

CALTECH NEWS

VOLUME 5, NUMBER 1 • FEBRUARY 1971

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

Caltech ranks first in four graduate study programs

In a survey of the graduate schools of 130 American Universities, the American Council on Education ranks the quality of the Caltech graduate faculty and the effectiveness of its graduate educational programs first in the nation in four disciplines: astronomy (Princeton and the University of California at Berkeley were second and third), developmental biology—a combination of genetics and embryology (Rockefeller University second, and Stanford University third), geology (Harvard University and UC Berkeley tied for second), and physics (tied with Harvard and UC Berkeley).

The graduate faculty ranks second in chemistry (Harvard first, and UC Berkeley third); second in molecular biology (tied with UC Berkeley, with Harvard first); third in mechanical engineering (MIT first, Stanford second); fourth in civil engineering (tied with Stanford behind UC Berkeley, Illinois, and MIT); and fourth in microbiology (tied with Harvard and Illinois behind Rockefeller, UC Berkeley, and MIT). Caltech also rated fifth in electrical engineering and physiology, sixth in biochemistry, ninth

in chemical engineering, and fifteenth in mathematics.

The survey rated schools in 36 disciplines, but since Caltech does not give advanced degrees in either the humanities or the social sciences, it received ratings in only 15 categories.

In the effectiveness of its doctoral programs, Caltech ranks first in astronomy, physics, developmental biology, and molecular biology, and is tied for first with Harvard in geology and chemistry. The Institute rates third in mechanical engineering, and is tied for third with UC Berkeley in biochemistry and with Harvard in microbiology. Caltech ranks fifth in physiology and in civil and electrical engineering. In chemical engineering, it is tied with MIT in seventh place. In mathematics it shares eleventh place with Brandeis and Cornell. It tied with UCLA for seventeenth place in botany.

Over 6,000 scholars from educational organizations and institutions, chosen by graduate deans of each of the 130 universities studied, filled out questionnaires rating the graduate faculties and doctoral programs.

Pings named vice provost, graduate dean

C. J. Pings, professor of chemical engineering and chemical physics, has been named vice provost and dean of graduate studies at Caltech. As dean of graduate studies, he succeeds H. F. Bohnenblust, professor of mathematics, who retired in January after 15 years in that position. Bohnenblust remains in that office as acting associate dean of graduate studies.

As vice provost—a newly created position—Pings assists Provost Robert F. Christy in supervising faculty appointments and promotions and in coordinating curriculum development; he also acts for the provost in his absence. For the time being Pings will retain his post as executive officer for chemical engineering, and will continue his research on the behavior of liquids—in collaboration with 14 graduate students and post-graduate fellows.

Pings served as chairman of the ad hoc faculty committee on aims and goals from 1968 to 1970, and he is a member of the faculty committee on relations with industry. He is also on the administrative committees for JPL and Beckman Auditorium, and is now president of the Caltech chapter of the American Association of University Professors.

Born in Conrad, Montana, Pings received his BS from Caltech in 1951, his MS in 1952, and his PhD here in 1955. After working in industry and as a field engineer on glaciological expeditions to



northern Greenland, he joined the chemical engineering faculty at Stanford University in 1955. He returned to Caltech—as an associate professor—in 1959.



Arie Haagen-Smit: "More time for orchids and crab grass."

Haagen-Smit to retire from faculty and ARB

In June of this year Arie Jan Haagen-Smit, professor of bio-organic chemistry, will retire from the Caltech faculty. A month later he will finish his three-year term as chairman of the California State Air Resources Board.

The general reaction of those who know him is that, at the age of 70, Dr. Haagen-Smit is far too young to be doing all this retiring.

"The word ought to be put in quotation marks," he admits. "The only difference will be that I may have a little more time for my orchids and the crab grass."

Last November, California's pioneer smog fighter made a report to the State's Assembly Transportation Committee. This report summed up the history of California's air pollution control, beginning back in 1949 when Haagen-Smit published the discovery that hydrocarbons in gasoline and oxides of nitrogen, reacting to sunlight, become photochemical smog. At that time he named the automobile and the gasoline refinery as the major sources of pollution—and this started a titanic struggle of forces between the determined Dutchman and portions of industry.

