



Donald W. Douglas, Jr., President of Douglas, discusses the ground installation requirements for a series of TIOR-boosted space probes with Alfred J. Carah, Chief Design Engineer

The care and feeding of a missile system

It takes more than pressing a button to send a giant rocket on its way. Actually, almost as many man-hours go into the design and construction of the support equipment as into the missile itself. A leading factor in the reliability of Douglas missile systems is the company's practice of including all the necessary ground handling units, plus detailed procedures for system utilization and crew training. This *complete* job allows Douglas missiles to move quickly from test to operational status and perform with outstanding dependability. Current missile and space projects include THOR, ZEUS, DELTA, ALBM, GENIE and others of vital national importance.

We invite qualified engineers, physicists, chemists and mathematicians to join us to help further these and future programs. Write to C. C. LaVene, Douglas Aircraft Company, Santa Monica, California, Section B



MISSILE AND SPACE SYSTEMS ■ MILITARY AIRCRAFT
DC-8 JETLINERS ■ CARGO TRANSPORTS ■ AIRCOMB
GROUND SUPPORT EQUIPMENT

Personals

1922

Francis L. Hopper, military development engineer at the Bell Telephone Laboratories in Winston-Salem, N.C., has been made a Fellow in the Institute of Radio Engineers for "contributions in underwater sound research and sound recording."

1927

E. Howard Fisher has been elected vice president in charge of gas operations for the Pacific Gas and Electric Company in San Francisco. He has been general superintendent of pipe line operations since 1954 and was formerly an executive of the Coast Counties Gas and Electric Company, which was merged with PG&E in 1954. An ice skating enthusiast, Howard has served as a director and treasurer of the St. Moritz Ice Skating Club in Berkeley. He is a member of the Engineers Club of San Francisco, and was chairman of the board of trustees of the Orinda Community Church.

1935

Louis T. Rader, MS, PhD '38, is now vice president of the International Telephone and Telegraph Corporation and

will have charge of all non-military operations for IT&T's United States companies. Louis comes to IT&T from General Electric, where he had worked for 20 years, most recently as general manager of the specialty control department in Waynesboro, Va.

1940

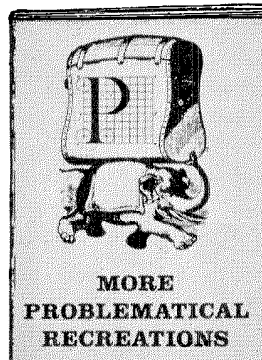
Robert S. Ray, MS '41, resigned last month as vice president of the Collier Carbon and Chemical Corporation (a subsidiary of Union Oil Company) to become a private consultant. The Rays live in Fullerton and have four children—Marilyn 13, Linda 12, John 8, and Dick 7.

1944

Charles B. Miller, who was assistant to the general manager of Southern Pacific Pipe Lines in Los Angeles, has now been made superintendent of the company's northern district at Roseville, Calif.

George M. Wood, BS, MS, has been appointed branch manager of the Glendale office of the International Business Machines Corporation. He was formerly

continued on page 48



WIT-SHARPENER

Response to our first collection of these delightfully vexing enigmas has been so heart-warming that we have decided to issue a second volume for your delectation. Write to our Dr. William Jacobi, and ask for "More Problematical Recreations." Gratis, of course.

.....

And if you find your fancy tickled by the prospect of working with nationally recognized scientists and engineers in such fields as inertial guidance, radar, tactical data processing systems, airborne digital computers, or space research investigations, you will want to communicate with our Mr. C. T. Petrie.



LITTON INDUSTRIES

Electronic Equipments Division, Beverly Hills, California

Personals . . . continued

assistant manager in Glendale, and has been acting branch manager for the past four months.

1946

Howard W. Morgan, Jr., has joined the law firm of George Raymond Drew and Richard H. Ward in Cincinnati. He was formerly a sales engineer with the Lodge and Shipley Machine Tool Company. He received his law degree in 1956 from the Salmon P. Chase College of Law in Cincinnati.

Ali B. Cambel, MS, chairman of the department of mechanical engineering, and director of the gas dynamics laboratories at Northwestern University in Evanston, Ill., received the 1959 G. Edward Pendray Award from the American Rocket Society at their 14th annual meeting last November in Washington, D. C. The award, named after one of the founders of the Society, is given for "outstanding contributions to the scientific rocket and jet propulsion literature."

Fern W. Mitchell, MS, PhD '48, director of the analytical and physical research department of the W. R. Grace & Company research division in Clarks-ville, Md., has been appointed to the

advisory board of *Analytical Chemistry*, a monthly publication of the American Chemical Society. He will serve for three years on the 15-member advisory board.

