producing equipment that is rugged, dependable, good looking, easy to use and maintain... and reasonable in cost. They have devised special tooling for such processes as coil-winding, microscopic welding, lens and prism grinding. They have successfully applied the principles and economies of mass production and assembly to the precision electronics field, at the same time actually increasing standards of quality. They have brought the beauty and utility of modern industrial design to a field where appearance and practical convenience were frequently ignored. The Beckman engineering staff adapts the concepts and discoveries of the company's own research to commercially useful and feasible products. It also performs custom engineering services for other companies, and for government and military agencies. Product design and production engineering are frequently part of contracts undertaken by Beckman on new electronic developments.

**INSTRUMENTS TAKE SHAPE** on the drawing boards of the engineering departments which convert design concepts into dependable production models.



1. **INDUSTRIAL DESIGNERS** assure that the instrument is good-looking, functional, easy to use.

2. **PROTOTYPE MODELS** are built and rebuilt to work out the "bugs" before going into production.

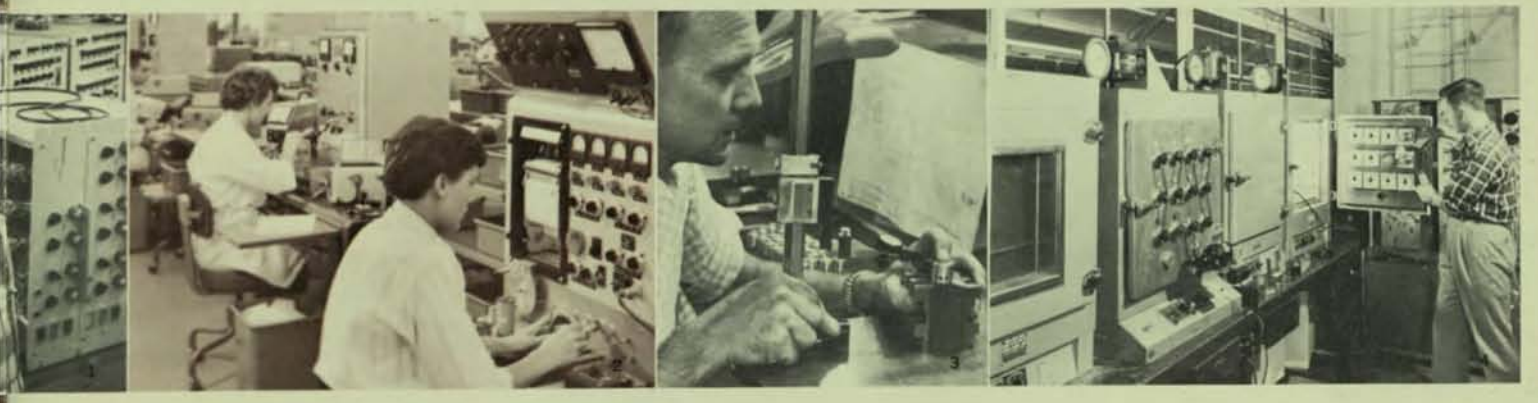
3. **CIRCUITRY IS PUT TOGETHER** and checked out, step by step, in an experimental model section.

4. **CUSTOM MODIFICATION** of standard instruments is a routine engineering service at Beckman.

5. **DEVELOPMENT CONTRACTS** for special equipment are assigned to project engineering groups.

## **TESTING** . . . *for assured quality*

Thorough testing at every stage of design, engineering and manufacture assures the dependability of Beckman products. Before a new design is released for volume production, it is field-tested under actual operating conditions. Standard parts and instruments are subjected to the most rigid inspection procedures before approval for shipment.
Custom designed equipment, or equipment modified to meet specific customer needs, undergoes exhaustive trial runs. Beckman maintains environmental test laboratories to simulate extremes of temperature, humidity, salt spray, vibration, shock, acceleration and altitude to applicable military specifications. The company's own government-certified standards laboratory insures strict adherence to electrical and mechanical standards. Certified test reports are available on items of critical tolerances. Every precaution is taken to be sure that Beckman equipment meets or exceeds the most demanding specifications of both private industry and the armed services. Beckman products, giving reliable service throughout the world for many years, are the most eloquent testimony to their rugged dependability, accuracy and long life.



**1. RIGOROUS PERFORMANCE TESTS** are given these high speed timing units for a missile checkout system.

**2. 'POTS' PUT THROUGH PACES** at these intricate test stands are sure to perform up to specification.

**3. INCOMING INSPECTION** of all parts and materials is the first of many quality control steps.

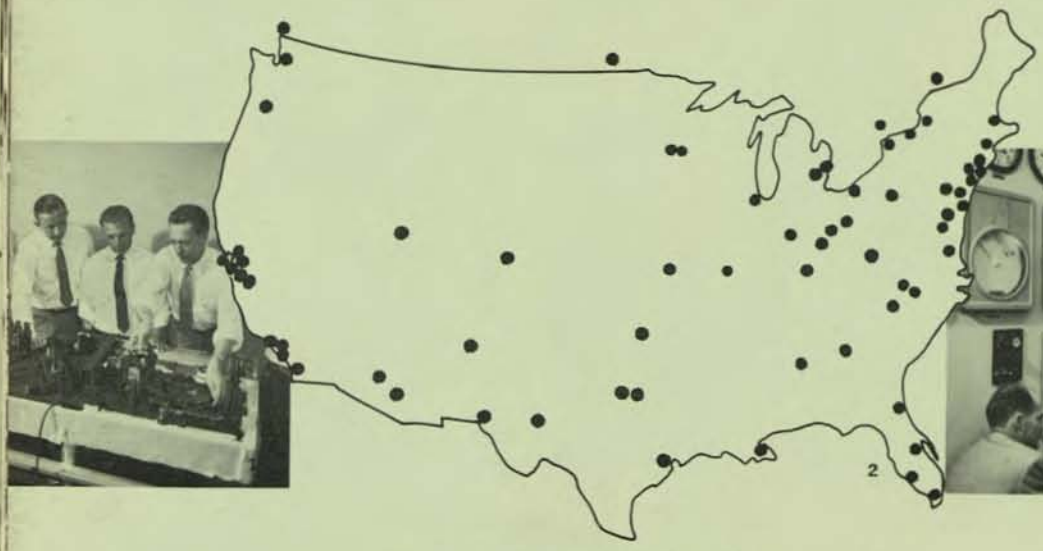
**4. IN ENVIRONMENTAL TEST LABS,** Beckman products are subjected to extremes of heat, cold, shock, altitude, pressure, etc., to assure reliable performance under the most demanding conditions.

