

The Month at Caltech

NAS Elections

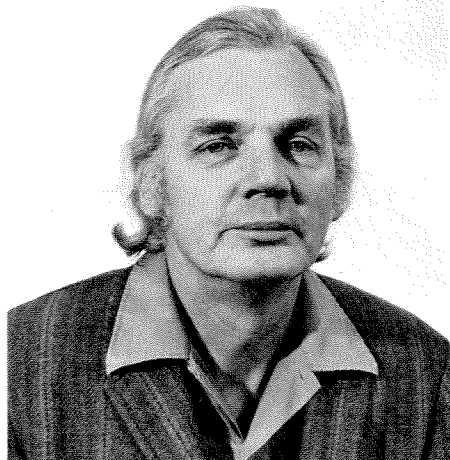
Five faculty members were elected to the National Academy of Sciences last month, bringing Caltech's total current membership to 46. The new members are Roy J. Britten, visiting associate in biology; Pol E. Duwez, professor of materials science; Peter Goldreich, professor of planetary science and astronomy; George Housner, professor of civil engineering and applied mechanics; and William B. Wood, professor of biology.

Britten, a staff member of the Carnegie Institution of Washington who has been at Caltech for the past year, has been doing research on DNA. He has found that much of the DNA of higher organisms consists of sequences of nucleotides repeated many times with varying degrees of precision. The discovery of this quality of DNA has opened new possibilities for the interpretation of both differentiation and evolution.

Except for the period 1935-40, Duwez has been at Caltech since 1933. He ranks as one of the world's leading scientists in the field of metals and materials, and is particularly noted for his development of new alloys with his ingenious "splat quenching" technique. Some of these new substances have unusual superconducting and thermoelectric properties.

Goldreich has done extensive theoretical work in classical astronomy, geophysics, and neutron star physics. He played a major role in explaining the mechanism of a pulsar, and obtained the first explanations of physical conditions for the maser process in interstellar clouds. He has been on the faculty at Caltech since 1966.

Housner, who is also a member of the National Academy of Engineering, is a noted earthquake engineer. His work on the properties of strong-motion earthquakes is the foundation for much of the current thought about design necessities in a seismic area. Housner was a consultant on California's Feather River Water Project, in the design of San Francisco's rapid transit system, and in



Roy Britten



Peter Goldreich

preparation of the Atomic Energy Commission's manual on nuclear reactors and earthquakes. He is a Caltech alumnus (MS '34, PhD '41) and has been a member of the faculty since 1945.

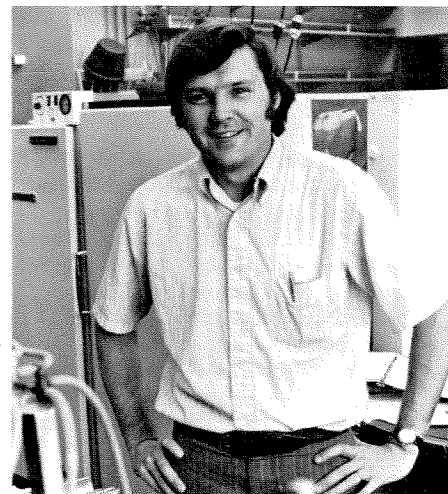
Wood, who has been at Caltech since 1965, did major research toward determining the function of individual genes of the virus T4 from precursor components. During the past five years, he and his graduate students have analyzed the sequence of molecular transformations necessary for constructing the tail fibers of the virus. A significant milestone in understanding molecular architecture, this work won for Wood the U.S. Steel Award in Molecular Biology from NAS in 1969.



