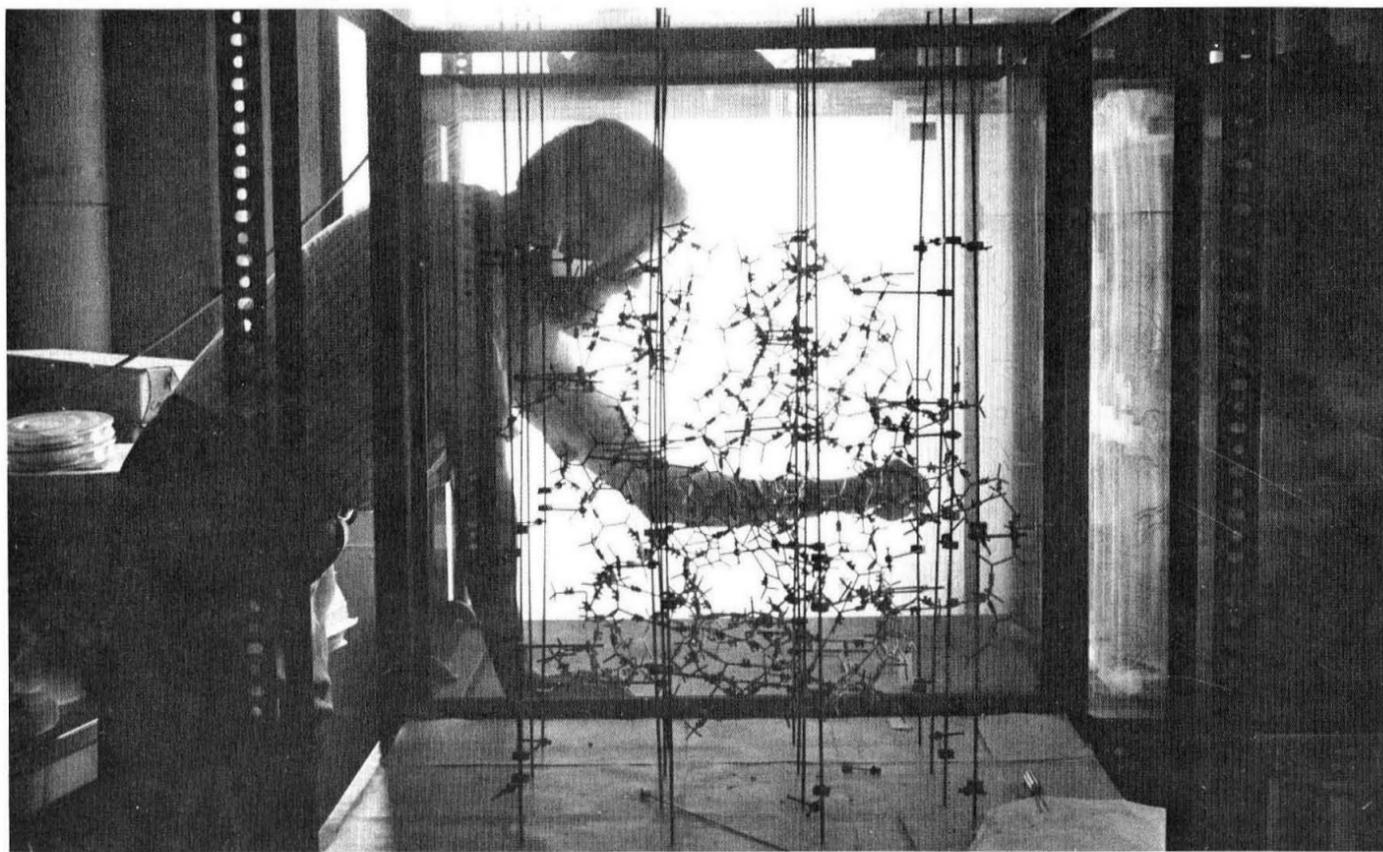


PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

Insight into energy metabolism



Richard E. Dickerson, professor of physical chemistry, examines an atomic model of the structure of cytochrome c, a respiratory protein involved in the conversion of energy in the body. This cytochrome c protein is from the bacteria, *P. aeruginosa*. Dickerson's work is important in an understanding of energy metabolism.

Victor Veysey heads Industrial Relations Center

Former U.S. Congressman and Assistant Secretary of the Army Victor V. Veysey, BS '36, has been named to head Caltech's Industrial Relations Center. He succeeds Robert D. Gray, director of the center since 1941; Gray will continue with Caltech as professor of economics and industrial relations.

The Industrial Relations Center conducts more than 50 management seminars and workshops each year for area executives. It also offers advisory and research and development facilities in management for California industry, and courses to prepare Caltech students for managerial roles.

"We're delighted to have Victor Veysey in this position," said Rob-

Molecule converts sunlight into fuel

A compound that can convert the energy of sunlight directly into chemical fuels has been developed by three Caltech scientists. The compound, a complex molecule containing the metal rhodium, is the discovery of Harry B. Gray, the William R. Kenan, Jr. Professor and Professor of Chemistry; Kent R. Mann, an N.S.F. energy postdoctoral fellow; and June graduate Nathan Lewis.

This work is still in an experimental stage. But discovery of the molecule raises the possibility of converting sunlight into fuel much more efficiently than through proposed plans for converting either solar-produced electricity or plant material into fuels.