**100% INSPECTION** is a common procedure, due to the critical tolerances of Beckman equipment.

# FIELD SERVICES...*to meet customer needs—fast*

Prompt, on-the-spot service to customers by qualified field personnel has always been a basic precept at Beckman. Nearly 100 highly trained company sales and service men cover every part of the country, supplementing a network of more than 90 locations of Beckman dealers and representatives. It is literally true that "there is a Beckman representative near you." The company maintains three regional parts and service branches and numerous local branches in principal industrial areas. Certain dealers and representatives maintain service facilities and parts inventory. Their personnel receive the same thorough factory-training as company field men. Under the corporate Director of Foreign Operations, there are trained sales and service representatives in 53 foreign nations. Customer field services include: assistance in design and application; installation; training; parts and repairs. This genuine concern with product performance and customer satisfaction—after the sale—is a key factor in the company's growth. It is also a continuing source of valuable information resulting in new and improved products and services.





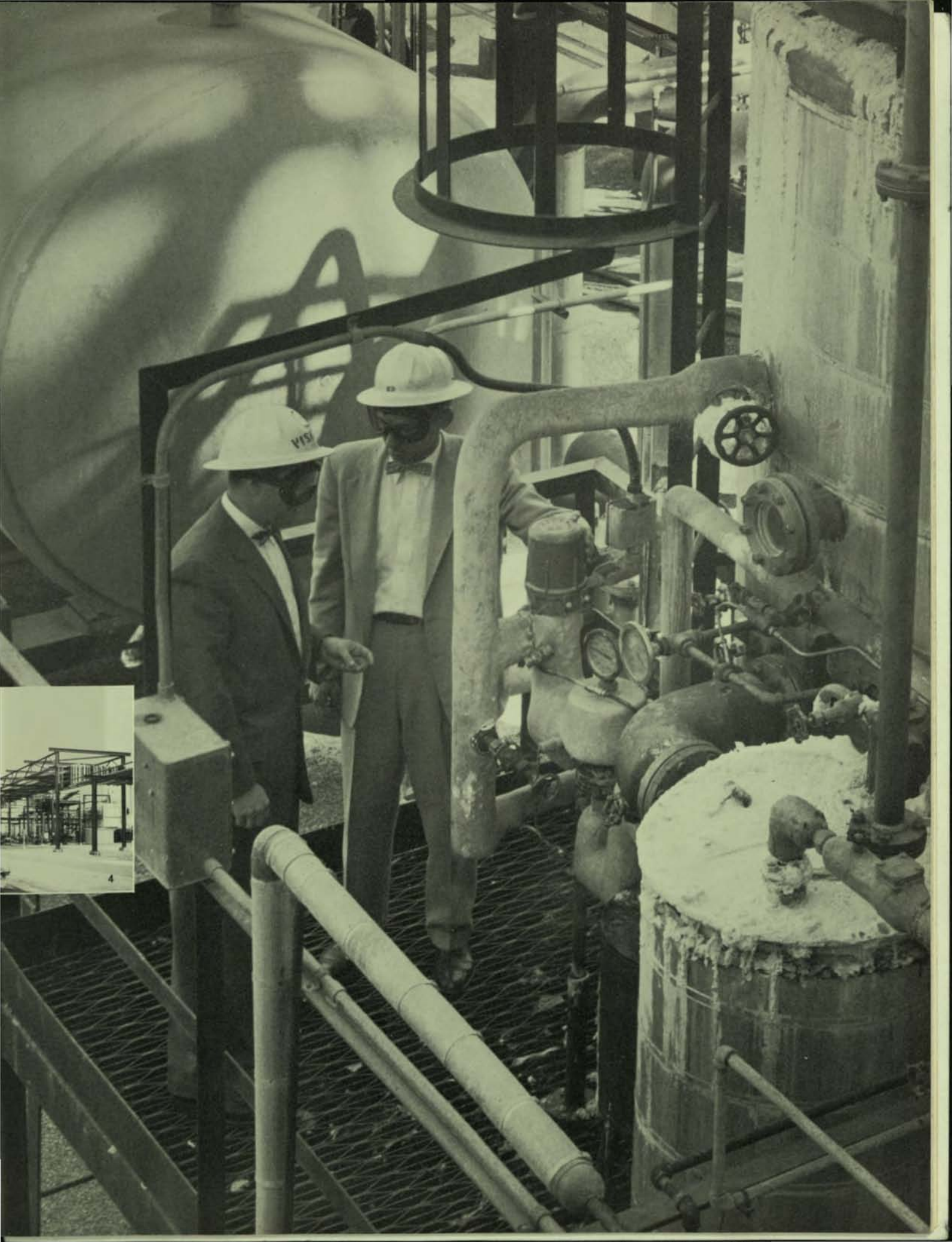
**1. TRAINING SESSIONS** are conducted for company, dealer and customer personnel to assure proper operation and maintenance of instruments.

