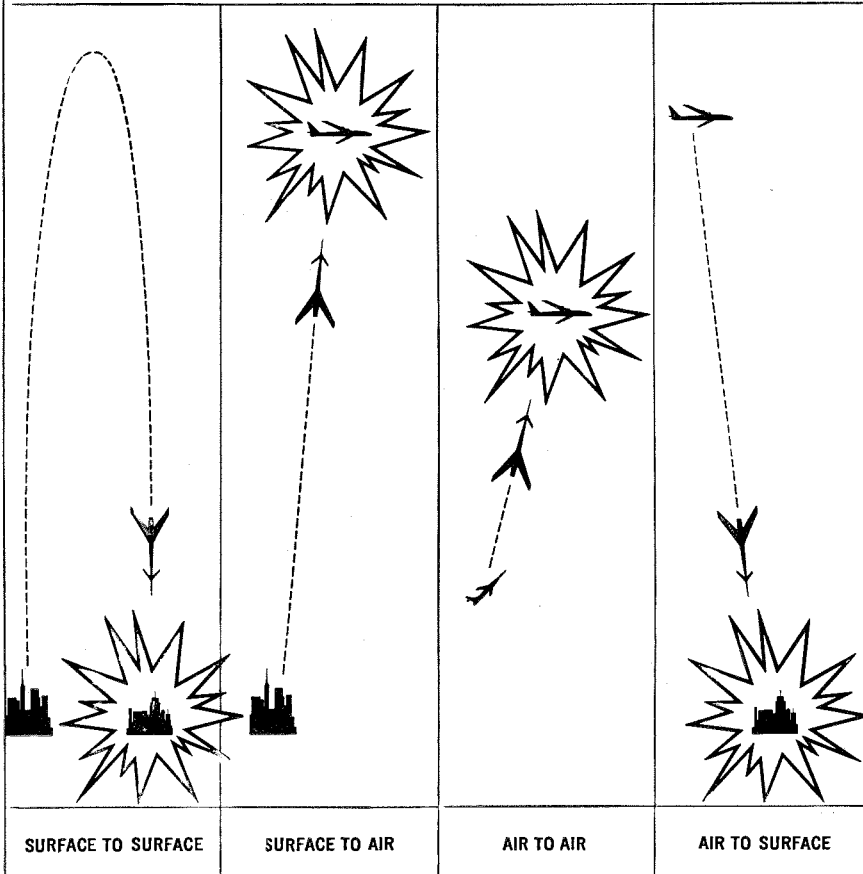


GUIDED MISSILES



Nearly all guided missiles require specialized and highly advanced electronic systems of miniature proportions. These systems may include servo-amplifiers, microwave receivers and transmitters and extremely efficient though compact power supplies. The performance objectives for this equipment would be difficult in conventional engineering applications.

At Hughes, the achievement of such objectives in the very limited space and under stringent environmental conditions of the modern guided missile provides an unusual challenge to the creative engineer.

Positions are open for Engineers or Physicists with experience in systems analysis, electronic guidance systems, infrared techniques, miniature control servo and gyro systems, microwave and pulse circuitry, environmental testing, systems maintenance, telemetering, launching systems and flight test evaluation.

Scientific and Engineering Staff

HUGHES

RESEARCH AND DEVELOPMENT LABORATORIES

Culver City, Los Angeles County, California

PERSONALS

1917

J. Calvin Brown, attorney, has been elected to serve as chairman of the board of the Engineers Club of Los Angeles. *A. M. Zarem*, MS '40 and *Thomas F. Edson*, '29, were elected as directors. Abe Zarem is manager of the Southern California Division of the Stanford Research Institute and Tom Edson is a consulting engineer.

1921

Chester A. Boggs has joined the technical staff of the Radar Division of the Hughes Research and Development Laboratories at Culver City. He was formerly a design engineer with the Western Geophysical Company.

1923

George T. McKee, director of architecture and engineering for the Oakland Public Schools, died of lung cancer on July 3, after an illness of seven months. George had been with the school system since 1936. He is survived by his wife, two sons, a daughter and two grandchildren.

1925

Thomas P. Simpson, vice-president and director of manufacturing of the General Petroleum Corporation, celebrated 30 years of oil company service last month.

1928

Moe W. Gewertz is a senior bridge engineer with the California Division of Highways, currently functioning as resident manager of the San Mateo-Hayward and Dumbarton toll bridges.

1935

Nathan Karp is home from the hospital after a seven week bout with meningitis—and doing fine. He has his own office as a consultant in structural engineering in San Francisco.

1938

Sylvan B. Walton, MS, has been teaching engineering at San Jose State College for the past eight years, specializing in heating, ventilating, refrigeration and industrial instrumentation.

Howard Seifert, PhD, is now a senior staff member of Ramo-Wooldridge. He has also accepted an appointment at UCLA as visiting professor of engineering and will divide his time between the two positions. Before joining Ramo-Wooldridge in 1954, Howard was with the Caltech Jet Propulsion Lab for 12 years.

1940

Robert B. Young, who has been chief engineer at Aerojet's Azusa liquid engine division since 1951, has been appointed as resident manager of the Company's new liquid rocket plant in Sacramento.