The compound, which is blue in solution, consists of two atoms of rhodium held closely together by four clamplike structures composed of carbon, hydrogen, and nitrogen atoms. The structure of the molecule resembles a windmill, with the rhodium atoms trapped at the hub and the clamplike structures protruding like the vanes of a windmill. When the light strikes it, the blue compound reacts with the hydrogen atoms in the surrounding solution to produce hydrogen gas, and the compound's color changes from blue to yellow.

The new compound solves a major problem that has plagued scientists attempting to use chemicals to harness solar energy. Until now, the compounds with which they have experimented have been able to utilize solar energy to activate only a single electron at a time. But pairs of electrons are necessary to create chemical bonds, as in the production

of hydrogen gas, from the individual atoms in solution. The Caltech discovery contains two rhodium atoms in each molecule; when irradiated, each of these yields an electron. This means that two electrons are available to create a chemical bond.

The rhodium molecule has several other advantages that make it promising as a sun-capturing chemical. It reacts most readily with light in the visible region of the light spectrum, where solar energy is most concentrated. And it reverts slowly to its original blue form. This means that there is time to remove the hydrogen fuel that is produced before it is absorbed.

But considerable work must be done before the molecule will be practical for use in solar conversion systems, according to Gray. For one thing, the efficiency of the conversion system is low. One hundred photons of light are required to produce four molecules of hydrogen. Another problem is that the system utilizes only a small portion of the spectrum of sunlight.

To solve these problems, the scientists plan to "fine tune" the molecule, changing its structure to alter the distances of the rhodium atoms from one another. They will also try to fit metal atoms other than rhodium into the structure. For example, if iron, nickel, or cobalt can be used, then the economics of the system will improve substantially.

Gray and his colleagues are experimenting with ways to recycle the compound — perhaps the most important problem to be solved before it can be used to make fuels from sunlight. After hydrogen is pro-



Harry Gray

duced through use of the blue form, then the yellow form must regain its lost electrons and revert to the blue form before it can be used again.

Benzer honored by the Technion

Caltech biologist Seymour Benzer is the recipient of the fifth annual Harvey Prize in Human Health presented by the Technion — Israel Institute of Technology. Benzer, who is the James G. Boswell Professor of Neuroscience, received the \$35,000 award "in recognition of his discoveries in molecular genetics and behavior, which inspired the work and thought of a whole generation of modern experimental biologists." The prize was presented at the Technion's annual Board of Governors' meeting.



Victor Veysey

ert F. Christy, acting president of Caltech. "His diverse management talents should enhance and broaden the center as the invaluable aid to California industry that it has become under Bob Gray."

In 1975 Veysey received Caltech's Distinguished Alumni Award, the highest award that the Institute can confer on an alumnus. He also has received the U.S. Army Outstanding Civilian Service Award and is a fellow of the Institute for the Advancement of Engineering.

As assistant secretary of the Army for civil works in 1975-76, Veysey was responsible for the Army Corps of Engineers' civil works program for development of water resources, for the Army's environmental policies and programs, and for policy for the Panama Canal Company and Zone government.

Before his election to the California Legislature as an assemblyman in 1962, he worked as a manager in private industry. In 1971 he was elected to the U.S. Congress, where he was a representative of the 38th and 43rd districts of California until 1975.

From 1942 to 1944, Veysey taught industrial relations at Caltech and was plant manager for a Caltech project to design and build Navy rockets and ordnance.

ALUMNI ACTIVITIES

December 7

Alumni Dinner — Earnest C. Watson Caltech Lecture. Cocktails, 6 p.m.; dinner, 6:30 p.m., the Athenaeum. Cost: \$9.00 per person. Lecture, 8 p.m., Beckman Auditorium. Speaker: Murray Gell-Mann, Robert Andrews Millikan Professor of Theoretical Physics.

January 2

Rose Parade Special. 7:30-9:30 a.m. — Continental breakfast in the Athenaeum; 9-11:15 a.m. — Walk to Colorado Boulevard to watch the 89th Annual Tournament of Roses from reserved grandstand seats; 12 noon — Buffet lunch in the Athenaeum. For those with tickets to the game, a box lunch and bus transportation to the Rose Bowl will be provided.

It's cricket, after all

Cynics might observe that it really isn't cricket for a Caltech athletic group to break with tradition and win a championship. But the Institute's Cricket Club, apparently no respecter of tradition, did just that by placing first in its season competition. The club, composed of undergraduates, graduates, faculty, and staff, won 10 out of 14 contests, tying two and losing two events. The club claimed the championship with an August victory over the UCLA Blues.

The Caltech Cricket Club competes in the B League of a two-level league that was organized by the Southern California Cricket Association. Most clubs are not connected with colleges or universities.

No football this fall

Caltech won't field a football team this year because of an insufficient number of players, according to Director of Athletics, Warren G. Emery.

Emery said the decision was made by both the coaching staff and the players based on an inadequate turnout at the first practice session. Only 15 students showed up for the practice and 25 are needed to form the basis for a team.

Emery stressed that every effort will be made to field a team next year, and that cancellation of this year's football schedule by no means indicates a permanent cancellation of the sport.

"The coaches and players are terribly disappointed, of course," Emery said. "Football has been a tradition at Caltech since 1920. Caltech fielded a team every year since then except for the war years of 1942 and 1943 and many teams were fielded even earlier, back to the 1890's."

