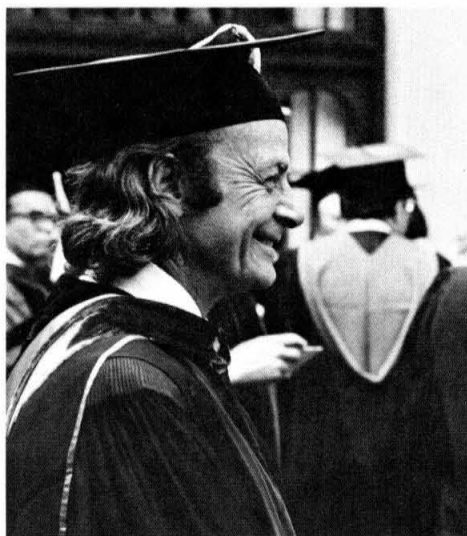


CALTECH NEWS

VOLUME 8, NUMBER 6, JULY 1974

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY



Richard P. Feynman

Visiting Committees: R& for insight

Caltech's visiting committees have completed another year of helpful work for the Institute. Composed of distinguished individuals in the various fields represented by Caltech's six divisions and the Environmental Quality Laboratory, the committees meet to offer fresh viewpoints to division leaders.

Their principal function is to discuss academic goals and ways in which they can be achieved. In this manner, the visiting committees play an important role in the direction of education and research at the Institute.

Each committee consists of a minimum of nine members who spend one or two days a year in session on the campus. At these conferences the division chairmen and their colleagues report on new developments, research progress and results of educational innovations.

Lewis H. Sarett, president of Merck, Sharp & Dohme Research Laboratories, heads a 14-member committee for the Division of Biology; this group held its meeting in December 1973.

James W. Glanville, MS '46, ChE '48, a Caltech trustee, heads the 10-member committee for the Division of Chemistry and Chemical Engineering, which met last March. Glanville is a partner in the firm of Lehman Brothers of New York City. He also is a member of the Visiting Committee for the Division of Geological and Planetary Sciences.

Stephen D. Bechtel, Jr., a Caltech trustee and president of the Bechtel Corporation, San Francisco, is chairman of the visiting committee to the Division of Engineering and Applied Science. This 10-member group met in May.

Alain C. Enthoven heads the visiting committee to the Environmental Quality Laboratory. Enthoven is a professor of public and private management at Stanford University's Graduate School of Business. The EQL committee of 10 members met in November 1973.

Owing to the recent death of John G. McLean, chairman of the visiting committee to the Division of Geological and Planetary Sciences, the meeting of this committee was postponed. A new chairman has not yet been chosen.

Lew R. Wasserman, Caltech trustee and president and chief executive officer of MCA, Inc., is chairman of the visiting committee to the Division of the Humanities and Social Sciences. This 13-member group met in April.

Simon Ramo, PhD '36, a Caltech trustee and vice chairman of TRW Inc., heads a 12-member visiting committee to the Division of Physics, Mathematics and Astronomy. Ramo is a research associate in electrical engineering at Caltech.

At 80th commencement:

416 students receive degrees

As a hot June, midday sun beat down upon the Court of Man, President Harold Brown conferred 416 degrees at Caltech's 80th commencement exercises.