**2. LOCAL SALES AND SERVICE OFFICES** are situated in all principal cities of the U.S. (see map) and in 53 foreign countries.

**3. KEEPING ON-STREAM** depends on reliable functioning of every instrument all the time. Prompt parts and repair service is a Beckman plus.

**4. BECKMAN INSTRUMENTATION ENGINEERS** help specify the proper equipment and design the sampling systems at customers' plants.

**COMPANY FIELD MEN** are available on short notice to service Beckman equipment and consult with users.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4

## Beckman / *data handling systems*

The electronic data handling system is the most complex of all equipment which understands and speaks "the language of the electron." It is a combination of electronic and electromechanical equipment which performs a specific series of automatic operations. It can measure, record, tabulate, compute, monitor, alarm, control, analyze, correlate, compare—all with extreme speed and accuracy. For example, Beckman systems are performing such functions as these:

- Continuous monitoring and logging of up to 400 temperatures, pressures and flow rates in a petroleum refinery.
- Automatic collection, recording and plotting of data received from a model plane undergoing wind tunnel tests.
- Rapid detection, measurement and recording of radioactivity in up to 250 laboratory samples.

Every Beckman system is different, custom-designed to accomplish specific objectives in a specific application. But the end results are similar: reduced costs, better quality, greater yield, increased safety, more error-free information faster. Important design features of Beckman systems include: modular or "building-block" construction—all solid-state circuitry—pinboard programming.

**10,000 TO 20,000 DATA SAMPLES PER SECOND** can be collected, sorted, and presented in "digital language" by the Beckman system designed for use in missile firing, wind tunnel tests, nuclear reactors and other dynamic testing operations.

**1. MONITORING PROCESS PLANT VARIABLES** – temperature, pressure, flow, liquid level, density, chemical composition – is handled automatically by Beckman systems.

**2. MISSILE FIRING DATA** and telemetered information from outer space are recorded by Beckman data handling equipment at high speed, with extreme accuracy.

**3. MODULAR CONSTRUCTION** is a basic design principle in Beckman systems. Circuit cards are combined into plug-in modular units, permitting rapid assembly and replacement.

**4. SOLID-STATE CIRCUITRY,** using transistors and printed circuits, was pioneered in the data systems field by Beckman; assures complete reliability of operation.

*The Beckman/Systems Division designs and manufactures systems to perform the following functions: high and low speed data acquisition; military and commercial computer control; missile checkout; counting and timing; telemetry.*

## Beckman / *analog computers*

Analog computers provide an engineering tool of great flexibility, speed and reliability. By rapid and accurate simulation of many variables, the computer makes it possible to develop and to test designs and to predict performance, without building models, prototypes or pilot plants. Thus it has become a primary tool in the design of aircraft, weapons, rockets, missiles, jet engines, process and power plants, atomic reactors and many industrial processes. By representing values in terms of electrical impulses, rather than digits, the analog computer is faster and more versatile than any other type of computing equipment for use in design work. Problems are set up on a color-coded patchboard and simply plugged into the computer. Beckman has developed many features to save programming time, set-up time and check-out time, and to reduce human error. In addition to designing, manufacturing and installing custom equipment, Beckman offers computer service on a fee basis to solve engineering problems.

**SIMULATING MANY VARIABLES,** by means of voltages recorded on a strip chart, saves hours of computation in the design of aircraft, missiles, engines and process plants.

1. **COMPLEX EQUATIONS** are set up on the patchboard and plugged into the computer.

2. **DESIGN OF AIRCRAFT** is speeded and improved by testing all variables on the computer, even before a model is built. A typical application.

3. **AUTOMATIC CONTROL** and recording devices save time and human error. Instructions are typed in. Results are recorded by typewriter, tape, oscilloscope, x-y graphs and strip charts.

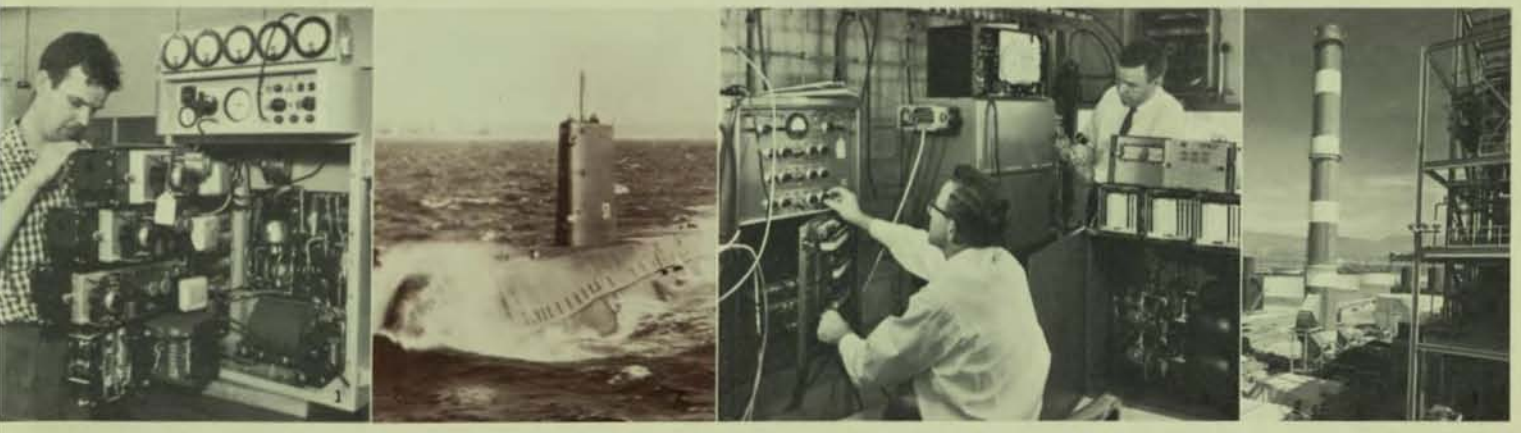
4. **MODULAR UNITS** may be added to increase the number of variables to be considered.