In the ensuing decade California's battle with smog spread from the Los Angeles city limits to counties surrounding both Los Angeles and San Francisco. By 1953 the legislature recognized smog as a state problem and created its first air pollution control program. In 1960 it established the State Motor Vehicle Pollution Control Board and wrote the first chapter in the statewide control of automobile emissions.

Every time a new smog control body was created, in this progression from city-

to-county-to-state concern, A. J. Haagen-Smit was a member of it. Finally, in March 1968, Governor Reagan appointed him to head an Air Resources Board, whose 14 part-time members dealt with all types of air pollution, and which was given increasing responsibilities by the legislature.

In the past five years the federal government has become more active in motor vehicle emission control. The clean air bill, recently signed into law by President Nixon, orders the auto industry to manufacture a virtually emission-free product by 1976. But California, represented by Haagen-Smit and the ARB, had already set standards for the nation. In fact, the ARB, with legislative backing, has been able to make such progress in effecting tough controls that it is now about to turn into an administrative-regulatory agency. (Exactly what form this will take will probably be decided during the next legislative session.)

Because he considers himself an innovator rather than an administrator, Haagen-Smit thinks this is an ideal time for him to retire from the ARB. He looks with satisfaction on the accomplishments of the board and the legislature, and believes that by the end of the 1970's the internal combustion engine will no longer be the number one smog producer. (The oil refineries have long since cleaned up their own houses.)

As he looks back over his years of confrontations with the petroleum, power, and automobile industries, one thing that pleases Haagen-Smit is their appreciation of his attitude.

"I always took a positive point of view

Continued on page 2

Earnest Watson 1892-1970

Earnest C. Watson, retired dean of the faculty and professor of physics, emeritus, died on December 5 at his home in Santa Barbara. He was 78.

A native of Sullivan, Illinois, Watson moved with his family to San Francisco in 1906. After graduation from high school in San Francisco, Earnest attended Lafayette College in Easton, Pennsylvania, from which he was graduated Phi Beta Kappa in 1914. In 1958 he was awarded an ScD degree by Lafayette.

Watson began his graduate work in physics at the University of Chicago, but he left in 1917 to do wartime anti-submarine research for the government. After the war he returned to Chicago as an assistant professor of physics, and then came to Pasadena in 1919 to supervise the construction of the first physics laboratories at Caltech (then Throop Institute).

Watson remained at Caltech until his retirement, working closely with Robert Millikan, Arthur A. Noyes, and George Ellery Hale on the development of innovative programs in science education. He was appointed full professor of physics in 1930, named dean of the faculty in 1945, and served as chairman of the division of physics, mathematics and astronomy from 1946 to 1949. During World War II he was a member of the National Defense Research Committee and acted as administrative director of a research and development project on artillery rockets, torpedoes, and other ordnance devices.

While on sabbatical leave in 1954,



Earnest Watson

Watson married Elsa Jane Werner in Tarbert, Scotland. From 1960 to 1963 he served as science attaché to the United States Embassy in New Delhi, India. His experience there led to his appointment as a consultant to the Ford Foundation on educational projects in India and Pakistan. He was still active in this work at the time of his death.

Earnest Watson leaves his widow, a brother, True G. Watson, of Walbridge, Ohio; two nieces; and a nephew. A memorial service was held on December 10 in Dabney Lounge on the Caltech campus.

Haagen-Smit to retire

Continued from page 1

with them. I've never been one of those fellows that run around verbally beating on Big Industry and talking like it's full of villains. That isn't my style. They've had their problems and still do—and they always knew I recognized this."

He knows that problems of environmental pollution control will always exist, and hopes they can be handled "by men who can deal with the stubborn opposition they will find at all levels of society." During his public life Haagen-Smit has also had to slog through plenty of swamps of public inertia. As he sees it, pollution control will be only marginal as long as the public insists on the goods and services it is accustomed to, and continues to regard such things as automobile emission inspections and curbs on electric power as "inconveniences."

On the plus side, Haagen-Smit has acquired a host of friends from Los Angeles citizen groups dedicated to joining the war on smog. He has great affection for them based on their caring, their grasp of the whole complicated smog picture, and their dedication (which has included frequent attendance at ARB sessions, hearings, and legislative sessions in Sacramento). That the feeling has been mutual was demonstrated strikingly last year when Haagen-Smit was hospitalized and immediately was inundated with cards, notes, and flowers from smog-fighting citizens.