Pol Duwez

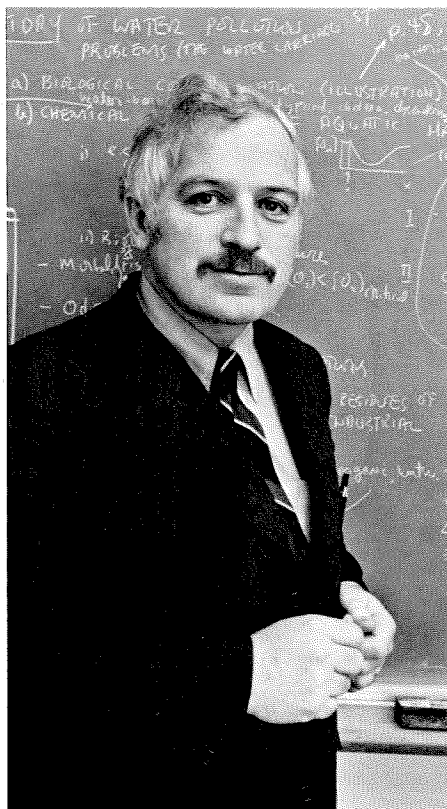


George Housner



William Wood

The Month at Caltech . . . continued



James Morgan

Morgan Moves to New Environment

James Morgan, 39, professor of environmental engineering science, has been appointed dean of students. He succeeds Robert Huttenback, professor of history, who has become chairman of the division of humanities and social sciences.

Between now and July 1, when his appointment becomes effective, Morgan plans to get ready for his new job by talking with those who know most about it: his predecessor; the other two members of the three-man team who are concerned with student activities and academic problems—Lyman Bonner, director of student relations, and David Wood, associate dean of students—and to as many students as possible. As far as Morgan is concerned, one of the most

important activities for a dean is to help adapt the educational opportunities at Caltech to the needs of the individual student, and that's how he'd like to concentrate his efforts.

A native New Yorker—who spent the first five years of his life in Ireland—Morgan received his BS in civil engineering at Manhattan College in 1954 and his MS at the University of Michigan in 1956. For four years after that he was an instructor in civil engineering at the University of Illinois, and then went on to take an MA and a PhD in applied chemistry at Harvard University, where he was a Danforth Teacher. From 1963 to 1965 he was an associate professor of water chemistry and of civil engineering at the University of Florida.

Since coming to Caltech in 1965, Morgan has focused his research on projects relating to water chemistry, the effects of pollution on natural waters, and the improvement of water quality through new treatment processes. His research group has been working on the environmental chemistry of phosphorus, models for complex chemical systems, the use of polymers for removing particles from water, and the behavior of trace metals such as manganese, cadmium, and iron in water.

Since 1967 he has been editor of *Environmental Science and Technology*, a journal on environmental research published by the American Chemical Society. He was one of the authors of the ACS 1969 report on "Cleaning the Environment," and is co-author with Werner Stumm of Harvard of *Aquatic Chemistry*, a widely used advanced text published in 1970.

Morgan expects to spend about half of his time on his new duties, and divide the rest between research and teaching. This is in the tradition of Caltech deans, who have all been chosen from the faculty and have continued some of their academic activities.

Guggenheim Awards for 1972

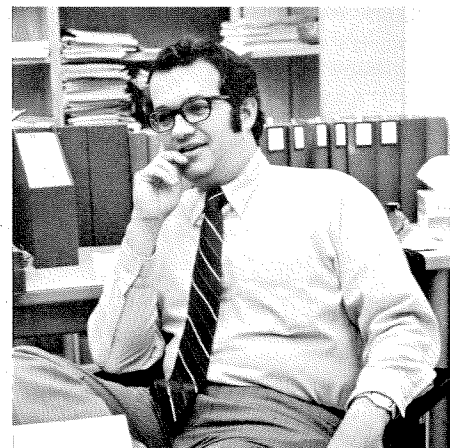
Guggenheim Fellowship Awards for 1972 rained on Caltech last month: Three faculty members, a poet-in-residence, and 14 alumni received grants from the John Simon Guggenheim Memorial Foundation in recognition of their past accomplishments and future promise. They are among 372 scholars and artists chosen from 2,506 applicants.

Harry Gray, professor of chemistry at Caltech since 1966, will use his grant to work on the spectroscopy of metallo-proteins—leaving Pasadena late this summer for the University of Copenhagen. About March 1 he will go on to the Biochemical Institute of the University of Rome for two or three months, and will probably wind up his project with a short trip to Israel before returning to Caltech in June of 1973.