Starting with a 60 to 4 loss to USC in 1893, the Beavers won 107 games, lost 322, and tied 16. Last year they finished the season with a 2-4 record, including 2 victories against a club team, the Glendale Colts.

James Mayer

A student's best friend is a master

Two years ago, James W. Mayer's professional attention centered on matters like the interaction between metals and semiconductors during the fabrication of integrated circuit components or the scattering of million electron-volt ions from crystals.

Those subjects still intrigue him, but his work at Caltech has now broadened substantially to include inviting a prominent industrial scientist to dinner in a student house . . . or helping a freshman who just blew a final to put himself back together . . . or organizing a gourmet cooking contest . . . or getting the word to a faculty member that freshmen are finding his course unintelligible and are afraid to tell him . . . or finding a grant to support a weekend art project.

As professor of electrical engineering, Mayer continues to carry a full research and teaching load. But as master of student houses he has taken on another major responsibility: making life for undergraduates more enjoyable and helping them to cope with academic pressures at Caltech. These pressures can be formidable, especially for freshmen.

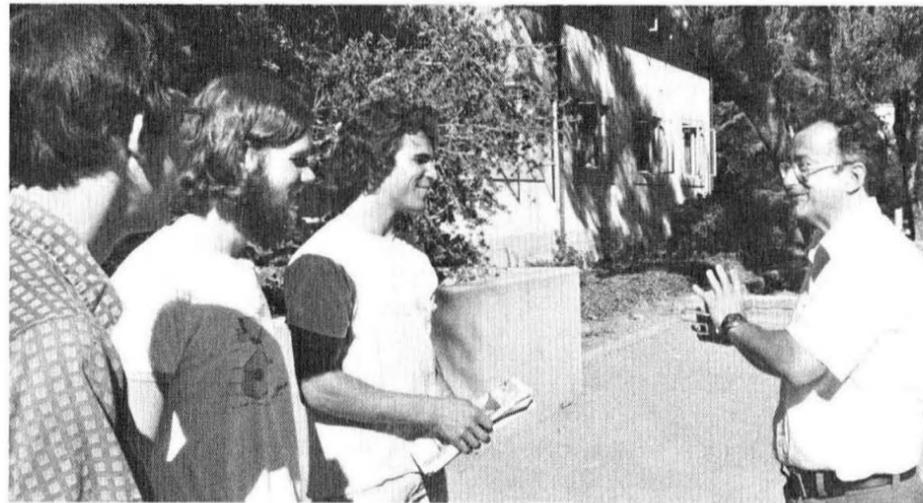
"The transition to Caltech can be brutal," Mayer says. "Many students have never been away from home before. Most never received less than a B in a course they cared about. They never felt they couldn't cope with their studies. They were among the brightest in their schools. A lot of them can adjust to a school where almost everyone is as bright as they are and the work is very tough, but others need some help."

To ease the academic pressures and to generate some social life, Mayer has put to work all of the ingenuity that he developed in wrestling with the problems of semiconductors. After all, one of the trademarks of a Caltech professor is his ability to grapple with new situations.

Knowing that one sure route to a young person's sense of well being is his stomach, the master's office introduced a series of gourmet cooking lessons conducted by a professional chef. In addition to providing an opportunity to eat the products of the instruction, the lessons culminated

in a cooking competition among the houses. It was judged by faculty members and administrators, and two microwave ovens were awarded to the winners. One of the ovens was a gift of the Alumni Association. The other houses received half the cost of new ovens. The master's office also sponsored a series of wine tasting seminars.

To satisfy artistic instincts, the office two years ago added Saturday afternoon classes to the renovated art workshop in the Dabney-Blacker House basement. Last year, Mayer



Outside the master's office, Jim Mayer greets returning students Paul De la Houssaye, Michael Toney, and Daniel Canin.

expanded the weekend art activities to include classes in stained glass.

Because student interest in music is high, Mayer encourages programs in this area. His office pays for the maintenance of the grand pianos in the student houses — pianos that offer welcome outlets for the many musically talented Techers who are suffering from academic fatigue. With the director of student relations, his office co-sponsored interpretive music classes conducted by James Boyk.

Another of Mayer's programs aims at helping some undergraduates to learn how to counsel fellow students who are under an emotional strain. Coping with the academic and social pressures at a university can upset almost any young person, and Mayer believes that support ought to be readily available.

"Often a student can help another student more than anyone else can,"

Mayer says, "and a student is available between 10 p.m. and 3 a.m., when problems tend to surface. We're training some upperclassmen in each of the houses to talk with people who are depressed or anxious about grades or their love life or getting along with a roommate — those kinds of things. We want the counselors to understand how common these feelings are and where the person can go for professional help if he needs it. Often a young person just needs to hear somebody say, 'You're not alone and your problem isn't

unique. Your feelings are a part of growing up.'"