If his work against smog has created in him a healthy cynicism about the amount of concern the man in the street may have about the air he breathes, it has at the same time given him a respect for most public servants.

"Legislators try to do the right thing under circumstances you wouldn't believe—and with little thanks," he says. "They are constantly being criticized by some segment of the public, often unfairly. How can anybody do his best under a constant barrage of criticism?"

He admits that, in retirement, he may

miss some of the rough-and-tumble aspects of official life.

"My lawn probably won't look as good. When I used to get mad at certain people I had to deal with, I got rid of my frustrations by pretending these people were weeds. I'd go after the weeds with a sharp tool, and as I dug each one out I'd say 'That's for you, X! Take that, Y! Now you, Z!'"

Retirement will still mean a full speaking schedule—which he enjoys—and activity in a variety of committees which, he says, never diminish; only proliferate. To take a random sampling, he acts in an advisory capacity to the Atomic Energy Commission; the Department of Health, Education and Welfare; various California state organizations; the Los Angeles County Air Pollution Control District; and the County Tuberculosis Association. He is a member of the editorial boards of two air pollution journals. Most pleasurable of all, he is a member of the board of trustees of the Los Angeles County Arboretum Foundation.

Haagen-Smit is one of a long and honorable line of scientists who eventually left their laboratories to go to work in various areas of public concern. He points to Linus Pauling, George Beadle, and Glenn Seaborg as typical examples—Pauling, to work for world peace; Beadle, to attack the problems of a great university (Chicago); and Seaborg, to serve on the Atomic Energy Commission. He confesses that "you get to a point in your life when you say to yourself, 'So I isolate another plant hormone. So what!'"

Haagen-Smit has always been grateful to Caltech for permitting him to make the transition from professor of bio-organic chemistry to public smog fighter.

"It financed my nearly full-time occupation on behalf of the State," he says, "and accepted gracefully the loss of a teacher."

Of course he is far too modest to add that the Institute's loss has been everybody's gain.

Calendar of Events

Friday, Feb. 5, 8:30 p.m. Beckman GREECE—(The Ancient World: From Athens to Cairo). A travel film in the Armchair Adventures series, narrated by Gene Wianko. Tickets: \$2.50-2.00.

Sunday, Feb. 7, 3:30 p.m. Beckman JULLIARD QUARTET performs Mozart's Quartet in A major, Wolf's Intermezzo and Italian Serenade, Bartok's Quartet No. 5. Tickets: \$5-4-3.

Monday, Feb. 8, 8:30 p.m. Beckman THE LIMITS OF GROWTH: HOW MANY PEOPLE CAN THE EARTH SUPPORT? A lecture by Harrison Brown, professor of geochemistry and of science and government. Caltech Lecture Series. Free.

Friday, Feb. 12, 8:30 p.m. Beckman British actor EMLYN WILLIAMS portrays Charles Dickens in a humorous and powerful one-man tour de force. Tickets: \$5.50-4.50-3.50-2.50.

ALUMNI DIRECTORY SUPPLEMENT

A supplement to the 1969 Alumni Directory will be ready for distribution after February 1, 1971. This supplement will list the names and addresses of those who received degrees in June 1969, and June 1970. Copies of this supplement will be sent automatically to Association members who received degrees in 1969 and 1970. Other Association members may secure a copy by filling in the form below and sending it to the Alumni Office, 204 Throop.

Please send the 1969-70 Supplement of the 1969 Directory to:

Name

Address

City..... State..... Zip.....

Sunday, Feb. 14, 8:00 p.m. Beckman ELLIOTT CARTER and the COMPOSERS STRING QUARTET in the continuing ENCOUNTERS series of avant garde music. Tickets: \$3.50, \$3.00—members of the Pasadena Art Museum or Friends of Beckman, \$2.00—students.

Monday, Feb. 15, 8:30 p.m. Beckman THE LIFE HISTORY OF A COSMIC RAY. A lecture by J. R. Jokipii, associate professor of theoretical physics. Caltech Lecture Series. Free.

Saturday, Feb. 20, 11 a.m. and 1 p.m. THE RED BALLOON, children's film classic from France, by Albert Lamorisse. Tickets: \$1.25—children, \$1.75—adults. Beckman Auditorium.