With his grant, Vincent McKoy, associate professor of theoretical chemistry, will be going to Harvard University in January to spend about three months with the theoretical chemistry group there. He then plans to spend a couple of months



Harry Gray

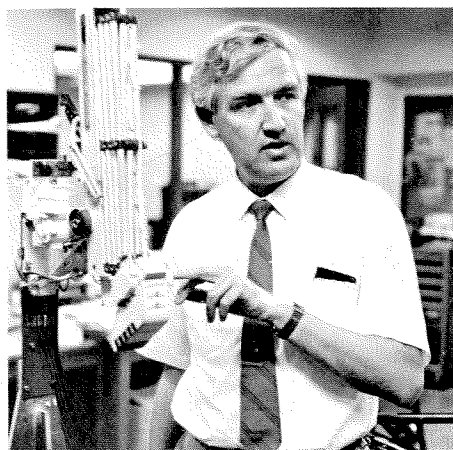


Vincent McKoy

working on electron molecule scattering with the applied physics group at Yale. McKoy got his PhD from Yale in 1964 and has been at Caltech since that time.

Ronald Scott, professor of civil engineering, will use his award to spend a year as a Fellow of Churchill College of Cambridge University. He plans a three-part program there: giving one formal lecture each term that he is in residence, doing some teaching and research on constitutive relations for soils, and revising a book that he wrote about ten years ago. Scott has been a member of the Institute faculty since 1958.

Diane Wakoski, poet-in-residence at Caltech this term, comes most recently from New York, though she is a native Californian and a graduate of UC Berkeley. Her first book, *Coins and Coffins*, was published in 1962, and since then there have been five more: *Discrepancies and Apparitions*, *The George Washington Poems*, *Inside the Blood Factory*, *The Magellanic Clouds*, and *The Motorcycle Betrayal Poems*.



Ronald Scott



Diane Wakoski



Practical Chemistry

Where there's smoke, there's fire—and in this case it's on purpose. The demonstration was part of a session of Chem 6, a series of informal seminars in practical chemistry organized in response to complaints by students that their regular chemistry courses were too heavily theoretical. The pyrotechnics show put on by George Rossman, assistant professor of mineralogy and chemistry, was one of the more spectacular of the series, which also covered such subjects as explosives, propellants, poisons, hormones, stimulants and depressants, and addictive drugs. Undergraduate chemistry students Art Ellis and Doug Hounshell organized the seminars with the assistance of Harry Gray, professor of chemistry, and an ad hoc group of other faculty, postdoctoral fellows, and students.

Fulbright for Anson

Fred C. Anson, professor of analytical chemistry, has been named a Fulbright Scholar to study abroad under the U. S. State Department's educational and cultural exchange program. Beginning in September, he will spend four months working with Dr. Rolando Guidelli of the Institute of Analytical Chemistry in the University of Florence.

Anson's research involves electrochemical studies of inorganic compounds, and he and Guidelli will be working jointly on investigations of particular chemical substances which absorb on the surfaces of metal electrodes, facilitating the efficient conversion of chemical energy directly into electrical energy.

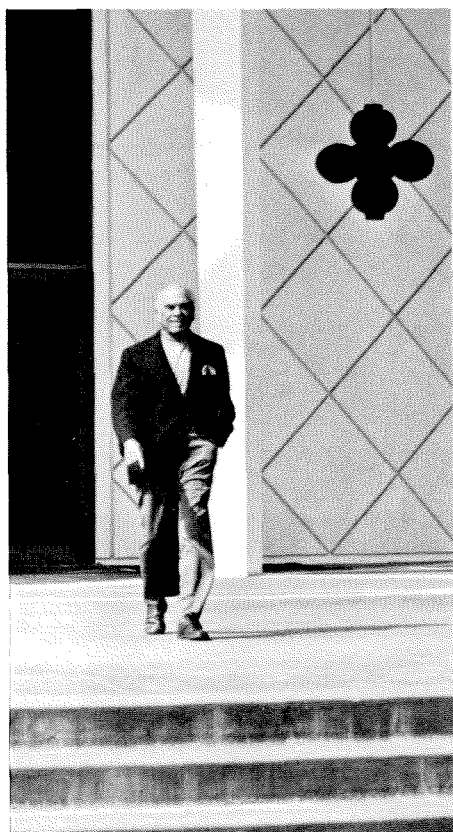
Anson is a Caltech alumnus, class of 1954, and received his PhD from Harvard. He has been a member of the Caltech faculty since 1957.