*The Beckman/Berkeley Division designs and manufactures EASE analog computers and various precision components for control systems.*


Beckman

## Beckman / *process instruments*

Instruments for the continuous analysis of process streams, exhaust gases, and air content are playing an increasingly important part in both industrial and military applications. They perform essential functions in the automatic control of plants. Thousands of Beckman pH meters are automatically measuring the critical acidity-alkalinity ratio of liquids in food, beverage, chemical, petroleum and power plants and water supply systems. Beckman atmosphere analyzers are continuously monitoring the air on our new atomic submarines; are keeping tab on air pollution in the battle against smog; are improving combustion control by analyzing exhaust fumes. Beckman infrared analyzers and industrial gas chromatographs are automatically analyzing and recording the chemical content of process streams—resulting in better quality, higher yield, lower costs and bigger net profits. Beckman process instruments are widely used in the fueling and checkout of missiles. Engineering services include the design of sampling systems for specific process stream applications.



**LONELY SENTINELS.** Beckman instruments give continuous, dependable, accurate analysis of process streams in petroleum, chemical and power plants.

1. **ATMOSPHERE ANALYZERS** receive a final checkout before installation on atomic submarines.

2. **ATOMIC SUBMARINE NAUTILUS** used a Beckman atmosphere analyzer on her historic cruise under the polar ice cap.

3. **INDUSTRIAL GAS CHROMATOGRAPHS** are tested and calibrated in Beckman application labs before installation in a process plant.

4. **POWER PLANTS** use Beckman instruments to measure pH of feedwater and to improve combustion efficiency by analyzing stack gases.

*Beckman's complete line of process instruments is manufactured by the Scientific and Process Instruments Division. They are sold and serviced direct by the company field staff, except pH meters which are sold through recorder manufacturers.*

## Beckman / *laboratory instruments*

Fast, accurate, automatic analysis of chemical mixtures, by means of electronic instruments, has revolutionized laboratory techniques in the last 25 years. Beckman has made more of these electronic laboratory tools than all other manufacturers combined and has been responsible for many of the important "firsts." Dr. Beckman formed the company in 1935 to manufacture the first commercial pH meter. Beckman pH meters are now standard throughout the world. In 1940 the company developed the first commercial quartz spectrophotometer. Today, the thousands of Beckman spectrophotometers in use have revolutionized the science of analytical chemistry of solids, gases and liquids. Recently Beckman introduced the first commercial gas chromatograph, considered to be the most significant analytical advance in many years. By employing complex technologies to produce practical, reliable laboratory tools, Beckman is speeding medical, industrial and military research, improving product quality, increasing laboratory efficiency and reducing costs.

**CHROMATOGRAPH-PURE FRACTIONS** as small as 0.0002 cc can be separated in a Beckman gas chromatograph and further analyzed in a Beckman recording spectrophotometer (background).

**1. PRECISION OPTICAL SYSTEMS** depend on expert cutting, grinding and polishing of quartz and other optical materials in the company's own optical laboratories.

**2. RECORDING SPECTROPHOTOMETER** automatically analyzes chemical compounds and produces an accurate "curve" of the results, saving hours of time.

**3. BECKMAN pH METERS** have become standard throughout the world in virtually every industry where water is used.

**4. TABLE-TOP CLINICAL ANALYSIS** is accomplished with Beckman titration unit, spectrophotometer and miniature centrifuge.

*Several Beckman divisions make instruments for laboratory use. Scientific and Process Instruments Division: electrochemical, gas analysis, spectrophotometers. Berkeley Division: counting, timing, frequency measuring equipment. Spinco Division: instruments for biomedical studies. Many standard Beckman instruments are sold through laboratory supply dealers and sales representatives. The more highly specialized lines are handled direct by the company field staff.*


Beckman
AIR CIRCULATION
SAFETY ALARM
HEATER
AIR-SHIELDS, INC.
ISOLETTE

## Beckman / *medical and clinical instruments*

By combining scientific knowledge and engineering skills, the Beckman organization has produced reliable instruments which simplify and speed medical research, the treatment of disease, the development and production of improved medicines, serums and vaccines. There are Beckman instruments in virtually every modern hospital, clinic, and medical laboratory in this country and abroad. Beckman instruments were used in developing the Salk polio vaccine, are essential in the study and early detection of cancer, are standard tools in medical research fields, such as proteins, viruses, blood, amino acids and hormones. Some techniques perfected by Beckman have particular value in the biomedical instrumentation field. These include: *centrifugation*, the separation of minute particles by centrifugal force; *electrophoresis*, the diffusion of electrically active particles passing through an electrical field; *ion exchange chromatography*, for separation of amino acids and polypeptides. Photometric analysis and automatic recording, utilizing intricate optical systems perfected by Beckman, are integral parts of many of these instruments, saving hours of time, increasing accuracy, and eliminating the factor of human error.

**1. COLLECTING PURE FRACTIONS,** in quantity, is accomplished by continuous flow paper electrophoresis, in laboratory work with proteins, amino acids, pharmaceuticals.