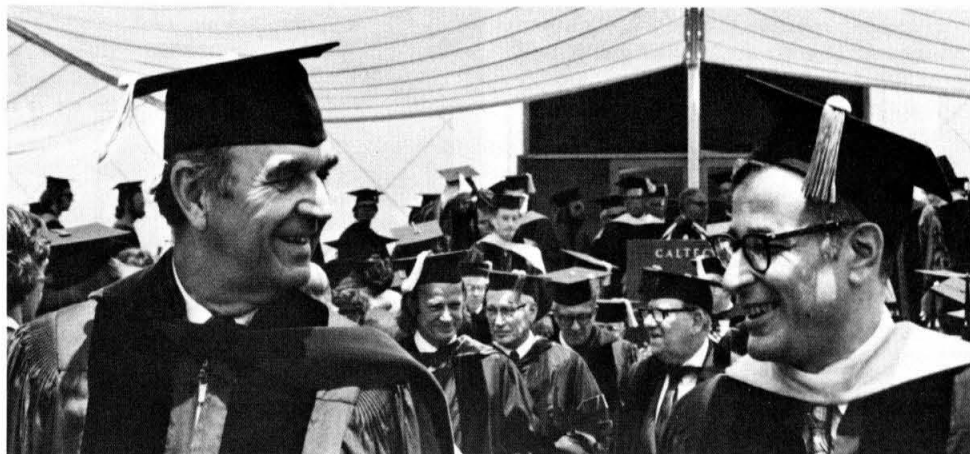
While proud relatives poised and clicked their cameras, those receiving degrees filed into their seats to the dramatic accompaniment of processional music by the Caltech Convocation Brass and Percussion Choir.

The students' choice for commencement speaker, Richard P. Feynman, Nobel Laureate and Richard Chace Tolman, Professor of Theoretical Physics, spoke on "Unscientific Evidence." He urged the graduating students to place integrity at the forefront of all their scientific efforts.

"When you conduct an experiment, bend over backward to report all the evidence," he told them. "Record the facts that agree with your conclusions as well as those that don't. Publish all your results—whether or not they are what you had hoped. Give all the information that can possibly be of help to others in judging the value of your contribution."

"If you don't follow this path, you may gain some initial fame, but in the long run, you won't gain much of a reputation as a scientist."

"Don't fool the layman. Explain to him honestly what you're doing—wheth-



R. Stanton Avery, left, chairman of the Caltech Board of Trustees, and President Harold Brown, right, at conclusion of the Institute's 80th commencement exercises.

er or not this explanation is likely to bring you research money. Above all, don't fool yourself. If you can keep from fooling yourself, then probably you can keep from fooling others.

"May you have the good luck to go where you are free to exercise this kind of integrity, and where you need not compromise it because of pressures from the institution where you work."

Feynman stressed that such rigorous integrity is especially important in a world

where people are influenced by unscientific evidence in many disciplines.

Feynman was introduced by R. Stanton Avery, chairman of the Caltech Board of Trustees and chief executive officer of Avery Products Corporation, who presided over the commencement exercises.

President Harold Brown told the assembled group that 114, or 58 percent, of the 195 seniors were graduating with honors, setting a new school record.

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Alumni choose R. L. Heacock as president

Raymond L. Heacock, BS '52, MS '53, received the gavel as incoming president of the Caltech Alumni Association from outgoing president Stuart M. Butler, Jr., BS '48, at the annual Honorary Alumni Dinner in the Athenaeum, June 20.

A resident of La Crescenta, Heacock is spacecraft systems manager, Mariner Jupiter-Saturn 1977 Project, JPL. He had served as vice president and treasurer of the association.

Other officers installed were: vice president, William J. Carroll, BS '48, MS '49; secretary, P. Douglas Josephson, BS '65; and treasurer, Fred A. Wheeler, BS '29.

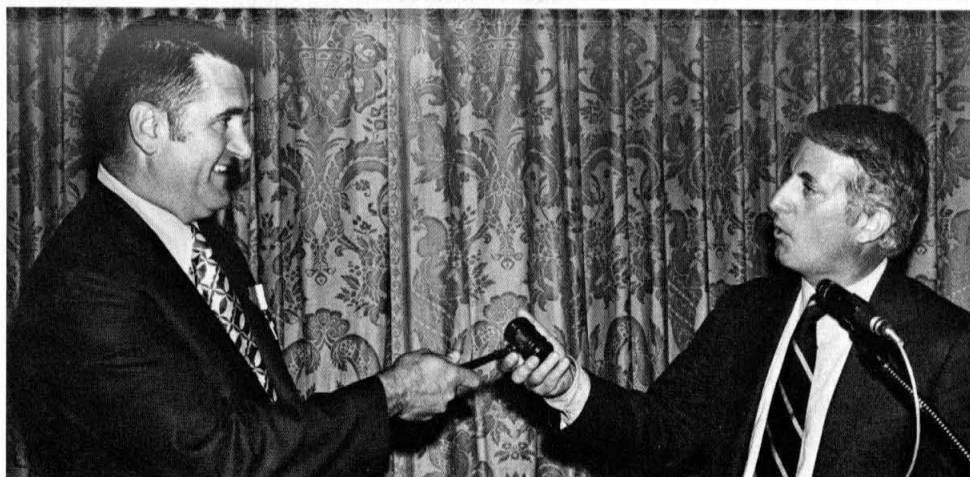
Named honorary alumni in recognition of their contributions to the Caltech community were H. Frederic Bohnenblust, professor of mathematics, emeritus, and Horace N. Gilbert, professor of business economics, emeritus.