Saturday, Feb. 20, 8:30 p.m. Beckman ITZHAK PERLMAN, widely acclaimed young violinist from Israel. Tickets: \$6-5-4-3.

Sunday, Feb. 21, 8:15 p.m. Dabney Lounge THE DI TULLIO TRIO performs music by Leclair, Beethoven, Martinu, and Haubiel. Free.

Monday, Feb. 22, 8:30 p.m. Beckman MENTAL SPECIALIZATION IN THE CEREBRAL HEMISPHERES OF MAN. A lecture by Roger W. Sperry, Hixon Professor of Psychobiology. Caltech Lecture Series. Free.

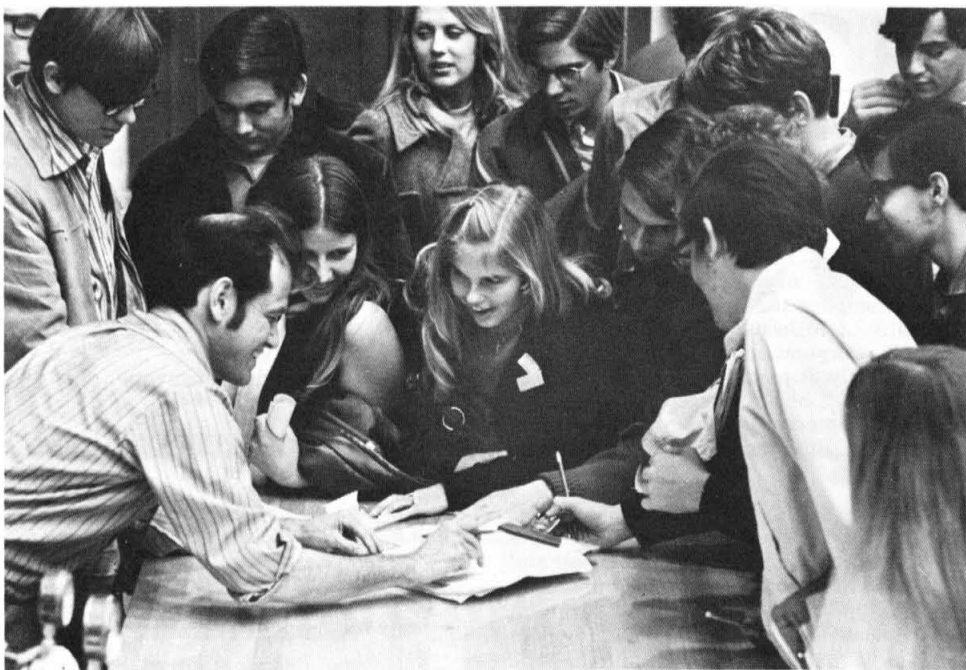
Friday, Feb. 26, 8:30 p.m. Beckman Burch Mann's BALLET AMERICA in "Big Country." Twenty brilliant young artists present a totally new concept in theatrical dancing. Tickets: \$5.50-4.50-3.50-2.50.

Saturday, Feb. 27, 8:30 p.m. Beckman DR. L. S. B. LEAKEY, Hon. Director of the National Museum, Centre for Prehistory and Paleontology, Nairobi, Kenya. "Exploring in the Land of the Sonjo." Tickets: \$3.00, \$2.00—students.

Saturday, March 5 and March 12
Alumni Wine Tastings.



Arie Haagen-Smit tours one of his favorite places, the Los Angeles County Arboretum.



"Tracking Down Particles:" Jerry Pine, professor of physics, answers questions after his talk on detecting subnuclear particles on January 6. About 125 high school students attended the lecture—the third in a series of seven Wednesday afternoon science programs.

Faculty honors

John N. Bahcall

John N. Bahcall, associate professor of theoretical physics and staff associate of the Hale Observatories, has been awarded the Helen B. Warner Prize of the American Astronomical Society. The first theoretical physicist to receive the \$500 prize, Bahcall is honored for his contributions to the field of cosmology in two areas—for theoretical work on an experiment to detect solar neutrinos, and for using quasars to determine the distribution of matter in space.