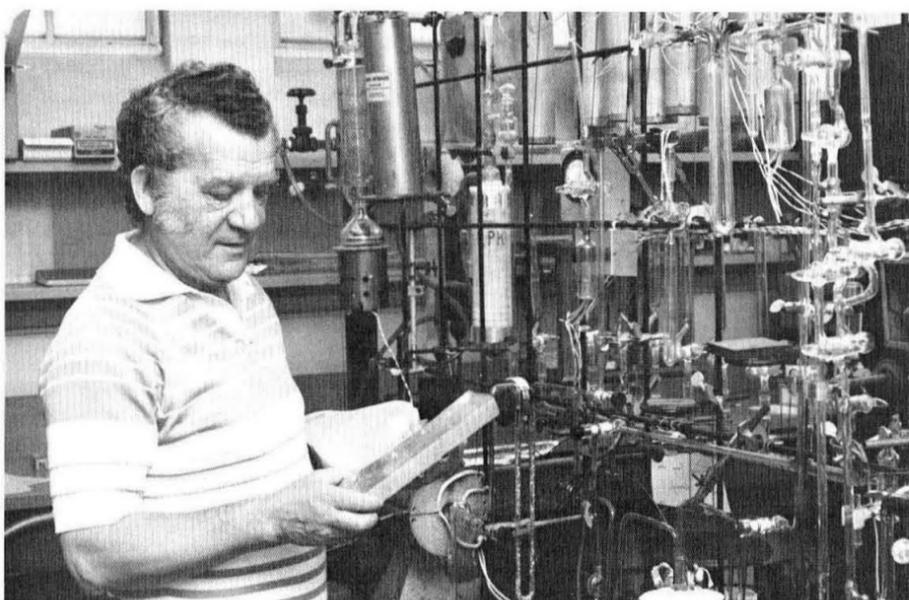
Mayer believes the student-to-student approach also works effectively on academic problems. His office last year named upperclassmen in three houses as tutors to freshmen in physics and math. The program functioned so well that this year it is available in all seven houses.

His office also subsidizes dances and parties — "anything to make life for the students more interesting" — and in this context Mayer praises the efforts of his assistant, Carmela Kempton, in meeting challenges. "She has a difficult job," he says. "She has to stay within our budget, but when we concoct a crazy but workable scheme, she has to try to find the money, take care of the details, and make it go."

He praises his wife, Betty, whom he calls the "real heroine of the assignment." Mrs. Mayer may not have been aware in the beginning that her role in her husband's new job would include entertaining some 60 undergraduates a week — on both prescheduled and spontaneous occasions — while keeping up with her own work as a teacher, but she does it magnificently. Last fall, the Mayers' involvement even extended to offering room and board to two entering freshmen until they could find suitable housing.

Mayer believes that a scientist or engineer with a research background has a special advantage as master of student houses because he understands the makeup of Caltech undergraduates and his background instills confidence. He concedes that it's tough to carry on full-time research duties while tending to the social needs of 875 undergraduates. But the understanding between him and the students — and his concern for their problems — makes the double duty worthwhile.

Ancient woods provide climatic history clues



Geochemistry Professor Samuel Epstein examines a piece of ancient wood as he prepares to analyze the isotopic composition of the hydrogen in its cellulose. From these measurements he can determine the isotopic composition of the water absorbed by the tree during its lifetime. In this way he gains information about the temperatures while the tree was growing, and thus about climatic variations many thousands of years ago.

Roberts tells Fund leaders

Alumni gifts ensure Caltech's freedom

Caltech is a unique institution, a precious national and international resource, but a resource that is in jeopardy, John D. Roberts, the Institute Professor of Chemistry, told about 100 Alumni Fund area leaders, speakers, and guests at the keynote session of the annual Alumni Fund Leadership Conference on September 17.

"The importance of private universities as innovators and standard

research and in medicine, he explained. As an essential part of this expansion, the Institute will construct the new Braun Laboratories of Cell Biology and Chemistry.

Robert H. Cannon, Jr., chairman of the Division of Engineering and Applied Science, described research under way in the division and stressed the importance of general operating funds for this work. "The future of the country depends on small pri-



Alumni Fund award winners display their trophies: From left—Martin Poggi, Vern Edwards, Andy Campbell, Ray Richards, Jeff Williamson, George Gleghorn, and Dee Brouillette.

setters for public education is incontestable," Roberts said, "and Caltech provides a marvelous example. But a lengthening shadow falls on almost all private research-oriented universities. This shadow is their increasing dependence on federal support. If we allow this dependence to continue, then Caltech and other fine private institutions may become in effect federal universities."

For example, Roberts noted that new young faculty members at Caltech used to be able to launch their research with non-federal funds. This meant that they could begin to work on a program of their choosing even if no agency in Washington would provide support. "But this freedom to initiate research without federal support is much more limited than it used to be," Roberts said.

"Caltech's quality and its small size mean that it can change rapidly, foster innovation, and exert an impact far out of proportion to the number of its faculty and students," Roberts said as he stressed Caltech's uniqueness. "The next ten years will provide the acid test as to whether we can retain our impact and our independence. To have victory in this battle to keep Caltech flexible, vital, and unique, we must rely on your unstinting support."

As a member of the Institute's Presidential Search Committee, Roberts reported that arrangements are in progress which should result in several strong candidates for the presidency visiting with faculty, students, administrators, and trustees on the campus during October. "We want to provide a real choice of individuals with different backgrounds and experiences. From the results of these visits we will recommend one or more finalists to the trustees," he said.

In a morning session, Leroy E. Hood, BS '60, PhD '68, the Ethel Wilson Bowles and Robert Bowles Professor of Biology, described Caltech's plans to increase its work in immunology and cell biology. Research in these fields will be conducted by faculty members with backgrounds in both fundamental

private institutions," he said, "and these institutions depend on private contributions. Discretionary funds enable us to launch new projects and to bring talented new faculty members to Caltech."

