

Retirements

1980-1981

James F. Bonner

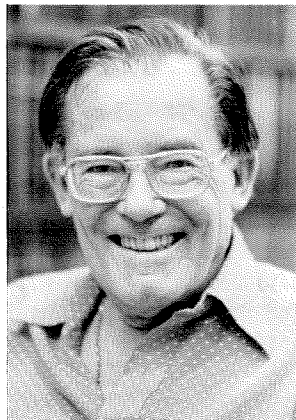
Professor of Biology

James Bonner came to Caltech as a junior in chemistry in 1929 — just one year after the founding of the Biology Division. In that one year he discovered biology. After a brief return to finish his AB at the University of Utah, he became a graduate student in biology at Caltech in 1931. Bonner will become professor of biology emeritus this July.

Bonner has been internationally known for his work on how living cells specialize. He earned Caltech's first PhD in plant physiology in 1934. In his earlier research he continued in this field and in plant biochemistry, making substantial contributions in the discovery of hormones that regulate growth and that induce plants to flower and bear fruit. One of the successful applications of his research was a great increase in the yield of Malaysian rubber trees. In the early 1960s Bonner turned toward more fundamental biochemical research into the molecular basis of the control of gene activity in higher organisms. His insights into the biochemical signals that switch genes on and off opened a whole new research area in the structure and functioning of the genetic apparatus. These studies led him into genetic engineering.

Bonner has had a continuing interest in population growth, world food production, and in the future of industrial society. He was one of the originators of the "Next 100 Years" conference and book and of the subsequent Next 90 and 80 Years.

In 1973 he received the American Chemical Society's Richard C. Tolman Medal, and he is a member of this and many other professional societies, including the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Association for the Advancement of Science. His books, *Plant Biochemistry* (three editions), *Principles of Plant Physiology*, *Molecular Biology of Development*, *The Nucleohistones*, and others, have been widely used in university courses. He has traveled ex-



James Bonner

tensively, both in a professional capacity and an avocational one — mountain climbing and skiing.

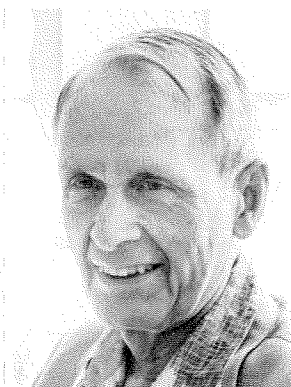
Bonner is not retiring. He and his wife, Ingelore, are the principal officers of their genetic engineering firm, Phytogen.

Francis H. Clauser

Clark Blanchard Millikan Professor of Engineering, Emeritus

Francis Clauser became professor emeritus last summer and now finds more time to travel — an interest that in the past has led the Clausers to drive by car to such far reaches of the globe as the Australian Outback, the length of South America, through the Middle East to Persia, and across the Sahara to old Timbuktu. They have most recently visited Mongolia and western China and are currently cruising the canals of France.

Clauser earned all his degrees at Caltech — BS in physics (1934), MS in mechanical engineering (1935), and PhD in aeronautics (1937). After leading a design research section at Douglas Aircraft, he worked with Project RAND, now the Rand Corporation, in 1946, and then accepted an invitation from Johns Hopkins to establish a department of aeronautics at that university. In 1965 he was named academic vice chancellor at UC Santa Cruz. He returned to Caltech in 1969 as Clark Blanchard Millikan Professor of Engineering to become chairman of the Divi-



Francis Clauser

sion of Engineering and Applied Science, a job he relinquished in 1974.

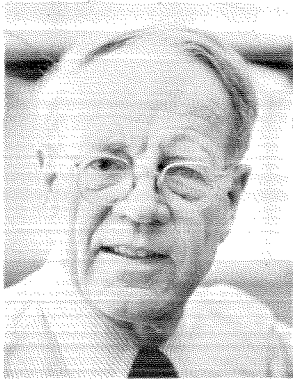
In 1966 Clauser received one of the first Caltech Distinguished Alumni Awards. He is a fellow of the American Academy of Arts and Sciences and the American Institute of Aeronautics and Astronautics and a council member of the National Academy of Engineering. He has published widely in the fields of aerodynamics, space flight, fluid dynamics, applied mechanics, and nonlinear mechanics and is currently conducting research on the reduction of combustion engine emissions.