1947

Richard A. Boettcher, MS, project staff administrator of the engineering division of J. H. Pomeroy & Co., Inc., in Los Angeles for the past two years, has been transferred to the San Francisco office of the company. Dick will assist executive vice president William Pomeroy in the "business development, relations and policy areas of engineering and construction in the company."

Arnold H. Nevis, who has been in a hospital residency in neurology at the UCLA Medical Center since 1957, is planning to move to Gainesville, Florida, with his wife and two sons—Allan and Joel. He has accepted a position in neurology at the medical center there, where he will be doing research, teaching and clinical neurology.

1948

Tom Tracy writes from Palo Alto that "after 10 years with the Minneapolis-

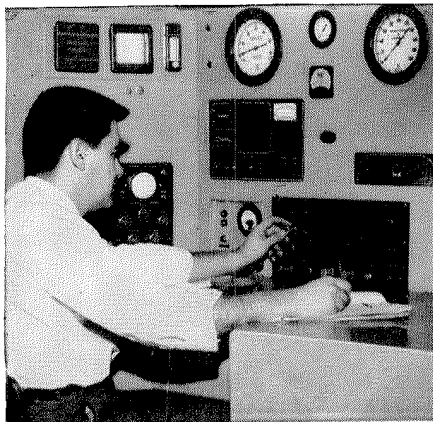
Honeywell Regulator Company in Los Angeles, I have accepted a job as north-west district manager of the Ampex Corporation, with headquarters in (sigh) Palo Alto at the Town and Country Village Shopping Center."

S. Dean Wanlass, PhD '53, has been appointed to a newly-created position as manager of product planning at Acronutronic, a division of the Ford Motor Company, at Newport Beach.

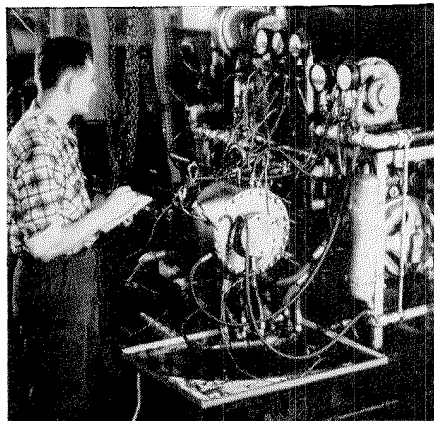
1949

Paul D. Saltman, PhD '53, associate professor of biochemistry at the USC School of Medicine, has received a \$75,000 five-year senior postdoctoral fellowship from the U.S. Public Health Service. He will go to the University of Copenhagen, Denmark, next summer for a year of research with Dr. Hans Ussing, famous for his studies of the transport of molecules across membranes in the body. After this sabbatical leave, Paul will return to SC, where his research and teaching will be supported for another four years by the fellowship. He has been a member of the SC faculty since 1953.

continued on page 52



FATIGUE SPIN RIG uses compressed air to drive balls around the bore of a test cylinder to determine cylinder's static fatigue life.



JET ENGINE BEARING TESTING MACHINE tests main rotor ball bearings under actual operating conditions of load and lubrication.

Fafnir works with "unknowns" to come up with ball bearings you'll need!

In many fields of industry and technology, progress depends in large measure on solving increasingly complex ball bearing problems. Bearing materials and lubricants have yet to be perfected that can take certain temperature extremes. Higher speeds and heavier loads pose formidable problems. So does miniaturization.

To help its research engineers probe the unknowns in these and other areas, The Fafnir Bearing Company maintains the most up-to-date facilities for metallurgical research, and bearing development and test-

ing. It is another reason why you are likely to find Fafnir ready with the answers—should bearing problems some day loom large for you. Worth bearing in mind. The Fafnir Bearing Company, New Britain, Connecticut.

Write for booklet, "Fafnir Formula For Solving Bearing Problems" containing description of Fafnir engineering, research, and development facilities.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA



Subscribe Now at Half Price*

You can read this world-famous daily newspaper for the next six months for \$5, just half the regular subscription rate.

Get top news coverage. Enjoy special features. Clip for reference work.

Send your order today. Enclose check or money order. Use coupon below.

The Christian Science Monitor P-CN
One Norway St., Boston 15, Mass.

Send your newspaper for the time checked.

6 months \$5 1 year \$10
 College Student Faculty Member

Name _____

Address _____

City _____ Zone _____ State _____

*This special offer available ONLY to college students, faculty members, and college libraries.