Directors elected to three-year terms were: Carole L. Hamilton, PhD '63; Le Val Lund, Jr., BS '47; Raymond A. Saplis, BS '44; and Richard L. Van Kirk, BS '58.

Board members who will continue to serve during the coming year are: G. Louis Fletcher, BS '56, MS '57; John D. Gee, BS '53; Robert B. Grossman, BS '33; James L. Higgins, BS '56; Richard A. Karp, BS '64; Richard C. Nielsen, BS '66, MS '67, PhD '71; Leon T. Silver, PhD '55; outgoing president Butler; John R. Fee, BS '51, treasurer, emeritus; and Donald S. Clark, BS '29, MS '30, PhD '34.

During the evening, plaques were presented to outgoing board members Wayne T. McMurray, BS '45; and Stanley T. Wolfberg, BS '38. Spicer V. Conant, BS '64, and Rea A. Axline, BS '31, who could not be present, also will receive plaques.

A past president's plaque was presented to Arthur O. Spaulding, BS '49, MS '58, president of The Association in 1972-73, who has served in every office on the board.



Raymond L. Heacock, left, incoming president of the Caltech Alumni Association, receives gavel from 1973-74 president, Stuart M. Butler, Jr., at annual Honorary Alumni Dinner.

For leadership, academics:

Two Clark Awards presented

Junior Richard Gruner and sophomore Jonathan Teich received this year's Donald S. Clark Alumni Awards for potential leadership qualities and academic performance. Presentations were made at the Donald S. Clark Award Banquet.

The awards are made annually from funds contributed by the Caltech Alumni Association in honor of Clark, BS '29, MS '30, PhD '34, professor of physical metallurgy, who was secretary of the Alumni Association for 26 years.

Gruner, an applied physics major from

Fresno, California, and Teich, a chemistry major from Edison, New Jersey, each received \$500.

Gruner is an editor of the *California Tech*, a photographer for student publications; and a member of the Caltech Men's Glee Club, the Board of Control of the Honor System, and Page House.

Teich is ASCIT's director for academic affairs; and a member of the Freshman Admissions Committee, the Glee Club, and Ruddock House.



Recipients of Donald S. Clark Awards: Richard Gruner, left, and Jonathan Teich, right, with Clark.

58 percent graduate with honors

Continued from page 1

"This doesn't signify that our faculty is getting soft, but rather that our students are getting smarter," he said.

Brown alluded to the fact that this is the first graduating class that includes a substantial number of young women. Twenty-four of the graduating seniors were girls, including those who enrolled at Caltech in 1970 when women were first admitted as undergraduates. An additional eight women received graduate degrees.

"Our experience demonstrates that, given the motivation and the opportunity, young women can compete equally with young men," Brown said.

In talking to the class of 1974, Brown commented, "Your accomplishments will vary but I have no doubt that among you are the best and brightest of your generation." Noting that he is impressed by the number of Institute graduates who are attracted to public service, he said, "In no small measure, our political survival depends on whether the best of our young people continue to enter this field."