It was Clauser's idea to establish at Caltech what has become the Sherman Fairchild Distinguished Scholars program. This was not the only one of his ideas to bear fruit. In 1946 he was in charge of RAND's first report — *Preliminary Design of an Experimental World-Circling Spaceship* — in which he predicted the imminent feasibility of such a satellite and its emergence as one of the most potent scientific tools of the century. And in 1968 as a member of the NASA Science and Technology Advisory Committee for Manned Space Flight, he advanced the concept of reusability of space vehicles as the logical way to reduce the costs of space flight — the genesis of the Space Shuttle.

Leverett Davis, Jr.

Professor of Theoretical Physics

Arriving at Caltech as a graduate student in 1936 with a BS from Oregon State College, Leverett Davis stayed on after earning an MS (1938) and PhD (1941) to join the research staff. During the war years he worked on the exterior ballistics of rockets, receiving the President's Certificate of Merit in 1948. At the end of World War II he joined the Caltech faculty, becoming



Leverett
Davis, Jr.

professor of theoretical physics in 1956. He will become professor emeritus in July of this year. During many of those years he acted as the unofficial faculty parliamentarian, providing the last word on proper procedures.

A National Science Foundation grant took him to Germany in 1957-58 for research at the Max Planck Institute for Physics in Göttingen. Davis's work has been concerned with the polarization of star light by interstellar dust grains that are aligned by the galactic magnetic field, with the acceleration of cosmic rays, with the characteristics of the magnetic field and plasma in interplanetary space, and with the properties of the solar wind. He helped plan, design, and carry out the magnetometer experiments on the Mariner and Pioneer spacecraft. In 1970 Davis received the Exceptional Scientific Achievement Award from the National Aeronautics and Space Administration for using spacecraft data to measure the magnetic fields near Mars, Venus, and Earth, as well as the high frequency waves in the Earth's magnetosheath.

Davis has participated in summer study groups on interplanetary and planetary exploration for the National Academy of Sciences, NASA, and the European Space Research Institute. He has been president of the Commission on Plasmas and Magnetohydrodynamics in Astrophysics, and a councillor of the American Physical Society. He is also a fellow of that society as well as the American Astronomical Society, and the American Geophysical Union.

Marshall Hall, Jr.

Professor of Mathematics

Marshall Hall, Jr. will become professor of mathematics emeritus on July 1. A member of the faculty since 1959, he was



Marshall
Hall, Jr.

named Caltech's first IBM Professor of Mathematics in 1973 and was executive officer for mathematics between 1966 and 1969. His BS (1932) and PhD (1936) are from Yale, where he was assistant professor from 1941 to 1946; he served on the faculty of Ohio State University from 1946 until 1959, as full professor after 1949.

An internationally known mathematician, Hall has worked extensively in combinatorial analysis (the study of the arrangement of objects) and group theory (in particular, finite simple groups) and discovered important relationships between the two fields. He is also known for his research on theory of numbers and projective geometry.

Hall was elected a member of the American Academy of Arts and Sciences in 1975 and a fellow the following year. He is also a member of the Mathematical Association of America and the American Mathematical Society and has chaired symposia and summer institutes for the latter group. Hall had studied at Trinity College, Cambridge, as a Henry Fellow in 1932-33 and returned there on Guggenheim Fellowships in 1956 and 1971. In 1977 he was a visiting fellow at Merton College, Oxford, and in 1980 was the Lady Davis Visiting Professor at the Technion in Haifa, Israel. The Yale Graduate School awarded him the Wilbur Lucius Cross Medal in 1973 for his achievements.