Then three students, two undergraduates and a graduate, talked about their experiences at the Institute: Carol Thompson, a senior majoring in engineering; Eric Kaler, a senior majoring in chemical engineering; and William Sargent, a PhD candidate in aeronautics, discussed the honor system, the availability of student aid, the opportunities for undergraduates to do research, and continuing campus traditions. Their moderator was Ray D. Owen, vice president for student affairs and dean of students.

"Why should I give \$100 when Caltech has a budget of between \$50 and \$60 million?" The question was asked, and answered, by David W. Morrisroe, Caltech's vice president for financial affairs and treasurer, speaking at the luncheon meeting.

"Your gifts of unrestricted money are the most important money we receive at the Institute," Morrisroe told the alumni. "They give us our independence."

Morrisroe explained that restricted money from private and federal sources constitutes over half of the Institute income. It's good, but it goes on the sure bets, he said, and we need support for the young men and women — the undiscovered Feynmans and Gell-Manns.

Money coming into Caltech and other colleges and universities is becoming more and more restricted, both from government and from the private sector, Morrisroe said.

"The unrestricted money is vital. I ask you to continue to place your bets on Caltech," Morrisroe concluded.

Leaders in an afternoon session on how to ask for Alumni Fund support were Charles Thomas, BS '35, former national Alumni Fund chairman; George Gleghorn, MS '48, PhD '55; Jeff Williamson, BS '48, MS '49, Eng '55; Dick De Lauer, Eng '50, PhD '53; Harry Sigworth, BS '44; and Vern Edwards, BS '50.

In an award ceremony on Saturday evening, Martin Poggi, BS '37, 1976-77 national Alumni Fund chairman, thanked the Alumni Fund Council members and area chairmen and the 550 other workers for their role in a successful fund that set records for both dollars and donors. Then he presented a Rookie-of-the-Year Award to Jeff Williamson for obtaining gifts from 60 percent of the alumni in his area, the central San Fernando Valley.

Vern A. Edwards, BS '50, western Pasadena, received a Pro-of-the-Year Award for the best participation in an area headed by an experienced chairman. Of the alumni in Edwards's area, 68 percent contributed. Last year, Edwards won a Rookie-of-the-Year Award.



Jack Roberts, Institute Professor of Chemistry, delivers the keynote address at the Alumni Fund Leadership Conference.

Six other area chairmen were honored because they received gifts from more than 50 percent of the alumni in their area: Allan Goldberg, BS '57, MS '58, Laguna Beach, 55 percent; George Gleghorn, MS '48, PhD '55, TRW employees, 54 percent; Don Stewart, BS '47, Pomona/Claremont, 52 percent; Fred Allardt, BS '35, MS '37, San Luis Obispo, 51 percent; Paul Dane, BS '34, Eng '41, Marin County/North Coast, 51 percent; and Tucker Gordon, MS '56, PhD '59, Western Pennsylvania, 50 percent. Gleghorn also was recognized for receiving the most money: \$46,392. A close runner-up was Ray Richards, BS '40, East San Fernando Valley, with \$45,290.

Other chairmen, recognized for raising more than \$20,000 in their areas, were Jean Meuris, MS '60, Eng '61, Oakland/Berkeley, \$34,678; Andy Campbell, BS '46, San Marino, \$28,460; Dee Brouillette, BS '55, MS '56, San Diego, \$27,262; Ken Gold, BS '42, New York City, \$26,774; Allan Goldberg, BS '57, MS '58, Laguna Beach, \$26,247; Bob Rinker, MS '55, PhD '59, Santa Barbara, \$24,380; Don McFaddin, BS '28, Alhambra/South Pasadena, \$22,311; Ed McCord, BS '71, Northern Illinois/Wisconsin, \$20,622; and Dick Smyth, BS '51, Newport/Corona del Mar, \$20,292.

Honored for special success in recruitment was Josiah Smith, BS '39, BS '40, Eng '48, Washington, D.C., with 45 workers.

Alumni serving as area chairmen in their regions this year include: Forrest S. Allinder, BS '49, MS '50, downtown Los Angeles; Paul L. Armstrong, BS '51, MS '55, Orinda-Moraga, California; Walter D. Biggers, BS '55, El Monte-Covina, California; C. James Blom, BS '50, Bakersfield, California; Robert D. Boche, BS '34, PhD '38, Riverside-San Bernardino, California; Delano A. Brouillette, BS '55, MS '56, San Diego; Ross A. Buchanan, BS '44, Anaheim-Fullerton, California.

Jonathan F. Callender, BS '66, New Mexico; Andrew B. Campbell, BS '46, San Marino, California; Dean N. Clay, MS '66, Eastern Canada; Spicer V. Conant, BS '64, Northern New Jersey; Thomas W. Cooper, BS '57, Torrance, California; Roy S. Cornwell, Eng '55, Livermore, California; Harold B. Crockett, MS '40, La Canada, California; Paul H. Dane, BS '34, Eng '41, Marin County-North Coast, California; Joseph A. Dobrowski, BS '49, Altadena, California; Bruce R. Doe, PhD '60, Colorado.