Brown introduced two men who received their PhD's from Caltech 50 years ago—the first year that PhD's were awarded by the Institute. Present on the platform were Robert B. Brode, PhD '24, professor of physics, emeritus, UC Berkeley; and Ernest H. Swift, PhD '24, professor of analytical chemistry, emeritus, Caltech.

Both Brown and Avery praised Arnold O. Beckman, chairman of the Board of Trustees, emeritus, and Mrs. Beckman, for their many contributions to the Institute over the years that they have been active in the Caltech community.

Rabbi Edgar F. Magnin of Wilshire Boulevard Temple, Los Angeles, gave the invocation and benediction. He told the students:

"So this is the end and the beginning. We live in a strange, troubled era. We must go ahead; we can't go back. For your journey forward you will need stamina, mind and spirit, reason and faith, brains and heart, hope, above all, and trust. For idealism divorced from pragmatism is futile, just as pragmatism divorced from idealism is silly, and can be dangerous.

"Go forward and make the world a little better, at least, than you found it."

After the commencement address, the Caltech Glee Club sang several selections, under the direction of Olaf M. Frodsham. Leslie J. Deutsch, class of 1976, played the organ.

This year's senior class is the largest since 1948. In addition to the 195 bachelor of science degrees, 110 MS, 107 PhD, and 4 special engineer degrees were awarded.