George W. Housner

Carl F Braun Professor of Engineering

George W. Housner becomes professor emeritus on July 1 after 36 years as a member of the Caltech faculty. He first came as an MS student in 1934, arriving from the University of Michigan with a BS degree, and after working as a struc-

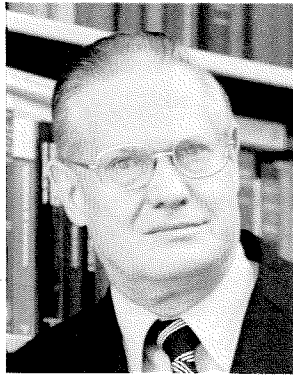


George
Housner

tural engineer he returned in 1939 and received his PhD in 1941. In 1941-42 he was with the U.S. Army Engineer Corps, and from 1942 to 1945 he served with the Operations Analysis Section of the 15th Air Force in North Africa and Italy. He has been on the staff of the Institute since 1945.

Housner is internationally known for his research on strong earthquakes and their effects on structures. His work has been an important contribution to the development of earthquake-resistant design procedures now in worldwide use. He has frequently been consulted on the seismic design of major projects, including the San Francisco Bay Area Rapid Transit System, the long-span suspension bridge over the Tagus River in Lisbon, Portugal, high-rise buildings in Los Angeles, the California Feather River Water Project, the Trans Arabian Pipe Line, and nuclear power plants in the U.S., Japan, and Europe.

Housner is a member of the National Academy of Engineering and of the National Academy of Sciences. He is currently chairman of the Earthquake Advisory Board of the California Department of Water Resources and has served on the Governor's Council on Earthquake Hazards and the Los Angeles County Earthquake Investigation Commission. His awards include the Distinguished Service Award of the U.S. War Department, the Vincent Bendix Research Award of the American Society for Engineering Education and the von Karman Medal for Research of the American Society of Civil Engineers. He has served as president of the Seismological Society of America and the International Association for Earthquake Engineering. At Caltech he has been chairman and secretary of the faculty and is a member of The Associates.



Donald Hudson

Donald E. Hudson

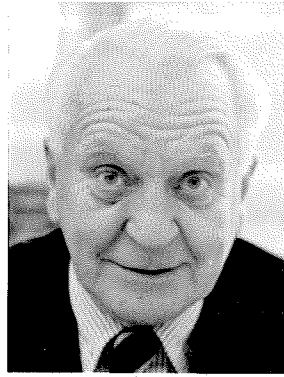
Professor of Mechanical Engineering and Applied Mechanics

After earning his BS (1938), MS (1939), and PhD (1942) at Caltech, Donald E. Hudson joined the faculty, becoming professor of mechanical engineering and applied mechanics in 1955. He will become professor emeritus next month.

A pioneer in developing analytical and experimental methods in earthquake engineering, he has made basic contributions to experimental techniques in structural dynamics, developing some of the first practicable devices for determining the response of full-scale structures to dynamic loads. He made the first of many visits to India in 1958, when he assisted in establishing the School of Earthquake Engineering at the University of Roorkee. At present he directs a joint Indo-U.S.A. program for the deployment of special instrumentation for the measurement of strong earthquake ground motions in the Himalayan regions. He has been active in similar instrumentation projects in California, Yugoslavia, and Argentina. Earthquake engineering interests have taken him on extended trips to South America in connection with UNESCO programs, to New Zealand, and to Japan.

Hudson was elected to membership in the National Academy of Engineering in 1974. He is a Fellow of the American Society of Mechanical Engineers, and past president of the Seismological Society of America. Other memberships include the Society for Experimental Stress Analysis, the American Society for Engineering Education, the American Geophysical Union, and the Earthquake Engineering Research Institute. In 1980 he was elected to a four-year term as president of the International Association for Earthquake Engineering.

Paco Lagerstrom



Paco A. Lagerstrom

Professor of Applied Mathematics

After 35 years on the Caltech faculty Paco A. Lagerstrom will become professor emeritus this summer. He first came to the Institute as a research associate in aeronautics, becoming professor of aeronautics in 1952. He has been professor of applied mathematics since 1967.

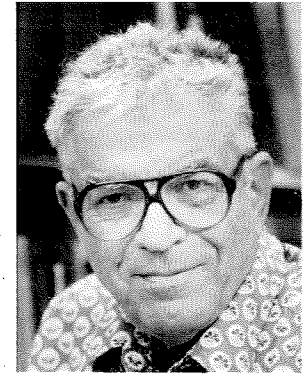
Born in Sweden, he studied at the University of Stockholm and earned a graduate degree in philosophy in 1939. In 1942 he received a PhD in mathematics from Princeton, where he remained as an instructor until early 1944. He then joined Bell Aircraft as an aerodynamicist and subsequently Douglas Aircraft where he stayed on as a consultant till 1966. Lagerstrom has been at Caltech since 1946 except for a year (1960-61) when he taught at the University of Paris on Guggenheim and Fulbright fellowships.