Bahcall's theoretical work supported a unique experiment conducted by Raymond Davis Jr., of the Brookhaven National Laboratory in Long Island, N.Y. Davis's experiment was designed to obtain information about the temperature and density of the sun's nuclear core by recording neutrinos that are thrown out from it. Neutrinos are the only subatomic particles from the interiors of stars that reach the earth unchanged.

A neutrino laboratory, consisting of a huge tank of cleaning fluid (perchloroethylene), was built deep in South Dakota's Homestake Mine where it is shielded from cosmic rays. On the rare occasions when a neutrino hits a chlorine atom in this fluid, the atom becomes radioactive. The task is to measure the radioactive atoms in the fluid.

In the other experiment for which he was honored, Bahcall took spectroscopic and photometric readings of light emitted from distant quasars to determine the composition and density of the otherwise invisible gas and dust clouds through which the light must pass en route to earth.

Bahcall has been a member of the Caltech faculty since 1963. He received his AB from the University of California at Berkeley in 1956, his MA from the University of Chicago the following year, and his PhD from Harvard in 1960.

Gerald J. Wasserburg

Gerald J. Wasserburg, professor of geology and geophysics, is the 1970 recipient of the Arthur L. Day Medal awarded by the Geological Society of America for "outstanding contributions to geologic knowledge through the application of physics and chemistry to the earth sciences."

Wasserburg was cited for his research in determining the time scale of the solar system. He was also recognized for the establishment of dating methods using long-lived natural radio isotopes, the study of geologic processes using natural isotopes as tracers in nature, and the application of thermodynamic meth-

ods in the study of geologic systems.

As a Day Medal holder, the Caltech scientist becomes a life member in the Society in which he already holds a fellowship.

Wasserburg, a member of the Caltech faculty since 1955, was also recently awarded an Exceptional Scientific Achievement Award from the National Aeronautics and Space Administration for his work in examining material returned from the surface of the moon.



G. J. Wasserburg

Edwin S. Munger

Edwin S. Munger, professor of geography and a world authority on Africa south of the Sahara, has been appointed to the Department of State's Advisory Council on African Affairs.

The council meets quarterly to advise Secretary of State William Rogers and Assistant Secretary for Africa David Newsom on United States policy toward the African countries.

Munger has been involved with Africa for many years. He is a member of the United States-United Nations Association's panel on Southern Africa, and a trustee of the United States-South African Leader Exchange Program.

Munger has just returned from Paris, where he attended a 12-day conference on African problems. The conference was held under the auspices of the United States-South African Exchange Program.

Munger reported that the conference produced the "most extensive dialogue in over 25 years between prominent Afrikaners close to the government, liberal South Africans, black and white Americans, and black South Africans from inside South Africa and in exile."

DIVISION REPORTS

This column will appear monthly to keep alumni informed of faculty changes, honors, research, and other current news from the Institute's six divisions.

Chemistry

Bill Beranek, graduate student in chemistry, is the principal organizer of 10 Wednesday afternoon seminars that are examining "Chemistry and Society"—the effect of society on chemistry, and vice versa, the responsibility of the chemist to society, and the future of chemistry.

James Morgan, professor of environmental engineering science, launched the series on January 6 with a talk on "Trace Metals in the Environment." Arie Haagen-Smit, retiring professor of bioorganic chemistry, and Sheldon Friedlander, professor of chemical and environmental health engineering, discussed air pollution at the January 13 meeting; Norman Brooks, professor of environmental science and civil engineering, and Aron Kuppermann, professor of chemical physics, led discussions on "Strategies for Solving Environmental Problems" on January 20.

The remainder of the series includes a talk on the philosophy of chemistry by division chairman George Hammond, an examination of the research and political responsibilities of the chemist, and a panel discussion on the future of chemistry as a discipline.

Humanities and Social Sciences

The Division of Humanities and Social Sciences has set up a series of seminars to give faculty members an opportunity to report on their current interests and research. The purpose of the series, says history professor Peter Fay, is "to introduce ourselves to ourselves. We are less interested in making our work available to others than we are in making it available to ourselves, but members of the Institute community are welcome to attend."

Held once a month, the seminars are being given by the division faculty, regular or visiting; seminars by outside professors will occur from time to time. The first seminar was given on January 6 in Dabney Hall by Will Jones, visiting professor of philosophy, on "Theoretical Disagreements and World Views." The four remaining meetings this year will feature Heinz Ellersieck, associate professor of history; Elizabeth Marvick, lecturer in political science; Oscar Mandel, professor of English; and Robert Bates, assistant professor of political science.