Caltech awards 1945 student, Gertrude Fila, her MS degree

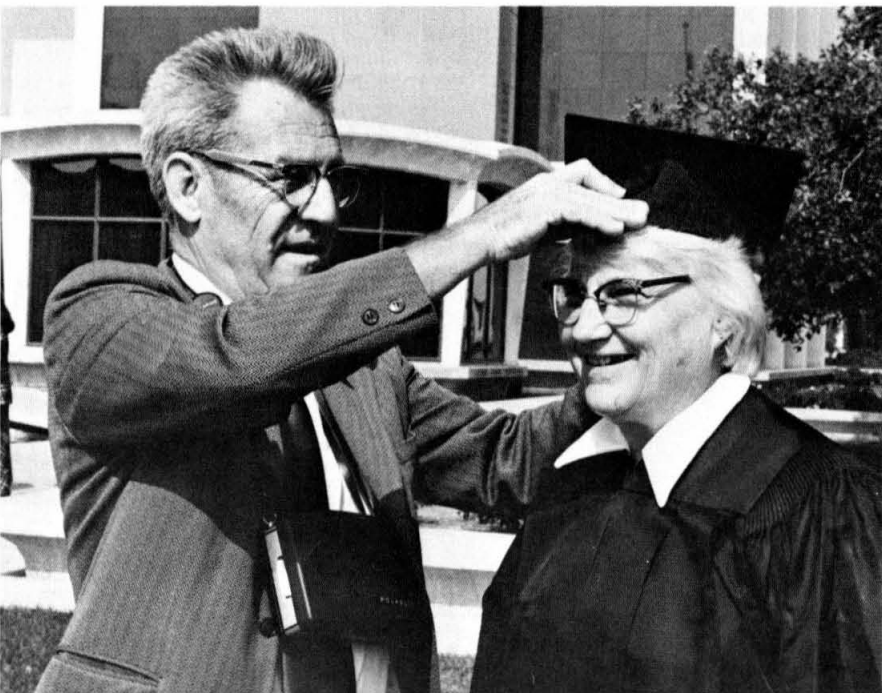
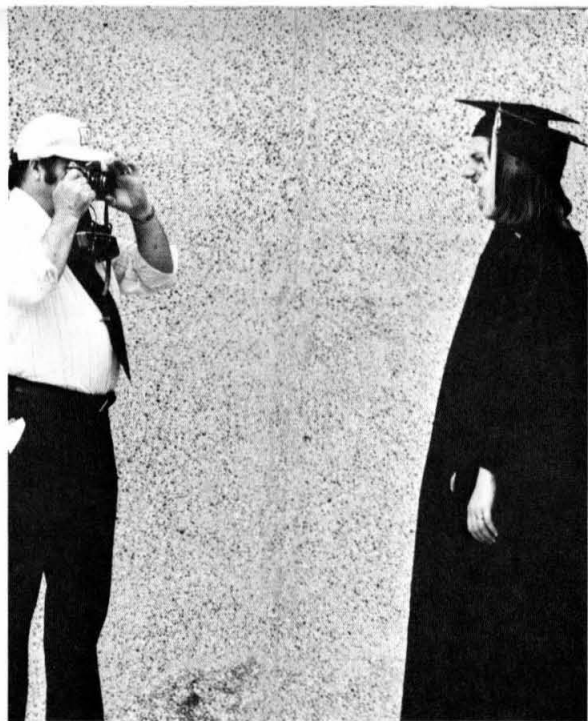
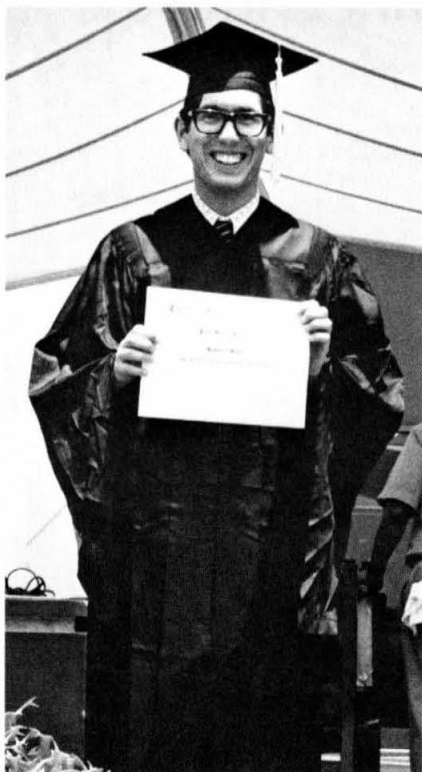
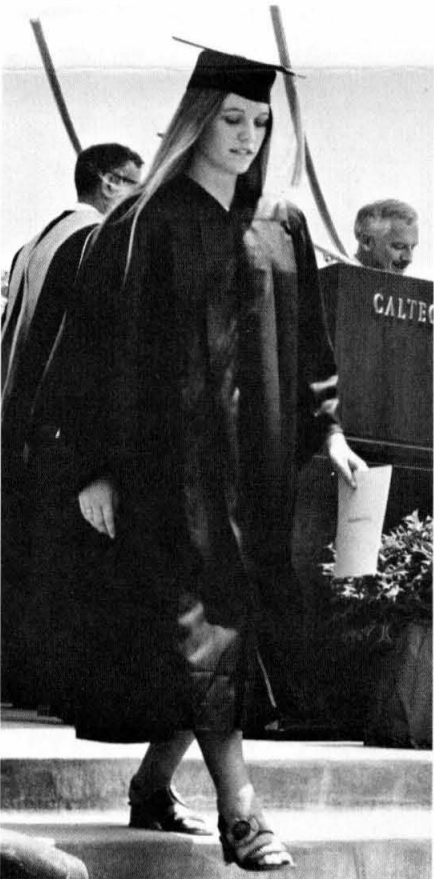
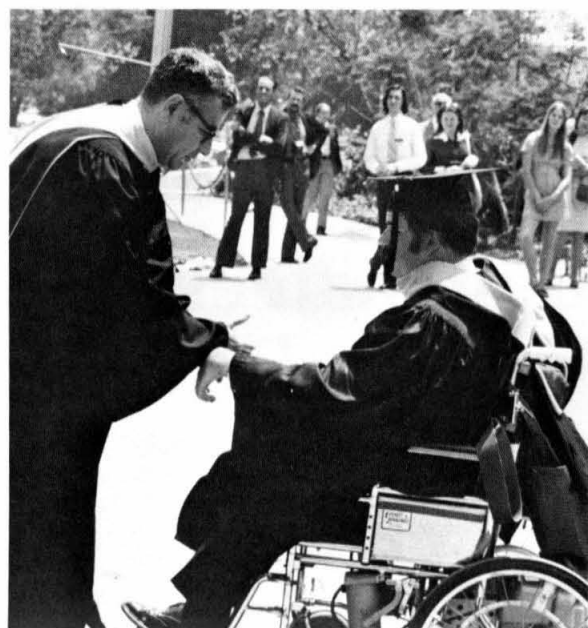
The Caltech campus looked far less familiar on commencement day to Mrs. Gertrude Hill Fila than it did to the other graduates; she had done the course work for her MS degree in aeronautics in 1943-45.