His early applied work was concerned mainly with aerodynamics and space dynamics (he was a contributor to Douglas's pioneering 1946 report on the feasibility of placing a satellite in space). Later on he turned to theoretical studies of viscous flow. This led to investigations of the basic ideas underlying singular perturbation techniques, the extension of those techniques, and their applications outside fluid dynamics, and he is currently finishing a book in this field. His early work on supersonic wings involved use of Lie's classical methods of applying group theory to differential equations, and recent research has focused on the extension of Lie's ideas to higher-order symmetries.

Lagerstrom has played a very active role in the local arts community. He has been a board member of the Coleman Chamber Music Association since 1950 and its president (1958-60). Other board memberships included the Southern California Chamber Music Society and several other music organizations, and he is a former trustee of the Pasadena Art Museum. In 1974 the Pasadena Arts Council presented him its Patron of the Arts award.

Lagerstrom also was named Chevalier

Robert Langmuir



(dans l'ordre des) Palmes Académiques (1963) and is a founding member of the international committee of Journal de Mécanique (Paris). He is a member of the American Mathematical Society and SIAM.

Robert V. Langmuir

Professor of Electrical Engineering, Emeritus

Robert V. Langmuir came to Caltech for the second time in 1948. The first time was as a graduate student in 1935, and he received his PhD in 1943. Between 1942 and 1948 he worked for General Electric — on radar countermeasures until 1945 and then on the construction of a 70 MEV synchrotron. When he came back to the Institute it was as a senior research fellow, and his research was on the construction of a large electron synchrotron in the energy range between 600 million and one billion volts. One way or another, that project kept him and several other faculty members busy for the next 12 years. He became a full professor in 1957 and professor emeritus in 1980. He acted as head of electrical engineering from 1960 to 1970.

Langmuir was a consultant to TRW Inc. from 1956 to 1964 and to Consolidated Engineering Corporation from 1952 to 1954. He is a Fellow of the American Physical Society and a member of the Institute of Electrical and Electronic Engineers. His book, *Electromagnetic Fields and Waves*, was published by McGraw-Hill in 1960.

Gilbert D. McCann

Professor of Applied Science, Emeritus

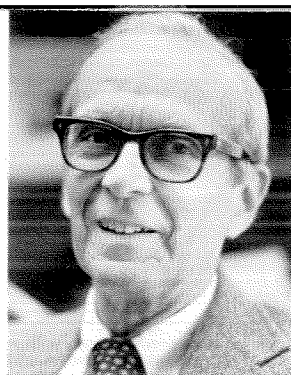
Gilbert D. McCann became professor of applied science emeritus last summer after 34 years on the Caltech faculty. He also received all three degrees from the Institute, his BS in 1934, MS in 1935, and PhD in 1939.

After several years at Westinghouse, where he initiated the company's large-scale computer program, he returned to

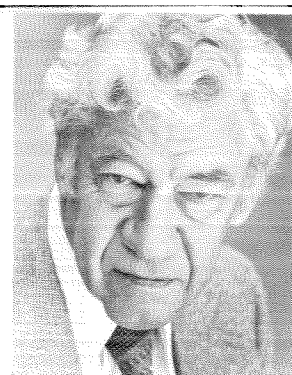
Gilbert McCann



Rodman Paul



Duncan Rannie



Caltech in 1946 to begin a research program in the development of analog and digital computers and their applications to engineering and numerical analysis. From 1947 to 1966 he was professor of electrical engineering and thereafter until retirement was professor of applied science. He was named director of the new computing center (later known as the Willis H. Booth Computing Center) in 1966, a post he held until 1971.