The Month at Caltech . . . *continued*

Mr. Capra Comes to Pasadena

Mr. Capra came to Caltech on April 17 to give the Monday Evening Lecture in Beckman Auditorium on "A Caltech Alumnus in the Arts."

Frank Capra got his degree here in 1918 in chemical engineering; then went on to a distinguished career in motion pictures—a fact duly noted by President DuBridge when he presented Frank



Frank Capra

with one of the first Distinguished Alumni Awards at the Institute's 75th birthday celebration in 1966. "Frank Capra," he said, "demonstrates that a Caltech education is not necessarily a fatal handicap to a distinguished career in the arts."

Capra put in a full day at Caltech on the 17th. He met in the afternoon with students working on the film-making project which he supports. Then his fellow members of the Caltech Associates entertained the Capras at dinner in the Athenaeum before Frank gave his Beckman lecture—to a full house.

During the Capra visit, it was formally announced that Frank and Lucille Capra had given their 14-acre Lu-Frank Ranch to the Institute, for use as a retreat. The \$250,000 ranch consists of a five-bedroom house, built in 1956, a caretaker's cottage, a large pool, landscaped gardens that include rare trees planted in 1884, a family orchard with a variety of fruit trees, four acres of avocado trees and one of young citrus trees. The ranch is on gently sloping hills five miles east of Fallbrook, about 100 miles from Caltech.

Achievement Award

C. J. Pings, professor of chemical engineering and of chemical physics, has received the Technical Achievement Award from the American Institute of Chemical Engineers for outstanding contributions to his profession. The citation also commended Pings, who is Caltech's vice provost, dean of graduate studies, and executive officer for chemical engineering, for his excellent record as an administrator.

Ping's research is in the area of liquid state physics, centering on applied chemical thermodynamics and the physics and chemistry of liquids. His work in thermodynamics has led to improved methods of describing the displacement of chemical equilibria, and the techniques he has developed have been adopted by several universities for both graduate and undergraduate courses.

Computer Co-op

Caltech, USC, and UCLA are studying the possibility of setting up a cooperative computer network. The three schools began considering the possibility of sharing computers for greater efficiency and economy last fall—financing their investigation with a \$25,000 grant from the Rockefeller Foundation. If the project works out, it may encourage other universities to consider similar sharing, and for this reason the National Science Foundation recently allocated \$144,800 to the three schools to conduct a more extensive study.

According to Provost Robert Christy, Caltech's representative on the inter-school panel, the Institute spends about \$1.3 million a year on leasing and operating its computers. About \$500,000 of that amount is funded through various research grants. The other \$800,000 comes from the Institute's general fund. Of this, about \$200,000 is used for educational purposes and another \$200,000 is used for research computing.

Christy hopes the computer study will reveal how Caltech might save from \$100,000 to \$200,000 annually—possibly by eliminating one of its computers and sharing use of an off-campus facility, and still, of course, maintaining the excellent computing service now available.

At present Caltech has two computers: an IBM 370/155 for batch processing and a PDP-10 for interactive processing. In batch processing, numerical data are fed in batches into a computer and stored. When the computer has time from other duties, it processes and analyzes the information. In the interactive process, time rather than quantity of information is the important factor. The machine is constantly in communication with the user at a remote terminal. It responds instantly when the user has a question.

The PDP-10 operates an effective interactive system on campus, but it is not used up to capacity. USC leases and operates a batch processor similar to Caltech's IBM 370/155, but it is not fully used either. UCLA has a much larger capacity machine—an IBM360/91—which it is purchasing.

If a high-speed communications link between Caltech and one or both of the other schools were to be established, USC, for example, could send all its interactive work here, and the Institute could send all of its batch processing work there. Machines at both schools would be operated at their full efficient capacities. If either school needed even more computer time, it could be purchased from UCLA, which could use the money re-

ceived to help pay for its computer.

One purpose of the current study is to determine the costs of setting up terminals and communications systems, and to balance these costs against possible savings for each school. Another objective will be to estimate the benefits that might result from sharing the facilities as compared with the cost of further development of the individual computing centers.

A first report of recommendations is due in about six months, and the terms of the NSF grant set an 18-month time limit on the study.

Concurrently with the computer study, the three schools will look into cooperative library operations—the goal of this inquiry also being increased efficiency and economy. It will be a two-year study funded by a \$126,500 grant from NSF. When it is completed, a written report will be made available to other institutions interested in similar sharing.