**2. SPEEDING HEART RESEARCH,** the Beckman gas chromotograph accurately measures the fatty acid content of blood.

**3. VOLUME PRODUCTION** of high precision instruments is accomplished by the Spinco Division on the new amino acid analyzer.

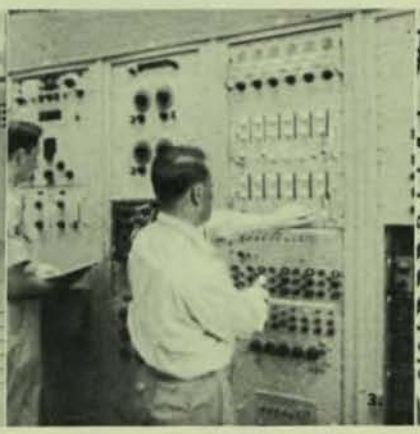
**4. POLIO VIRUS** was first isolated with the help of the Beckman/Spinco ultracentrifuge. (Preparative centrifuge models, in background.)

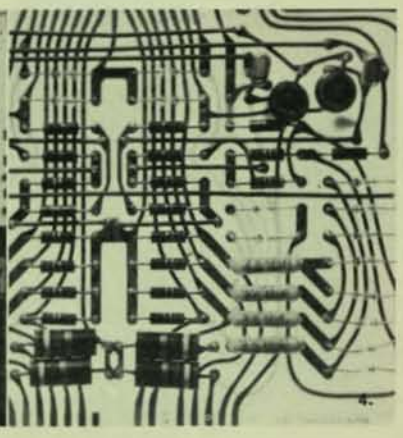
**SAFEGUARDING THE EYESIGHT** of a premature infant, a Beckman instrument provides instant oxygen measurement in an incubator.

*Medical and clinical instruments include centrifuge, ultracentrifuge, electrophoresis, centrifilmer, and gas analysis equipment of the Spinco Division; and pH meters, oxygen meters, atmosphere analyzers, spectrophotometers, flame photometers and other products of Scientific and Process Instruments Division. Distribution is through both laboratory supply dealers and direct company sales engineers.*

## Beckman / *electronic test instruments*

Instruments for rapid measurement and analysis of frequency, time intervals, wave forms, voltages, current, power and resistance perform vital functions in missile checkout and guidance systems, weapons fire control, radiation studies and the control of atomic reactors... in recording the feedback from space vehicles, monitoring and controlling many industrial operations... also in inspection and quality control of electronic original equipment manufacturers. Beckman is a major producer of both standard and custom instrumentation of this type. The company has developed many significant "firsts": a meter capable of counting up to 12 billion events per second; a direct reading frequency meter; an electronic decimal counting unit. The capabilities of the test instrument group center around the conversion of physical phenomena to digital or analog form and recording, displaying or transmitting the information. Services of the engineering staff are available to custom-design new test instruments or modify existing equipment for specific applications.





**1. INDUSTRIAL TIME-SAVERS,** these counter-controllers are used to control the cutting of sheet metal to exact length.

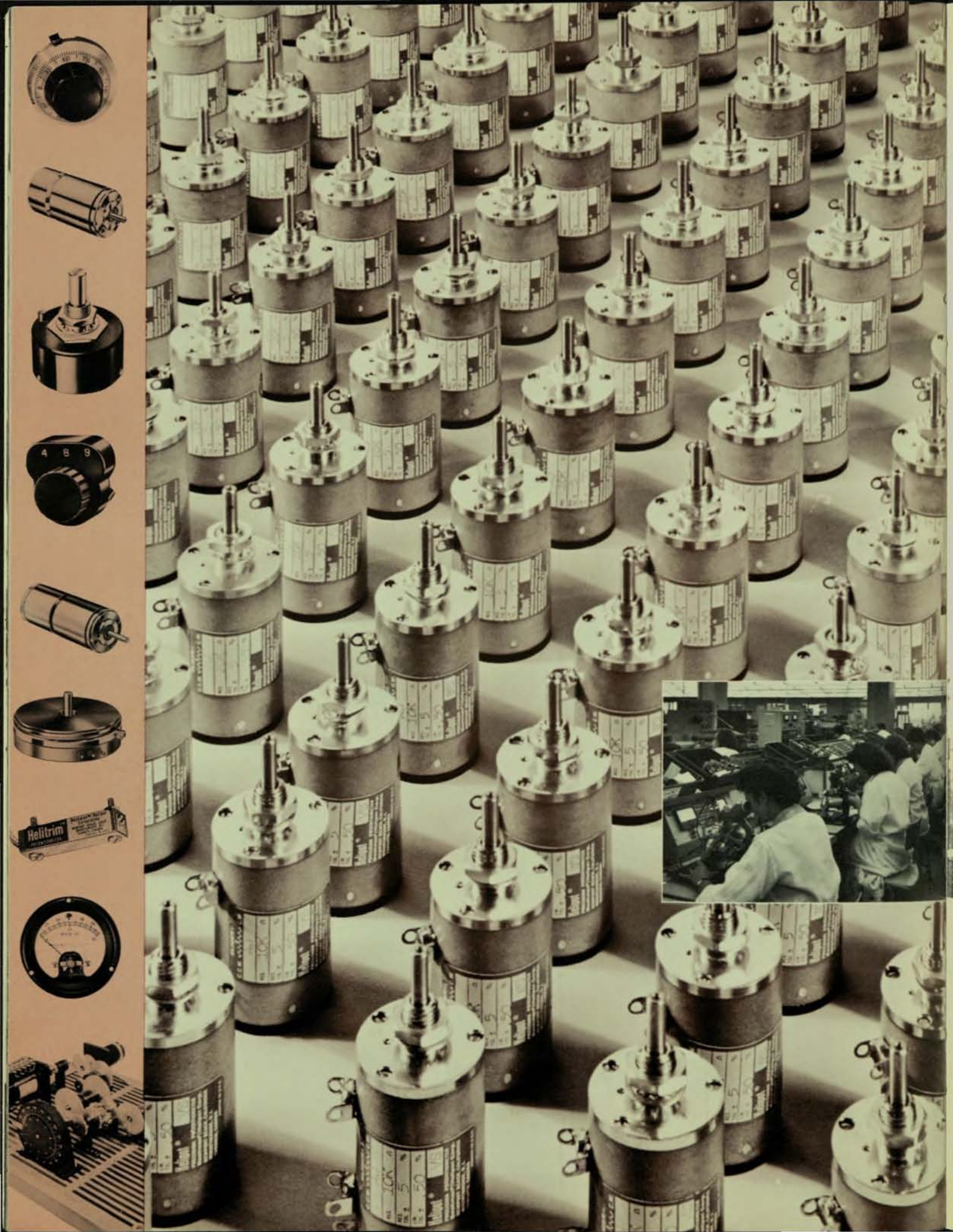
**2. 50,000 QUARTZ CRYSTALS PER DAY** are tested with a Beckman frequency meter in the research department of a major watch company.