1941

Newell T. Partch reports a third addition to his family—a daughter, Vicky—

ENGINEERING AND SCIENCE

STEEL IS 2 TO 3 TIMES
STRONGER THAN CAST IRON

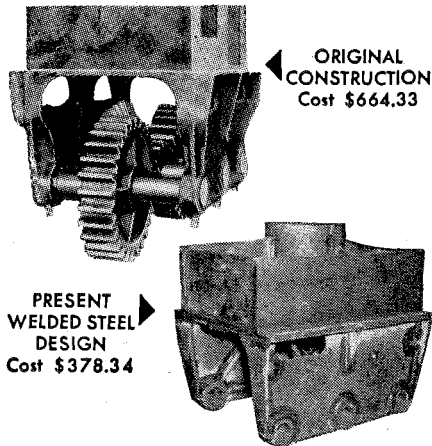
STEEL IS 2½ TIMES AS RIGID
AS CAST IRON

STEEL COSTS ⅓ AS MUCH
PER POUND AS CAST IRON

thoughts to think about

FIGURE the facts yourself. Only 40% as many pounds of metal are needed to build a machine part from steel as from cast iron. Furthermore, each pound of steel costs a third as much as iron. As a result, basic material costs using steel are about 15% of the costs using cast iron.

The large initial saving in material cost makes it possible to fabricate machine designs from steel at substantial reductions in cost.



Compare the two gear cases shown. The original cast construction cost \$664.33. Changing to welded steel design has cut this cost to \$378.34 . . . a 43% reduction in cost. In addition, scrap loss from metal defects has been entirely eliminated. Less material has to be left on for machining since distortion has been minimized.

According to leading product engineers, low manufacturing costs are of prime importance. As a student engineer, therefore, it will pay you to keep abreast of progress in designing for welded steel. Write for further information.

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of Arc Welding Equipment*

Personals . . . CONTINUED

which makes a total of three daughters from 10 years down to 2 months. He is vice-president and factory manager of Up-Right Scaffolds, Berkeley, Calif.

Ebenezer Vey, MS '42, has been appointed a full professor of civil engineering at the Illinois Institute of Technology in Chicago.

Reuben Snodgrass, MS '42, is the engineering department head for flight research at the Sperry Gyroscope Company in Long Island, New York. A recent paper of his, "A Flight Investigation of the Performance of Low-Ceiling Visibility Measuring Equipment," appeared in the *Aeronautical Engineering Review* for May, 1955.

1942

Wayne MacRostie is nearing the end of his sixth year in Sacramento, where he has been engaged in hydraulic engineering work for the State of California. Most recently Wayne has been supervising engineering studies aimed at providing a basis for settlement of water rights along the Sacramento River and in the Sacramento-San Joaquin Delta. The three MacRostie boys are now 2, 6, and 9.

1943

Robert M. Benson has formed a new company of his own, in Santa Monica, called Inertial Instruments, Inc. As president, he will direct its activities in the mass flowmeter field. Boh was formerly vice-president of Gyromechanisms, Inc.

Alexander C. Ridland, who was lead test engineer in the turbine lab at Convair, has now joined Solar Aircraft as an experimental engineer.

1946

Robert E. Stephenson, MS, formerly a research engineer at the University of Utah, has joined the staff of the Guided Missile Division, Hughes Research and Development, at Culver City, California.

1948

Frederick C. Roop, PhD, has been appointed head of the applied mechanics section in physics of Standard Oil of Indiana. He joined the company in 1948 as an assistant project engineer and became a senior project engineer prior to his new appointment.

David B. Willmer, MS, reports that he recently bought an Eichler home in Walnut Creek, California, and is working in San Francisco for the engineering department of the Standard Oil Company as a project engineer.

George P. Steck, MS, writes that he finished his PhD in statistics at the University of California in Berkeley last May and is working for the Sandia Corporation in Albuquerque, New Mexico. George is married and has two sons, aged one and three.

Alfred Paul Fay was married in June

to Mary Consuelo Oseguera of Altadena. They are living in Santa Monica.

1949

Douglas Brown and his wife announced the birth of their second child, Kyle Warren, in September. Doug is working in Los Angeles where he is in charge of foundation investigations for the Bridge Department of the California Division of Highways. The Browns are living in Van Nuys.

Irving L. Krumholtz writes that he is "still with the central engineering division of Fibreboard Products, Inc., in Antioch, California, and rustivating with my wife and three rapidly growing daughters in Concord. We are occasionally visited by the *James A. Harders*, '48, and other Caltech classmates or friends."

Donald Petersen, PhD '55, joined the Dow Chemical Company in August as a chemist.

Lloyd P. Geldart writes about life in Trinidad, where he is working for the Dominion Oil Company, Ltd.: "Have been here for three years in Port-of-Spain as chief geophysicist. Trinidad is ideal for foreign service—no language barrier, lovely homes, inexpensive servants, food of fair quality, although a restricted choice compared with the U.S. Almost everyone has a sail or power boat, lots of fishing, golf, tennis, parties. Have a month's vacation with the family every year, and last year returned to Los Angeles with stops in Venezuela, Colombia, Panama and Mexico City.