William A. Drew, BS '48, Indiana; Stanley A. Dunn, BS '43, Wisconsin; Vern Edwards, BS '50, Western Pasadena; Ronald G. Findlay, BS '64, South Peninsula-San Jose, California; Donald F. Folland, MS '36, Utah; Gerald W. Freeman, BS '56, Santa Monica-Malibu, California; Melbourne F. Giberson, MS '64, PhD '67, Eastern Pennsylvania-Delaware-Southern New Jersey; George J. Gleghorn, MS '48, PhD '55, TRW Inc. Employees; Allan M. Goldberg, BS '57, MS '58, Laguna Beach, California; David R. V. Golding, PhD '44, Hawaii.

Thomas P. Gordon, MS '56, PhD '59, Western Pennsylvania; Oran A. Graybeal, BS '38, Dallas; Raimo J. Hakkinen, MS '50, PhD '54, Missouri-Southern Illinois; David L. Hanna, BS '52, Phoenix; Thor P. Hanson, BS '64, Houston; Paul B. Harris, BS '49, MS '50, Oklahoma; Edward A. Hayes, BS '33, Tucson; William H. Hildemann, PhD '56, UCLA faculty and staff; George S. Holditch, BS '48, Cincinnati; E. Morton Holland, Ex '36, Connecticut.

Melvin E. Holland, BS '60, MS '61, Sacramento; J. Roscoe Howell, BS '26, Long Beach, California; Peter A. Howell, BS '50, Minnesota; Ming-ta Hsu, PhD '74, Manhattan; C. Warren Hunt, BS '45, Alberta-Saskatchewan-Montana.

Arne Kalm, BS '56, MS '57, Arcadia-Sierra

Madre, California; Bruce E. Kirstein, PhD '72, Eastern Washington-Eastern Oregon-Idaho; Ronald A. Kleban, BS '61, MS '62, West San Fernando Valley; Carl V. Larson, BS '52, Atherton-Menlo Park, California; Paul A. Levin, BS '72, Redondo Beach-Marina del Rey, California; Neville S. Long, BS '44, MS '48, North Peninsula-San Francisco; Daniel Markoff, BS '50, San Luis Obispo, California; Keith B. Martin, BS '58, Santa Barbara, California.

Edson R. McCord, BS '71, Chicago; Don E. McFaddin, BS '28, Alhambra-South Pasadena, California; Richard G. Merritt, MS '51, Eng '53, Washington; Jean C. Meuris, MS '60, Eng '61, Oakland-Berkeley; Harry J. Moore, BS '48, Westchester County, New York; Ira D. Moskatel, BS '72, Los Angeles-Beverly Hills; Philip M. Neches, BS '73, MS '77, Los Angeles-Brentwood; Richard C. Nielsen, BS '66, MS '67, PhD '71, Downey-Whittier, California.

Alan L. Porter, BS '67, Georgia; Dale Powers, PhD '75, Upstate New York; Carl A. Price, BS '49, Princeton; L. Willard Richards, BS '54, Ventura-Thousand Oaks, California; Raymond G. Richards, BS '40, East San Fernando Valley; Eugene S. Rose, Jr., BS '47, MS '48, Louisiana; Ernest E. Sechler, BS '28, MS '30, PhD '34, Caltech faculty and staff; Josiah E. Smith, BS '39, BS '40, Eng '48, Metropolitan Washington, D.C.; Richard K. Smyth, BS '51, Newport-Corona del Mar, California; Walter A. Specht, BS '57, MS '61, PhD '65, Los Altos, California; Robert R. Staley, BS '42, MS '43, Stanford-Palo Alto, California; Leonard M. Stephenson, PhD '68, Cleveland; Donald Stewart, Jr., BS '47, Pomona-Claremont, California.

Douglas C. Strain, BS '48, Oregon; Pin Tong, MS '63, PhD '66, Massachusetts; Ernest Wade, BS '43, MS '47, Palos Verdes, California; Chauncey W. Watt, Jr., BS '36, Massachusetts; George R. Watt, BS '46, Eastern Pasadena; Robert W. Wayman, BS '40, Michigan; Theodore S. Webb, Jr., PhD '55, Fort Worth, Texas.

Gordon B. Weir, BS '40, MS '41, Los Angeles-Hollywood; William M. Whitney, BS '51, JPL staff; William J. Williamson, BS '48, MS '49, Eng '55, Central San Fernando Valley; Frank A. Woodward, Eng '52, Washington; Ernest B. Wright, PhD '45, Florida; James Wu, MS '59, PhD '65, Tennessee-Alabama; Susan Wu, PhD '63, Tennessee-Alabama.

PERSONALS

1914

VIRGIL F. MORSE writes that he retired in 1956 and celebrated his 91st birthday on March 27. He says he plans to attend the 1984 reunion of the Class of 1914.

1918

FRANK R. CAPRA, noted film director and president of Frank Capra Productions, Inc., traveled this spring to Bisacquino, Sicily, a town he left 74 years ago to come to the United States with his parents. Capra made the trip in April, a month before his 80th birthday, and received a hero's welcome from the town's 8,000 inhabitants.

1926

ARTHUR C. WERDEN retired from the Edison Company and is living in Glendale, California.

1927

FRANK S. HALE writes that he and his wife are enjoying their retirement, and are keeping busy with Kiwanis and other clubs in Green Valley, Arizona.