Sloan Fellowship

James E. Gunn, assistant professor of astronomy, has received an Alfred P. Sloan Research Fellowship for 1972. Gunn is noted for his studies of quasars and for research that seems to support the validity of the red shift as a yardstick for measuring distance in the universe.

Sloan Fellowships are designed to make possible advances in basic research by young scientists. Gunn, 33, is one of 79 scholars chosen this year from among nearly 600 nominated by their senior colleagues in 46 colleges and universities. Twenty-two other members of the Caltech faculty have received the award since the program was initiated in 1955.

The grants—which average \$8,750 per year for two years—may be used for a number of different purposes: for example, purchase of equipment and supplies; for support of technical and scientific assistance, predoctoral and postdoctoral fellows, and summer work; and in payment for computer time and for relief from teaching duties.

J. Holmes Sturdivant 1906-1972

J. Holmes Sturdivant, professor of chemistry, died in Pasadena on April 21 at the age of 66. With his unmatched genius for design, Sturdivant helped make Caltech the mecca of theoretical and experimental structural chemistry it has been for the past 50 years. The principal experimental technique was X-ray crystallography, and he, more than any other person, created the instrumentation required to probe for the positions of atoms in crystals of a wide variety of chemical and biological materials.

For many years, Holmes taught courses in X-ray crystallography, and among his students were many men who became giants in the field of structural chemistry. Through his undergraduate courses in instrumental analysis, he emphasized the importance of understanding the basic principles of each instrument.

In his early years at the Institute, Sturdivant worked closely with Arthur Amos Noyes. The two men found a remarkable community of personality traits and ideas, sharing an almost reverent attitude toward precise, logical thinking and careful execution of experiments. Along with the late Robert Corey, Sturdivant produced the experimental facts which stimulated the advances made by Linus Pauling and other structural theorists of the 1930's and 1940's.

Holmes Sturdivant was Dr. Pauling's first graduate student. Pauling recalls, "He showed great ability in his work and was responsible in large measure for the development of structural chemistry at the Institute."

Ernest H. Swift, who succeeded Pauling as division chairman in 1958, recognized his contributions toward the administrative operation of the laboratories by naming Sturdivant executive officer for the division. Swift and John Roberts, chairman from 1963 to 1968, agree that "only one who has been a chairman can fully appreciate how indispensable Holmes Sturdivant was to the personnel and the many activities within the division."

Making Caltech a desirable place for the men who have made the Institute a world center for chemical science was no mean task in a place remote from the nation's centers of chemical industry and

most of the other centers of excellence in chemistry. Chemists all over the country have envied Caltech because of the quality of its laboratories, the mechanical and glass shops, the library facilities, the stockrooms, and the secretarial services. Sturdivant was the guiding influence behind creation of these indispensable adjuncts to productive scientific work.

The most obvious evidence of his skill was in the interior design of laboratories, particularly the Church Laboratory of Chemical Biology and the Noyes Laboratory of Chemical Physics. He also carried on a systematic and imaginative program for progressive rehabilitation of Gates and Crellin laboratories. Finally, in the last months of his life, he undertook a design project which was truly alien to his nature. Earthquake damage to the Gates Laboratory resulted in condemnation of the building. Financial stringency required functional replacement at minimal cost. The decision was made to construct a building to house undergraduate laboratory instruction under a painfully austere budget. Working with the architects, Sturdivant designed a building that will serve the instructional purpose, at least for the immediate future, and one that met the budget requirements. His humor is illustrated in his memo to me of February 23: "I suspect that the administration may ask you within a month your preference regarding the name of the new building. It is now known variously as the Chemistry Laboratory Relocation Building, Noyes Annex, Son of Noyes, and the Hovel. It would be mildly insulting to put anyone's name on it. Perhaps Laboratory for Undergraduate Chemistry would do, with the acronym LUC."

Gardening was one of Sturdivant's many interests outside Caltech. Some others were music and the ballet, and he was knowledgeable about both. His professional affiliations included membership in the American Chemical Society, the American Physical Society, and the American Crystallographic Association.

He is survived by his wife, Arletta, of Pasadena. It was his wish that no memorial services be held.

—George Hammond