"Trinidad is cross-roads of air travel and we have many visitors en route to Rio, Buenos Aires, Europe, U.S., Venezuela, Colombia, etc. Tobago, of Robinson Crusoe fame, is 25 miles off shore and a wonderful place to spend long weekends. Grenada and Barbadoes are also near by and are frequented by those who have tired of Tobago." (Everybody ready to catch the next boat?)

Henry A. Long, MS '50, has joined the Solar Aircraft Company as a controls engineer. Henry, his wife, and two children make their home in San Diego.

1950

Henry Shapiro, MS '51, ME '52, announced the birth of a son, Richard Murray, on June 9, 1955. The Shapiros are living in Los Angeles.

James O. McCaldin, MS '51, PhD '54, is working for General Motors in Detroit as a senior research engineer.

Jerry O. Matthews, who graduated from the USC Medical School in June, is now interning at the Orange County General Hospital. Jerry and his wife have a baby girl, Julie Ellen, born on June 25, 1955.

Walter John received his PhD in nuclear physics from the University of California and is now an instructor in the depart-

ment of physics at the University of Illinois.

1951

Robert John Kurland, who received his PhD at Harvard, has been granted a post-doctoral research associateship by the National Bureau of Standards and is conducting a study of free radicals and other unstable molecular species using microwave and other spectroscopic techniques.

Richard A. Hoppin, PhD, is now an associate professor at the State University of Iowa. He has been with Iowa State since 1951.

Richard Smyth reports a third addition to his family; Ernest Paul, who was born in October. Rich is with North American Aviation now. On the family's vacation last summer, he piloted their Bonanza to New York and back.

James A. Ibers has joined the Shell Development Company in Emeryville, California, as a chemist. During the last academic year, he was a United States National Science Foundation Postdoctoral Fellow in Chemistry at the Commonwealth Scientific Industrial Research Organization in Melbourne, Australia.

Stephen Pardee, MS '52, says he "is now firmly enclosed in the protective web of the U.S. Army. Mary Jo and I are living in Falls Church, Virginia (just outside Washington, D.C.) and are looking forward to seeing *Dallas Peck*, (BS '51, MS '53), plus family, who are going to be in this area 'til next summer."

1952

Gerald D. Fasman, PhD, has just returned from four years in England, Switzerland and Israel where he did post doctorate research. He is currently at the hospital of the Children's Cancer Foundation, a Harvard research group in Boston.

Michael J. Callaghan and *Richard Dickinson* have both completed Officer Candidate School at Newport, R.I., and are now ensigns in the USNR. They are stationed at the Naval Air Station in Jacksonville, Florida, attending Aviation Ground Officer's School. They report that *William Harris*, BS '49, was also in the same class and is now back in California.

1953

Kim Hamberger is at the University of Oklahoma studying for an MS in geological engineering, after spending some

time with the Phillips Petroleum seismograph crew and two years in the 549th Army Engineers in San Francisco and Alaska.

Carl G. Sauer, Jr., who is in electronics research at the Jet Propulsion Lab, was married to Eileen Holtan in May at Glendale.

Lawrence Davidson Starr, now a graduate student at MIT, was married in June to Irma Kushner, in Newton, Mass.

George B. Cook, Jr. is now a Reserve Ensign in the Navy.

1954

Paul Concus is now a member of the staff at the Advanced Electronics Laboratory, Hughes Research & Development, Culver City, California. Other Tech grads who have recently joined Hughes include: *Walter W. Lee, Jr.*, '54, *J. Philip Wade*, '55, *Lewis Ellmore*, '55, and *Walter L. Whirry*, '55, all members of the Systems Division. *Arthur E. Miller, Jr.*, MS '55, is employed in the Guided Missile Division.

1955

Charles St. Clair is working for an MS in geology and instructing beginners in the geology labs at the University of Arizona.

John W. Brookbank, PhD, is an assistant professor of zoology at the University of Florida in Gainesville.

Joseph D. Mandell, PhD, is doing a year's work on bacterial viruses at the Carnegie Institute in Cold Spring Harbor

John W. McKee, PhD, is working on aircraft nuclear propulsion at Douglas Aircraft.

Ernest Dzenolet is working in experimental psychology at Brown University.

William Lindley writes that "*Don Taylor* was married right after graduation and both he and his wife are working at the University of California Radiation Lab and living in Concord. *John Weisner* has moved to Livermore and is with the Lab. *Roy W. Paul* is in the same group that I am and is living in Berkeley. *Alva Yano* is living with Roy and working here, also. *Horace Furumoto* is the sole casualty—his Air Force orders came and now he's in Wyoming."

Oreste Lombardy, *Carl Bowin*, and *Robert Meade* are all taking graduate work in geology this year. Oreste spent the summer studying saline deposits in the Saline Valley, California,—in preparation for his Master's thesis, which he is working on at the New Mexico Institute of Mining and Metallurgy. Carl, now at Northwestern University, spent the summer as a field assistant for the Texas Company. Bob also did field work last summer (subsurface) for the Shell Oil Company, before starting at UCLA this fall.



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