**3. SATELLITE TRACKING STATION** in Hawaii utilizes Beckman's preset counters, as a part of a system for collecting and analyzing data from outer space.

**4. A LOOK INSIDE** shows the complexity of circuits and components—emphasizes the reason for Beckman's rigid inspection and testing.

**MASS PRODUCTION** techniques are used in the assembly of standard Beckman test instruments and components.

*The Berkeley Division manufactures counting, timing and frequency meters, pulse generators, volt meters, recorders, readouts, indicators, transducers. They are distributed through representatives. Scientific and Process Instruments Division makes micro-microammeters. The Systems Division custom designs counting, timing and frequency measuring equipment involving systems engineering.*

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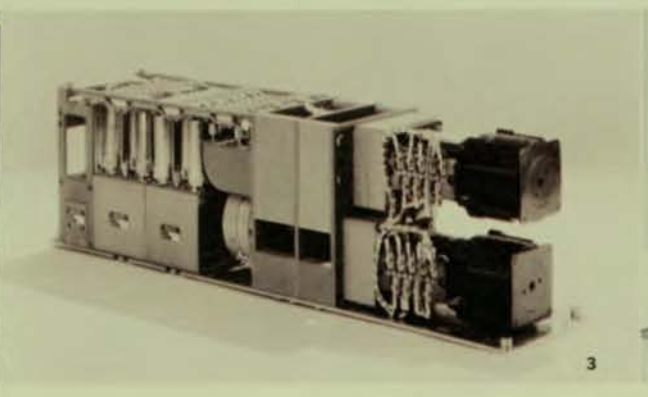
## Beckman / *components*

Beckman is the world's largest manufacturer of precision potentiometers, a basic component of virtually all electronic equipment and servo-systems. The Helipot Division was originally set up by Dr. Beckman to make the helical potentiometer which he invented in 1940. The company has expanded its line of components to include: expanded scale meters, servomotors, motor-generators and damped motors; turns-counting dials, magnetic clutches, ball and disc integrators, precision differentials and gears; and a complete line of breadboard hardware. As a logical outgrowth of these basic activities, the company designs and builds special "black-box" packages and modular subassemblies for prime contractors of systems controls and instrumentation. Typical contracts include an in-line integrator comprising a potentiometer, motor-generator, gear box and coupling, all made by Beckman—a data correction system for a radar computer—a master voltage monitor for ground control of the Titan missile. Development, engineering and production of custom potentiometers and other electronic components is a Beckman activity of growing importance to the national defense and to the advancement of space technology.

**THE ELECTRONIC BRAIN** of many instruments and systems is the helical potentiometer. Simply stated: it provides voltage change, as a function of shaft movement.