Mrs. Fila received a BS degree in mechanical engineering from Oklahoma A&M College in 1943. Because the Institute didn't admit women at that time, she couldn't formally register as a student. This didn't stop her from attending classes and conducting research.

Recently the aeronautics faculty reviewed her course work and her research and agreed that she had met the requirements for the MS degree in aeronautics that were in effect in 1945. It was recommended that she be awarded this degree at commencement.

Mrs. Fila, who lives in Stillwater, Oklahoma, came to receive the degree in person. She has been teaching kinematics, basic aeronautics, and vibrations at Oklahoma State University, where she received an MS degree in mechanical engineering in 1952.

Mrs. Fila and her husband are shown in the photo at the right.





Along with its other outstanding members, the class of 1934 produced two division chairmen at Caltech. Here, they join with former classmates and wives at reunion dinner in the Athenaeum: third from right—Francis H. Clauser, professor of aeronautics and chairman of the Division of Engineering and Applied Science; and far right, Robert P. Sharp, professor of geology and former chairman of the Division of Geological and Planetary Sciences. Mrs. Clauser is between them.

Classmates face challenge:

Alumni who have changed so much that they don't recognize you

"We've survived a depression, three wars, and Watergate; congratulations to us all!" exclaimed William L. Holladay, BS '24, as he welcomed former classmates to the Half-Century Club luncheon on June 7 in Pasadena's Huntington-Sheraton Hotel.

All those present who graduated 50 years ago received certificates of membership in the club; all alumni graduating prior to 1924 also were invited.

Holladay, secretary to the class of 1924, consoled those attending about what he termed "the frequent problem of your fellow alumnus who's changed so much he doesn't recognize you."

Noting that 31 were present of 54 surviving members of an original group of 78, Holladay quipped, "that's a better percentage than voted in the primary election."

Reuben B. Moulton, BS '57, was master of ceremonies for the event; he intro-



Holladay leads guests at Half-Century Club luncheon in singing the Caltech Alma Mater, as master of ceremonies, Reuben B. Moulton, accompanies on piano.

duced the oldest member present, Elmer E. Frey, BS '07, and the second oldest, Virgil F. Morse, BS '14, who read some of his own poems to the group.

A wry note was interjected by Howard R. Beck, who recently had undergone back surgery and who walked to the podium with the aid of a cane: "Little did I know when I bought my senior cane that in 50 years I'd need to use it."

At the conclusion of the luncheon, Holladay led the group in singing the Caltech Alma Mater, accompanied by Moulton on the piano.

In a departure from tradition wives and husbands were invited to the other class reunions for alumni who graduated at five-year intervals as well as to the Half-Century Club luncheon.

More than 210 alumni and wives attended reunion dinners in the Athenaeum on the evening of June 7 for the classes of 1934, 1939, 1944, and 1954. Eighty persons toured the campus before the social hours that preceded the dinners.

Among the more than 80 alumni and

wives attending the reunion of the class of 1934 were Francis H. Clauser, BS '34, MS '35, PhD '37, chairman of the Division of Engineering and Applied Science, and his twin brother, Milton U. Clauser, BS '34, MS '35, PhD '37, now dean of the Naval Postgraduate School in Monterey, California—still as confusing in their close resemblance as when they were students. Robert P. Sharp, BS '34, MS '35, professor of geology, was another faculty member present, as was Gilbert D. McCann, BS '34, MS '35, PhD '39, professor of applied science.