►In December, the Caltech Population Program held its first annual conference under the leadership of Harrison Brown, professor of geochemistry and of science and government, and Alan Sweezy, professor of economics. The meeting was attended by members of the American Universities Field Staff, by government and foundation representatives, by selected demographers from other universities, and by members of the Caltech Population Committee. AUFS staff members presented reports on 12 countries in all parts of the world, and detailed discussion was held on general population problems and on particular features of local situations. The Population Program is being conducted for the State Department's Agency for International Development.

Physics

►Two Caltech physicists will be among the first to do experiments at the new

300-Bev National Accelerator Laboratory at Batavia, Ill., when it opens its experimental program sometime between July 1971 and January 1972. Frank Sciulli, assistant professor of physics, and Barry Barish, associate professor of physics, have developed neutrino interaction experiments that are not possible with smaller accelerators (the largest U.S. accelerator now accelerates particles only up to 30 Bev). Their proposal was chosen by the laboratory over two similar proposals from other major groups of physicists from other leading universities and from the laboratory itself.

►In 1974 a huge orbiting device called HEAO-A (High Energy Astrophysical Observatory-A) is scheduled for launch, carrying some 12,500 pounds of scientific experiments. Two of the experiments that have been chosen involve Caltech staff.

For the first of these experiments, Edward Stone, assistant professor of physics, and Rochus Vogt, professor of physics, together with four scientists from other institutions, have designed a very large detector for the measurements of elements heavier than iron which are present in cosmic radiation. These measurements will lead to a better understanding of the origin and lifetime of cosmic radiation, and of the stellar element-building process. For example, it will be of interest to see if super-heavy elements, heavier than any known element, are present, as some theorists have suggested.

Also flying on HEAO-A will be a large-aperture, high-resolution X-ray telescope, designed by Gordon Garmire, associate professor of physics, and Guenter Riegler, research fellow in physics, in collaboration with groups from Columbia University and American Science & Engineering, Inc. This telescope will use a novel grazing-incidence method of focusing the X rays. It can be used to hunt for new cosmic X-ray sources in addition to studying the background of low-intensity X-radiation that fills the universe. The sensitivity of this device is measured in "microcrabs," (or millionths of a "crab")—a crab being the newly-coined unit of X-ray flux, equal to the flux we receive from the well-known X-ray source in the Crab Nebula.

Placement Assistance To Caltech Alumni

The Caltech Placement Service may be of assistance to you in one of the following ways:

- (1) Help you when you become unemployed or need to change employment.
- (2) Inform you of possible opportunities from time to time.

This service is provided to alumni by the Institute. A fee or charge is not involved.

If you wish to avail yourself of this service, fill in and mail the following form:

To: Caltech Placement Service
California Institute of Technology
Pasadena, California 91109

Please send me: (Check one)

- ☐ An application for placement assistance
- ☐ A form indicating a desire to keep watch of opportunities although I am not contemplating a change.

Name

Degree(s) Year(s)

Address

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PERSONALS

1926

MANLEY W. EDWARDS has retired after 33 years as principal engineer with the Public Utilities Commission of the State of California. He is now utility rate consultant for the city of San Diego.

1929

CHARLES BOSSERMAN, retired from Boeing in Seattle, is now working on a semi-volunteer basis for Job Therapy, a program for helping adult felons.

BOLIVAR ROBERTS retired from Pacific Telephone on September 1 after a career of over 41 years. For the past eight years he has been general plant manager of the southern counties area, with headquarters in San Diego. Bob and his wife, Isabelle, will make their retirement home in La Jolla.

1936

EUGENE BOLLAY, MS, is the first recipient of a newly established USAF Weather Service award "for distinguished service to the meteorological community." Bollay is the president of the American Meteorological Society and director of environmental sciences for EGG, Inc., Santa Barbara.

VICTOR V. VEYSEY was elected to the United States House of Representatives from California's 38th Congressional District in November. He replaces California's newly elected senator, John Tunney. A resident of Brawley and an Imperial Valley rancher for 20 years, Veysey has served as a California State Assemblyman for the past eight years.