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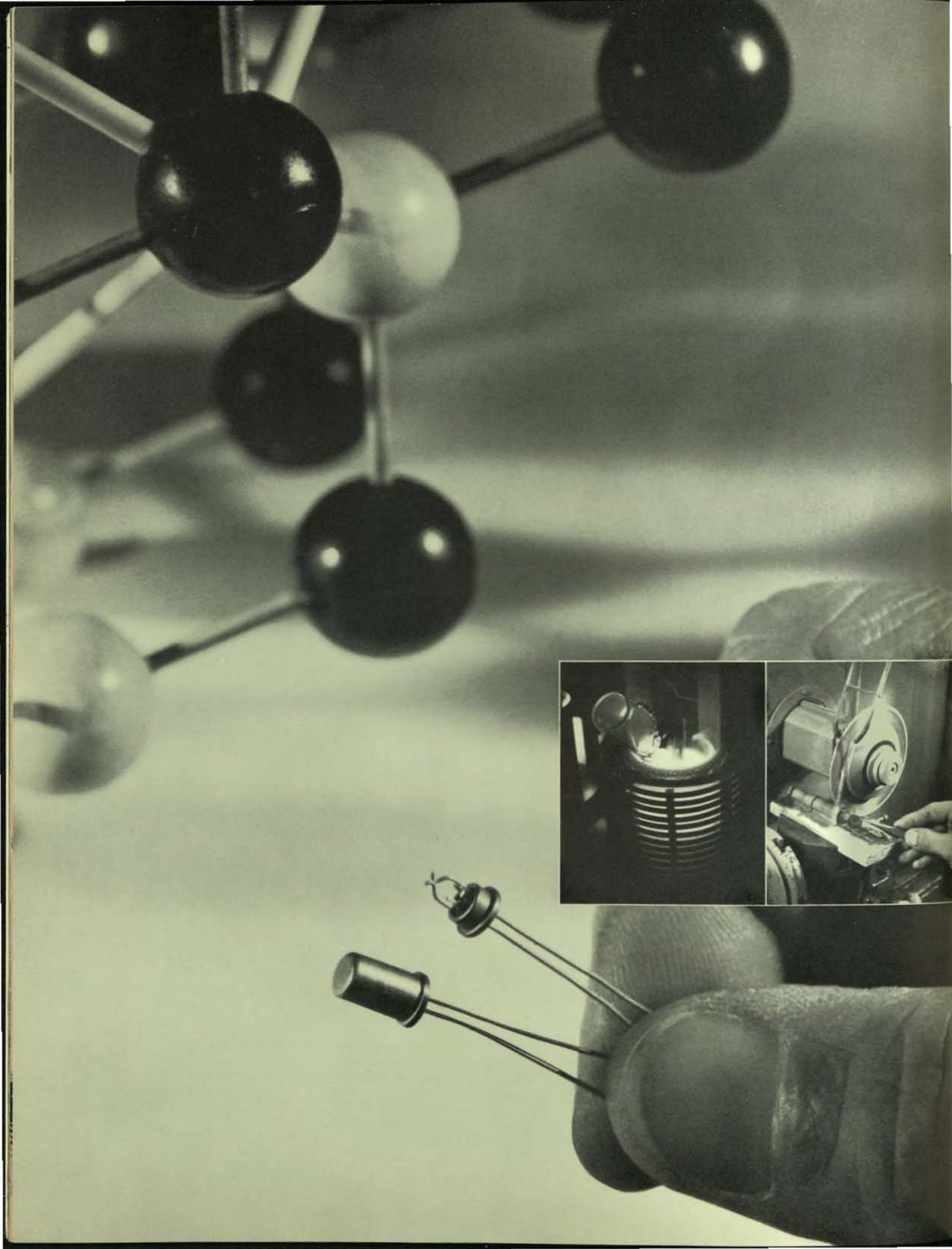
**1. MICROSCOPIC WELDING** of taps to a single turn of resistance wire was a Beckman development in the mass production of "pots."

**2. AUTOMATIC COIL WINDING** machines were invented and perfected by Beckman to spin fine resistance wire around helical cores, to a high degree of precision.

**3. COMPLEX SUBASSEMBLIES** are engineered and manufactured for custom applications. This one includes several Beckman components: potentiometers, gear boxes, servomotors.

**4. RADAR TRACKING EQUIPMENT** is one of the many applications of Beckman components, vital in defense and space exploration.

*Components manufactured by the Helipot Division are sold through factory-trained representatives.*



## Beckman / *semiconductors*

Conversion to solid-state circuitry and the development and use of miniature semiconductors to replace vacuum tubes comprise the most significant changes currently taking place in the electronics industry. Small and light weight... rugged and reliable under extreme environments...the semiconductor ushers in the space age. Dr. William Shockley, Nobel prize winner as co-inventor of the transistor and recognized authority in the field of solid-state physics, joined the Beckman organization in 1955. He now heads Shockley Transistor Corporation, a Beckman subsidiary, devoted solely to development and commercial production of semiconductors. The company is in volume production on the Shockley 4-layer transistor diode, which greatly simplifies switching circuitry for computers, telephony and control. Mass production of such miniature parts, to such close tolerances of accuracy and reliability, and at economically feasible cost, demanded completely new techniques of microscopic processing and assembly. The Shockley group assists in the solution of solid-state circuitry problems and develops special types of transistor diodes for particular applications. Research is underway on other semiconductor devices which promise to further advance the state of the art.

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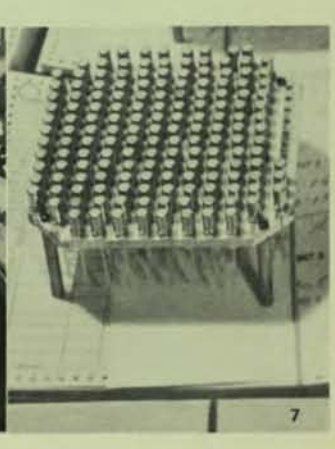

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**A TINY SILICON WAFER,** 2 thousandths of an inch thick and 1/32 inch in diameter, serves as a motionless, multi-purpose "switch" in the 4-layer diode.

**1. GROWING SILICON CRYSTALS** by freezing melted silicon on a "seed."

**2. SLICING CRYSTALS** paper-thin with a diamond edge saw.

**3. GRINDING CRYSTALS** to 1/10 the thickness of a piece of paper.

**4. REMOVING IMPURITIES** from parts by a three stage redistillation process.

**5. MICROSCOPIC ASSEMBLY** in controlled atmosphere.

**6. WELDING ON CAPS** in dust-free chamber.

**7. SERIAL NUMBER REGISTRATION** of each transistor diode, after final inspection and testing.

# Beckman / *principal offices & plants*

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*1 Anaheim, California*
*2 Berkeley, California*
*3 Palo Alto, California*
*4 Mountainside, New Jersey*
*5 Glenrothes, Scotland*
*6 Munich, Germany*

*Fullerton, California headquarters plant—*
*photo on page 6*

**CORPORATE HEADQUARTERS:**

Beckman Instruments, Inc.
*2500 Fullerton Road, Fullerton, California*

**DIVISION HEADQUARTERS:**

Berkeley Division
*2200 Wright Avenue, Berkeley, California*

Helipot Division
*2500 Fullerton Road, Fullerton, California*

Scientific and Process Instruments Division
*2500 Fullerton Road, Fullerton, California*