1928

CHARLES A. HISSERICH is retired and living in Costa Mesa, California.

1929

JOHN L. DICKINSON is owner of Dickinson & Associates, which handles tennis court construction, windscreens, and court equipment in the San Diego area.

1933

TRENT R. DAMES, MS '34, has been elected to the board of trustees of Mills College in Oakland, California. Dames is co-founder of Dames & Moore, a world-wide environmental and applied earth sciences consulting firm in Los Angeles.

1934

NORMAN L. HALLANGER, MS '36, retired in February from Meteorology Research, Inc. He writes that he's doing some part-time consulting work and that he hopes to "have time for a little golf."

LEE P. MORRIS has retired as refinery manager with Standard Oil of California and is living in Medford, Oregon.

1935

J. HAROLD WAYLAND, MS, PhD '37, professor of engineering science at Caltech, received an honorary degree of doctor of science in May from the University of Idaho.

1936

CLARENCE F. GOODHEART returned to full-time teaching on June 30 after finishing his term as chairman of the department of electrical engineering and computer science at Union College, Schenectady, New York. He has been on the faculty for 30 years.

ROBERT G. HEITZ, technical director of Dow Chemical Company's western division, was named a research fellow of the company. He is one of only three people who have ever held the highest title Dow confers on researchers.

IVAR E. HIGHBERG, PhD, who retired in 1975 as a consultant to the Naval Weapons Center technical director, received an honorary doctor of science degree in May from Whitman College in Walla Walla, Washington. He and his wife, Mary, live in Lakebay, Washington.

WILLIAM R. MENDENHALL, MS, general manager for natural gas sales with Standard Oil of California, has been named a fellow of the American Institute of Chemical Engineers for his contributions as an engineer and manager and for his accomplishments in the field of refining technology.

1937

ROLAND A. BUDENHOLZER, MS, PhD '39, recently was recognized for his 29-year role as director of the American Power Conference. Budenholzer is professor of mechanical engineering at the Illinois Institute of Technology.

1938

WILLIAM R. SEARS, PhD, professor of aerospace and mechanical engineering at the University of Arizona, was elected a corresponding member of the National Academy of Engineering of Mexico for his "scientific merit and professional prestige."

1939

E. E. GULLEKSON, MS, is president of Gullekson Associates, an economic management and engineering consulting corporation in Foster City, California. Gullekson was an executive with Standard Oil of California until his retirement after 37 years with the company.

WALTER H. MUNK, MS '40, professor of geophysics at the Institute of Geophysics and Planetary Physics and the Scripps Institution of Oceanography, as well as associate director of the University of California Institute of Geophysics and Planetary Physics, received the Professional Achievement Award from UCLA during the university's annual Alumni Awards Program in May.

EDWIN F. SULLIVAN retired from the U.S. Bureau of Reclamation in Washington, D.C., on June 17 and is planning a five-month trip to Europe before settling on the West Coast.

1940

JOHN W. JACKSON, MS, has retired from the University of Maryland, where he was professor of mechanical engineering, and is living in Ellerton, Florida.

JEROME KOHL has been elected president of the Carolina Designer Craftsmen and is an exhibiting member in photography. He is also chairman of the energy conservation subcommittee of the Sierra Club's national energy policy committee, and is continuing to teach in the nuclear engineering department at North Carolina State University, Raleigh.

1941

JOSEPH W. TRINDLE, MS '49, is pastor of the Bible Presbyterian Church in Manchester, Missouri, where he lives with his wife, Peggy, and their three younger children. Their oldest son has completed his first year at West Point with distinction. The Trindles were missionaries for several years in Morocco, where all four children were born, and they recently served as missionaries in the Holy Land.

1942

JOHN F. McCLAIN, JR., underwent open heart surgery in February. In April, he returned to work at the Naval Ship Weapons System Engineering Station, Point Hueneme, California, and is feeling fine.

1943

STANLEY A. DUNN was promoted to technical director and named a member of the board of directors of Bjorksten Research Laboratories, Inc., Madison, Wisconsin, with which he has been associated for the past 18 years.

IRL H. MOWERY, JR., MS, has been appointed director of planning and development for the Houston Ballet. His responsibilities include all fund raising and long-range financial development for the Ballet Foundation.

1945

JOHN S. DAVIS has been appointed chief engineer of the electronic systems division of Bunker Ramo Corporation in Westlake Village, California.

1946

GLYNN H. LOCKWOOD writes, "We recently moved from Carmel Valley to the big redwoods (Big Sur, California), and can postulate with some confidence that I'm the only Tech grad here! Still president of LTI Corporation in Monterey, a small manufacturing operation I launched 13 years ago. The commute is nothing short of spectacular!"

RICHARD P. SCHUSTER, BS '49, has been named Caltech's director of development, replacing Truman F. Clawson, now the development counsel for the Institute. Schuster joined the Caltech staff in 1964 as director of the Industrial Associates program, and in 1976 he was named director of foundation relations. Before coming to Caltech, he was with JPL for two years as project officer for the Arms Control Study Group, and with the Bray Chemical Company, Los Angeles, for 10 years as plant manager. As development director he holds responsibility for Caltech's fund raising programs. "I'm looking forward to a successful conclusion over the next year and a half to our \$130 million campaign, 'Caltech at the leading edge . . .,' and then to the years beyond," Schuster said.