1937

BRUCE W. DUNBAR, with the Shell Oil Company in New York, sends the location of a "missing" alumnus, CLARENCE L. DUNN, PhD '36: P.O. Box 250, LaConner, Washington 98257. Dunbar goes on to say, "Since retiring from Shell Development Company's Emeryville Research Center a few years ago, Clarence has been living aboard his boat and has had a variety of P.O. boxes, and I can't guarantee that the present one will last very long."

Obituaries

1924

RALPH C. WILSON on October 15 in Arcadia. He had retired from Pacific Telephone as a transmission engineer.

1928

TOMIZO SUZUKI on November 13, in Japan, of a heart attack. He had been retired from Kawasaki Heavy Industries since December 1969.

1932

CHARLES D. CORYELL, PhD '35, on January 7, in Cambridge, Mass. Professor of chemistry at MIT, Coryell was known for his pioneer work in nuclear chemistry and for extensive study of the isolation and identification of fission products. He joined the MIT faculty in 1946 after working in the Metallurgical Laboratory, Chicago, and at Clinton Laboratories, Oak Ridge, Tenn., in the Manhattan District Project during World War II. Coryell is survived by his wife, Barbara, and daughters Patricia and Julie.

1937

WILLIAM M. FIEDLER, MS, on June 25, of cancer. He had been general manager of raw materials for Jones & Laughlin Steel Corporation in Pittsburgh.

1943

WILLIAM O. GARRISON, MS, on April 23. He was the meteorologist in charge for the U.S. Weather Bureau in Tulsa.

EDGAR W. PUTNAM, MS, on November 13. Formerly an Air Force Major, he was a teacher in the Benson, Arizona, public schools.

1950

HAROLD C. MARTIN, PhD, on August 23. He was a professor of aeronautics and astronautics at the University of Washington, Seattle.



Mason, '47



Heath, '49

1938

JOHN G. McLEAN, president of the Continental Oil Company, is now chairman of the Committee on United States Energy Outlook for the National Petroleum Council. At the request of the Department of the Interior, the committee will make a study of the energy outlook for the United States from now to the end of the century.

1939

FRANK E. McCREERY has been elected president of Rohr Corporation, Chula Vista. One of the founders of the company, McCreery has been active in the aerospace industry since his graduation from Caltech.

1940

GEORGE C. BARBER writes that he left TRW Systems in Redondo Beach in June after working there 12 years on the MINUTEMAN ICBM Program. In September he joined Litton Systems advanced marine technology division in Culver City as a project engineer in the DD 963 Class Destroyer program.

VICTOR WOUK, MS, PhD '42, has been elected a fellow of the American Association for the Advancement of Science. In December he was chairman of a symposium on automobile pollution at the AAAS annual conference in Chicago. He is director of electronics research for Gulton Industries, Inc., of New York.

1944

ROBERT G. HALLWACHS, MS, is dean of the new college of humanities and social sciences at Drexel University in Philadelphia. This college will follow Drexel's traditional cooperative plan in which students alternate academic terms with terms working off campus. Hallwachs, also professor of English at Drexel, was previously dean of the faculty at Wells College in Aurora, N.Y.

1945

RICHARD J. REED of the Department of Atmospheric Sciences of the University of Washington in Seattle is the president-elect of the American Meteorological Society. He is a specialist in synoptic meteorology and dynamical weather prediction.

1947

SPENCER R. BAEN, MS, PhD '50, has been named assistant director for Texas A&M's Engineering Experiment Station. He retired from the Army in 1970 with the rank of colonel. Most of his military duty for the past ten years was related to missiles.

ELMER E. HALL, MS, formerly manager of the land department of Pacific Gas and Electric Company, San Francisco, has been advanced to the newly created position of assistant to Executive Vice President John F. Bonner. Hall joined PG&E in 1947.

JOHN L. MASON, MS '48, PhD '50, is the first director of engineering for the Garrett Corporation, Los Angeles. He will have overall responsibility for corporate engineering policies and technical activities in all of Garrett's divisions and subsidiaries.

CHAROEN CHAROEN-RAJAPARK, MS '48, writes to say that since October 1 he has been director-general of the Thai Meteorological Department in Bangkok, Thailand.

WARREN S. WOOSTER, MS, professor of oceanography at Scripps Institution in La Jolla, has been elected a councillor of the American Meteorological Society.