Shockley Transistor Corporation (A Subsidiary)
*Stanford Industrial Park, Palo Alto, California*

Spinco Division
*1117 California Avenue, Palo Alto, California*

Systems Division
*325 North Muller Avenue, Anaheim, California*

**EASTERN PLANT:**

Beckman Instruments, Inc.
*U.S. Highway 22 at Summit Road, Mountainside, N.J.*

**FOREIGN PLANTS:**

Beckman Instruments, Inc.
*No. 3 Six Points Road, Toronto, Ontario, Canada*

Beckman Instruments, Ltd.
*Glenrothes, Fife, Scotland*

Beckman Instruments G.m.b.H.
*115 Frankfurter Ring, Munich, Germany*

**DOMESTIC SALES AND SERVICE:**

Representatives in all principal cities.
See map page 14.

**FOREIGN SALES & SERVICE**

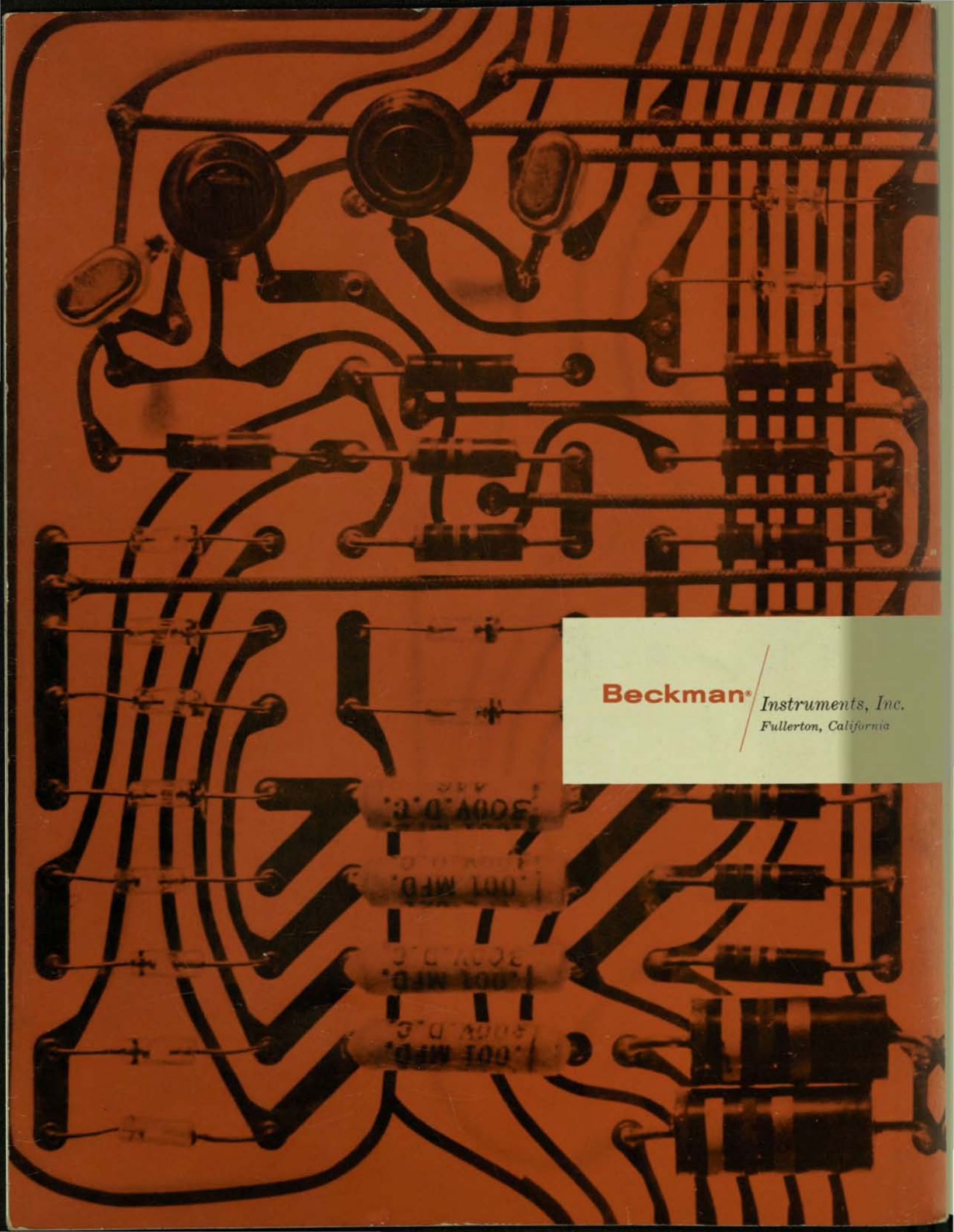
Representatives in 53 countries throughout the world.

## Beckman / *contract services*

Beckman Instruments, Inc., can move swiftly, effectively and economically on projects involving any phase of electronic instrumentation. We have the professional staff, the specialized equipment and skills, and the production capacity to carry out assignments like these:

- theoretical investigations
- feasibility studies
- development of complete systems or subsystems
- design and manufacture of subassemblies
- custom design of electronic components, test equipment, computers, analytical instruments.
- modification of standard devices and systems for special uses.

A Corporate Director of Contract Sales co-ordinates the activities of all divisions and subsidiaries on major contracts and subcontracts. This assures the best use of the company's total resources of manpower and facilities on every project, large or small.



Beckman®

*Instruments, Inc.*

*Fullerton, California*