DEAN P. STONE was ordained a priest in the Episcopal Church on June 24 at St. Mark's Cathedral in Salt Lake City.

1948

LOTHROP MITTENTHAL writes, "I am assigned in London as commander of the U.S. Army Research and Standardization Group. We live in nearby Beaconsfield where our five-year-old daughter attends an English school, complete with uniform, and is rapidly being Anglicized."

1949

WALTER G. PREVOST received his master of divinity degree from Cincinnati Christian Seminary on May 6. He is now living in Grants Pass, Oregon.

1950

SCOTT LYNN, MS '51, PhD '54, professor of chemical engineering at UC Berkeley, was named a Fellow of the American Institute of Chemical Engineers for his contributions in engineering education and for his accomplishments in the fields of industrial process synthesis and the principle of continuous processing.

1951

SANFORD S. SWEET, minister of the Valencia United Methodist Church in Placentia, California, joined a group traveling to Africa in August to study projects to combat world hunger.

1954

FRANKLIN D. DRYDEN, MS '57, writes that he just completed a year as chairman of the board of directors of the Caltech Y — "a very healthy and active student program under new executive director Walt Meader."

1955

ROBERT F. MELDAU, MS, left Phillips Petroleum in September 1976 to join Husky Oil Company of Santa Maria, California, as senior staff engineer. This past May he was promoted to manager, enhanced oil recovery.

RICHARD L. NIELSEN, MS '57, is senior regional geologist with the Anaconda Company, Uranium Division, Salt Lake City.

JAMES F. REX, Eng, retired from the Navy in 1976 and is living in San Francisco and "delving into real estate."

1956

BRADFORD STURTEVANT, MS, PhD '60, Caltech professor of aeronautics, was named the Paul Vieille Lecturer at the 11th International Symposium on Shock Tubes and Waves held in Seattle, Washington, in July.

1961

ELI I. CHERNOW, special assistant to Governor Brown for environmental protection, has been appointed by the governor as a judge of the Los Angeles County Superior Court.

1963

DENNIS BARRETT, PhD, was promoted to associate professor of biological sciences at the University of Denver.

1971

TERRENCE J. O'NEIL, a captain in the U.S. Air Force, has been interning in the medical department at Wilford Hall USAF Medical Center, San Antonio, Texas. His plans include a residency in the Air Force, specializing in pulmonary or renal medicine.

1972

DWIGHT L. CAREY is interning with Republic Geothermal, Inc., of Santa Fe Springs, California, as an environmental land planner while working for his doctor of environmental science degree at UCLA.

RUDY J. DAM received his doctorate in chemistry from the University of Oregon in December 1976 and is now a research physicist with the DuPont Company in Wilmington, Delaware.

ROBERT M. SPENCER writes that he and his wife left the house that they built in Colorado to move to California. Spencer now works as a staff engineer in the process and control department of Acurex in Mountain View, California.

1973

MARK KRITCHEVSKY, MS, received his MD degree from UC San Diego in June and plans to do his internship and residency in neurology in the San Diego area.

1974

JOHN M. GARTH writes that he is the head systems programmer and data base administrator for Johnson County, Kansas. His wife, KAREN EATON GARTH, BS '74, graduated from the Kansas University Medical Center in May and is doing her residency in surgery there.

BRUCE C. SPALDING married Cheryl Erickson in November 1976. They are living in Seattle, Washington, where he is a graduate student in biophysics at the University of Washington.

1975

WILLIAM L. JOHNSON, PhD, is assistant professor of materials science at Caltech.

OBITUARIES

1914

GUY DE WITT YOUNG on February 26 in Exeter, California.

1917

SIDNEY R. SEARL on August 14, 1973. He was retired and living in Pacific Palisades, California.

1922

ARTHUR W. SPENCE on May 12. He lived in Los Angeles and was retired.

1927

WILLIAM H. KRELLE on November 3, 1976, from emphysema. He was retired and living in Newport Beach, California.

ARTHUR W. ROOT of Los Angeles. He was retired.

1933

DELMAR H. LARSEN, MS '36, of a stroke on January 3. He was a construction engineer and patent agent living in West Hollywood.

1934

RICHARD S. CRUTCHFIELD on July 19 after a lengthy illness. Crutchfield was professor of psychology and director of the Institute of Personality Assessment and Research at the University of California at Berkeley until his retirement in 1976. At that time he received the Berkeley Citation, the highest honor the campus can bestow, in recognition of his outstanding accomplishments and services. He is survived by his wife, Mary, a son, Paul, and a daughter, Lila.

1935

ROBERT M. STANLEY, president of Stanley Aviation Corporation of Denver, Colorado, in a small plane crash on July 16 over the Atlantic Ocean.

BERNARD B. WATSON, PhD, of a heart attack on June 8. He was a physicist for General Research Corporation in McLean, Virginia, for 22 years until his retirement in 1975. Surviving are his wife, Etta, a son, Matthew, and a daughter, Reba.

RICHARD C. WRIGHT on July 17 of cancer. He was a partner with the insurance firm of McKay-Wright & Company of Arcadia, California. He is survived by his wife, Betty, and a son, BRUCE R. WRIGHT, BS '71.

1937

DANIEL L. GERLOUGH of a brain tumor on July 13. He was professor of transportation engineering at the University of Minnesota.

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