Engineering and Science

Personals . . . continued

1953

Robert L. Smith received his master's degree from Stanford in 1955 and is now working for his PhD there. He's married (to a girl he met at the Caltech dancing class), and has a 2-year-old daughter, Cecilia. Bob's current hobby is rebuilding an old player piano.

1955

Benjamin E. Cummings, MS '56, writes: "I am now working at Aerojet-General in Azusa, in the systems division. I took the position after I left the Air Force in June. In the AF I was in the Flight Research Branch and worked on jobs that ranged from sonic booms to aircraft accidents, and from transport aircraft to the X-15.

"At Aerojet my duties concern dynamics, including controls, structural dynamics and related problems.

"It may surprise some of my old friends to know that I'm married and have two daughters, Laura and Leslie. Leslie was born last September."

1956

Konrad W. Hubele, MS, died on December 28, 1959. His body was found in his car in a remote section of Angeles Crest near Horse Flats. He had been on

leave from Caltech because of illness, but was scheduled to return to graduate work in September, 1960. Konrad received his BS in chemistry at UCLA in 1954 and also had a degree in medicine from the University of Mainz in Germany in 1949.

Curt D. Schulze writes that "I'm still in El Centro in the Air Force and in charge of the instrumentation section of the Joint Parachute Test Facility. We expect to leave the AF next March and move to San Jose where I plan to work for IBM in research and development. On December 1 we had an addition to the family—Curt Richard."

George L. Fletcher, who is doing graduate work in mechanical engineering at Caltech, was married to Janet Gregory on December 27 in Redlands.

1957

Capt. Gerald Medsger, MS, spent two years after leaving Caltech at the Missouri School of Mines in Rolla, Mo., as an assistant professor in military science and English. He shared a house with Robert Ayers, MS, who was also an assistant professor at Rolla. In the summer of '59, Bob went to Fort Belvoir, Va., while Jerry was transferred to Germany.

He is now a construction engineer with the U.S. Army's Engineer Construction Group in Kaiserslautern.

1958

David S. Dennison, PhD, is now an instructor in zoology at Dartmouth College in a part-time research capacity. The Dennisons have a son, Edward Frank, born on April 2.

Lt. John M. McCoy, AE, was lost in an aircraft accident on June 25, 1959 while flying off the U.S.S. *Saratoga* out of Jacksonville, Florida. He had been in the Navy for 14 years. He received his BS in 1949 from the U.S. Naval Academy and a BS in AE in 1957 from the USN Postgraduate School. John received the Distinguished Flying Cross, the Air Medal and the Navy Commendation Medal.

Guy de Rimonteil de Lombares, MS, geophysicist with Compagnie Francaise Petroles in Paris, was married to Miss Anne de Galard Cerraube on December 19.

1959

Sol De Picciotto, graduate student at Caltech in electrical engineering, was married on November 30 to Phyllis Landy.

New Kind of Missile with HIGGINS INK

... carry it with you wherever you go!



Good news for draftsmen! New HIGGINS AMERICAN INDIA INK Cartridge always feeds the right amount of ink into pens and drawing instruments. No mess, no waste!

Compact, rigid, plastic cartridge fits easily in pocket, purse or drafting sets.


Stands on table, shelf, desk — won't roll off inclined drafting boards! Most convenient way to fill pens — and so economical!



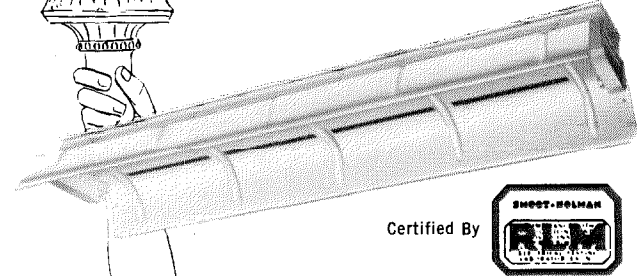
FILLS PENS FASTER, EASILY, NEATLY!


Ask your art or drafting supply dealer for this new item.

HIGGINS INK CO., INC.
Brooklyn 15, New York
The basic art medium since 1880

rugged, radiant,
dominant



Certified By 

new MARK V INDUSTRO-LUX

1960 design backed by 40 years of industrial lighting fixture experience.

- * Best looking industrial fluorescent fixture available today!
- * Five die-formed ribs provide maximum rigidity, straight rows!
- * New reflector aligner clips prevent light leaks between fixtures in continuous runs!
- * Proper light distribution. Computer designed!

Why settle for less when the best costs no more?

Write for Complete Specifications and Performance Data.



SMOOTH-HOLMAN
company

INGLEWOOD, CALIFORNIA