McCann presided over the initial expansion of Caltech's campus-wide, interactive computer system, making it accessible to students as well as faculty, and for teaching purposes as well as research. His own early research was directed toward miniaturization of electronic components for computers, while subsequent work took him into the application of computer technology to biology. He was particularly concerned with basic processes of sight perception and how animals can translate what they see into thought and action. His most recent research has involved combining x-ray and computer techniques applied to such diverse fields as archaeology and studies of the brain.

In 1942 McCann received the Eta Kappa Nu Award for Outstanding Engineer. He is a fellow of the Institute of Electrical and Electronics Engineers and a member of several other technical societies, as well as the Caltech Associates.

An avocation for McCann over the last few years has been raising Arabian horses. He hopes in retirement to have more time to devote to this.

Rodman W. Paul

Edward S. Harkness Professor of History

Rodman Paul, a leading authority on the history of the American West, will become professor emeritus next month after 34 years at Caltech. During that time he also served as acting chairman of the Division of the Humanities and Social Sciences (1978) and was twice cited by the student body for excellence in teaching (1977 and 1980).

Paul received his AB, AM, and PhD

degrees from Harvard, where he was also an instructor and assistant dean. After service in the Navy during the war, he taught briefly at Yale before coming to Caltech in 1947. He has been here ever since with the exception of a year at Oxford (1955-56) on a Ford Foundation grant.

In addition to his numerous professional memberships, Paul is currently president of the American Historical Association's Pacific Coast branch and has been elected a fellow of the Society of American Historians and the California Historical Society. He was president of the Western History Association in 1978 and from 1968 to 1977 was a member of the Advisory Council of the National Archives in Washington and also served as its chairman. Last year he was elected to membership in the famous old American Antiquarian Society, founded during the War of 1812. He has also been a member of the board of editors of half a dozen major historical journals.

Paul has published several books and numerous articles on the American West, particularly the mining era. His book *California Gold: The Beginning of Mining in the Far West* (1947) won the annual prize of the American Historical Association's Pacific Coast branch, and an essay by him won the annual prize as the best article published in the *Pacific Historical Review* in 1959. He has also written extensively on California history and is currently doing research for a book on the Far West and the Great Plains between 1859 and 1900.

W. Duncan Rannie

Robert H. Goddard Professor of Jet Propulsion and Professor of Mechanical Engineering

Duncan Rannie, who came to Caltech to study under Theodore von Kármán, will become professor emeritus this summer. With a BA (1936) and MA (1937) from the University of Toronto, Rannie was appointed a graduate assistant in mathematics and aeronautics at Caltech in

1938. For the next three years he worked with von Kármán on a number of projects, including the aerodynamic design of the Smith-Putnam windmill and the investigation of the failure of the Tacoma Narrows Bridge. From 1941 to 1946 he headed the aerodynamics group responsible for gas turbine development at the Northrop-Hendy Company. In 1946 he went to the Jet Propulsion Laboratory as chief of the Ramjet Section. He was appointed assistant professor of mechanical engineering in 1949, associate professor in 1951, the same year he completed his PhD, and professor in 1955. The following year he was named the second Robert H. Goddard Professor of Jet Propulsion and the title of Professor of Mechanical Engineering was added in 1978.

Rannie is known for his work in several branches of fluid mechanics, in particular the aerodynamics of turbomachines and of heat exchangers. He has done extensive research on the design of compressor blading, on stalling of compressors and on the flow of particulates in rocket engines. He is a Fellow of the American Institute of Aeronautics and Astronautics, a corresponding member of the International Academy of Astronautics and a member of the National Academy of Engineering.

John Todd

Professor of Mathematics

John Todd, who joined the Caltech faculty in 1957, will become professor emeritus on July 1. An expert in numerical mathematics, he has devoted most of his research over the past 40 years to exploitation of the computer in various fields of mathematics, science, and engineering.