1948

PAUL B. MacCREADY, MS, PhD '52, recently resigned as president of Meteorological Research, Inc., of Altadena, and has been

elected a councillor of the American Meteorological Society. He is a Certified Consulting Meteorologist.

1949

VIRGIL J. BERRY JR., MS, PhD '51, is now vice president of corporate research and development for the Joseph Schlitz Brewing Company of Milwaukee. He was with Sinclair Oil Corporation for nearly ten years, most recently as manager of corporate planning. When Sinclair merged with Atlantic Richfield Company in 1969, he was named manager of international finance, control, and planning.

JOHN HEATH JR. has been named a vice president for Marshall and Stevens Incorporated, an international firm of appraisers and valuation consultants. He joined the company early in 1970 as director of business development.

1952

LESLIE R. HESELTON, MS, captain in the U.S. Navy and formerly consultant to the Secretary's Defense Blue Ribbon Panel, has been assigned to the Naval Electronics Laboratory Center in San Diego.

1957

FRANK BORMAN, MS, is the new senior vice president of the operations group for Eastern Airlines, and will be responsible for the engineering and maintenance, flight operations, and operational coordination divisions of the airline. He will be based in Miami.

1958

THOMAS G. SCHUMANN, formerly on the faculty of California State College at Hayward, is now in the physics department at Cal Poly, San Luis Obispo.

DICK W. THURSTON, AE, assistant dean of the college of Physical and Engineering Sciences at Brigham Young University in Provo, Utah, writes with information about a missing alumnus—MILTON G. WILLE [MS '58], who is now an associate professor of mechanical engineering at BYU. Wille received his PhD in 1964 at The University of Michigan. He and his wife, Rhea, have six children.

1960

HANS D. LINHARDT, ME, vice president of Airco Cryogenics, a division of Air Reduction Company, Inc., received the degree of Doktor-Ingenieur in March 1970 from the Aachen Institute of Technology in Germany.

STANLEY A. SAWYER, PhD '64, associate professor of mathematics at Yeshiva University's Belfer Graduate School of Science in New York City, is conducting an investigation of probability theory in relation to problems of heat conduction under a grant from the National Science Foundation.

1961

DANIEL K. AI, PhD, former president of the Geophysical Technology Corporation of Pasadena, has been appointed a professor at Washington University in St. Louis, Missouri. He will head the interdepartmental Committee for Environmental Engineering.

1963

ALVIN L. KWIRAM, PhD, formerly a lecturer in chemistry at Harvard, recently moved to Seattle to become an associate professor of chemistry at the University of Washington.

1966

RALPH GAJEWSKI entered active duty with the Air Force in December as a first lieutenant and is currently assigned to the Air Force Weapons Laboratory at Kirtland AFB in New Mexico.

1967

ROBERT W. BERRY received his PhD in 1970 from the University of Oregon, although he did his research in the biology department at Yale. He is now commuting between New Haven and New York City, where he is a postdoctoral fellow in neuropathology at the Albert Einstein College of Medicine at Yeshiva University.

1968

CHARLES SAMMIS, MS, has been awarded

ALUMNI ASSOCIATION OFFICERS AND DIRECTORS

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CALTECH NEWS

Vol. 5, No. 1 February 1971

Issued seven times a year (Oct., Nov., Dec., Feb., Apr., May, and June) and published by the California Institute of Technology and the Alumni Association, 1201 East California Blvd., Pasadena, California 91109.

Second class postage paid at Pasadena, California.

EDITORIAL STAFF

Co-editors: Laurie Spaulding and Jeff Zakaryan

Associate editors: Jacqueline Hershey, Janet Lansburgh, Kathleen Marcum, and Kay Walker.

Photographer: Floyd Clark

a North Atlantic Treaty Organization postdoctoral fellowship at the University of Bristol in England. His field is geophysics.

ROBERT B. STOKES, who has been in the army since March 1969, is now at Ft. Huachuca, Arizona, after a year in Vietnam. He plans to return to graduate work at USC in February 1972.

DENNIS M. WEAVER, a first lieutenant in the Air Force, has arrived for duty at McConnell AFB, Kansas. An F-105 Thunderchief fighter-bomber pilot in a unit of the Tactical Air Command, he previously served at Takhli Royal Thai AFB, Thailand.