Educated in his native Northern Ireland and at Cambridge, England (where he studied under the legendary J. E. Littlewood), he received his BSc in 1931 from Queen's University, Belfast, where he was a lecturer from 1933 to 1937. Between 1937 and 1949 he taught at King's College, University of London, and it was there that he met and married Olga Tausky who also became a noted mathemati-

John Todd



cian. During the war he was a scientific officer with the British Admiralty. In 1945 he was instrumental in preventing the dissolution of the Research Institute at Oberwolfach, an organization that has since made unique contributions to the mathematical sciences. In 1947 he was invited to work on high-speed computing at the National Bureau of Standards in Washington, D.C., and California. Except for some time with John Von Neumann's group at Princeton's Institute for Advanced Study, and a brief return to London, Todd remained at the Bureau for ten years, first as chief of its Computation Laboratory (one of the first such to be equipped with an electronic computer, the SEAC) and then as chief of Numerical Analysis. In 1957 he became professor of mathematics at Caltech.

Robert Walker



Todd was also a Fulbright Professor at the University of Vienna in 1965. He has been active in various professional societies, in particular the Mathematical Association of America, of which he is at present a governor.

Robert L. Walker
Professor of Physics

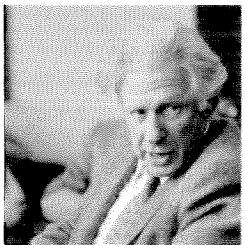
Robert L. Walker, who has also been executive officer for physics since 1976, will become professor emeritus this July. He has elected early retirement and plans to move to New Mexico.

Walker earned his BS at the University of Chicago in 1941 and during the war worked on the Manhattan Project at both the University of Chicago and Los Ala-

mos. After a year as research associate at Cornell University, where he earned his PhD in 1948, he came to Caltech as an assistant professor. He became associate professor in 1953, spent a year in Italy on a Fulbright Fellowship in 1955-56, and has been full professor since 1959.

Experimental high energy physics is Walker's field, and he has been particularly concerned with the design of detectors for high energy physics. During his early years at Caltech he was involved in the construction and operation of the billion-volt electron synchrotron, which at the time was the most powerful machine of its type. Much of his research was devoted to the experimental study of pion photoproduction reactions and to the theoretical interpretation of photoproduction data. After 1970 he worked on pion charge exchange and related reactions at the Fermi National Accelerator Laboratory.

His book, *Mathematical Methods of Physics*, written with Jon Mathews, was published in 1964. Walker is a fellow of the American Physical Society and a member of the American Association for the Advancement of Science. □



An Interview with
Marvin Goldberger

... continued from page 5

GOLDBERGER: That is the case, and that is being changed by a program now in its formative stages. We expect to emphasize in our fund-raising activities over the next three or four years those things that will contribute heavily to our unrestricted funds. The mechanism for doing that is to try to greatly increase the number of endowed professorships, which will serve the purpose of giving appropriate recognition to professors on the campus. It will also relieve the general budget effectively and therefore turn even highly restricted

grants instantly into unrestricted funds. And it gives us an excellent lever for attracting outstanding people from the outside.

TIM BRAZY: Tuition has been raised by \$1,000 for next year. Do you see this kind of increase continuing for the next few years?

GOLDBERGER: Well, the tuition is going up very rapidly all over the country. We're still \$1,000 or so behind the Ivy League schools. I think our tuition will continue to climb. I worry about this seriously, of course, because when tuition climbs, we have to find adequate funds for student aid. You know we don't deny people entrance on financial grounds. So you sort of get caught coming and going.

WASSERBURG: What is your view about faculty salaries, in particular for junior faculty? A small study has shown that these people are suffering some substantial economic jeopardy, and that means that the institutions are in danger of not being able to attract really outstanding young people on which the future of their institutions must clearly depend.

DANIEL KEVLES: Particularly in very high demand fields like engineering.

GOLDBERGER: Well the problem in engineering is really acute in all of the fashionable fields — computer science, electrical engineering, solid state physics. With current industrial engineering salaries, students in those fields have little incentive to take a job at half the salary at a university. But there are only a certain number of things that one can do to alleviate this situation. One thing we're trying to interest donors in is making prize junior appointments — like the Noyes instructorship in chemistry — jobs that have some perks such as certain amounts of funds available for research, for travel, or we might even want to allow a half year off during the first three or six years appointment for a sabbatical. As far as competing directly with salaries, I don't see how we can ever do that.

LIST: How do medical and dental schools do it, and law schools? They have exactly the same kind of problem — competing with a professional income that may run into six figures. Yet they seem to be able to find very good people to teach.