The class of 1929 held its reunion dinner on June 14 at the home of Milton Sperling, BS '29, in South Pasadena; the class of 1964 met during May at the home of James B. Black, director of public relations and executive director of the Alumni Association, in Pasadena. The class of 1959 plans its reunion in the fall in conjunction with the Interhouse Dance, and the class of 1949 on October 5, the evening before Homecoming. A reunion for the class of 1969 was cancelled due to lack of response.

STUDENT AWARDS

Bell and Ward Prizes

Junior David S. Dummit, Jr., of San Mateo, California, and freshman Christopher L. Henley, of Baltimore, Maryland, won Caltech's two highest awards in mathematics.

Dummit was awarded the Eric Temple Bell Undergraduate Mathematics Research Prize for a paper entitled "Cubic Fields Without Power Bases." Henley earned The Morgan Ward Award for his derivation of a formula that expresses the arithmetic-geometric mean of two numbers in terms of an elliptic integral.

The Bell award of \$150 and the Ward prize of \$25 are financed by the winnings of Caltech undergraduate participants in the William Lowell Putnam Competition. Caltech's team has placed first in this national mathematics contest for the past three years.

Fisher Award

Chosen by the physics faculty as the junior physics major who demonstrates the greatest promise of future contributions in physics, Joseph G. Polchinski, of Tucson, Arizona, is the winner of the annual \$150 Haren Lee Fisher Memorial Award in junior physics.

The award was established by Mr. and Mrs. Colman Fisher of Silver Spring, Maryland, in memory of their son who was killed in an automobile accident in 1967 during his junior year as a physics major at Caltech. The General Electric Foundation also contributes to the fund under the matching plan of its Corporate Alumnus Program.

Froehlich Award

Roland R. Lee of Palos Verdes Peninsula, California, a junior, is the winner of the \$500 Jack E. Froehlich Memorial

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Alumni Fund presses on toward goal

The 1973-74 Alumni Fund reached its final weeks with several proposals to major contributors still outstanding—and the goal a few percentage points short of attainment. By mid-June, the Fund had received \$342,000, placing it at 97 percent of the \$350,000 goal.

Harrison W. Sigworth, BS '44, chairman, said, "The outcome will be close. We won't know just how close until after July 1." He said a complete report on the results will be given in the September issue of *Caltech News*.

Sigworth expressed special satisfaction at the rise in number of donors. He said that over 800 more alumni had contributed to the Fund than at this time last year—a 46 percent increase.

He attributed this increase to a greater awareness of the Fund on the part of alumni, and to the efforts of many area chairmen and workers who made individual calls on all alumni in their regions.

Sigworth also stressed the importance of an experimental telephoning program tried for the first time this year in several areas—Los Angeles, San Francisco, the state of Washington, Chicago, Pittsburgh, Boston, and New York City.

"In these cities, about 100 alumni telephoned a total of 2,000 prospective donors; 60 percent of the people they contacted made pledges," he said. "Most of these alumni had not contributed to the Fund before."

He noted that about three-fourths of the money received represented gifts from alumni who were contacted personally.

"There is no question but that personal contact with alumni is essential to a successful Fund," he said. "This contact arouses the enthusiasm that most alumni feel for Caltech, and then the giving begins to take care of itself."

Sigworth expressed thanks to all of the volunteers who had worked for the Fund: the members of the Alumni Fund Council, the 75 area chairmen, and the individual workers, without whom he said the effort could not have been successful.

Stressing the importance of the money to Caltech, he said, "Since most of the Alumni Fund gifts go toward unrestricted operating needs, their significance cannot be overemphasized. Without them a lot of important projects would have to be left undone. This amount of income is equal to about \$7,000,000 of endowment and that's a very impressive figure."

Sigworth said the amount of money raised is encouraging in view of the nation's economic picture this year.

Sigworth reminded alumni that the 1974-75 campaign under the leadership of National Chairman Reuben B. Moulton, BS '57, will begin in the fall. "The loyal support of all alumni is necessary if we are to continue providing Caltech with operating funds that are so essential to its program of quality education and research," he said.

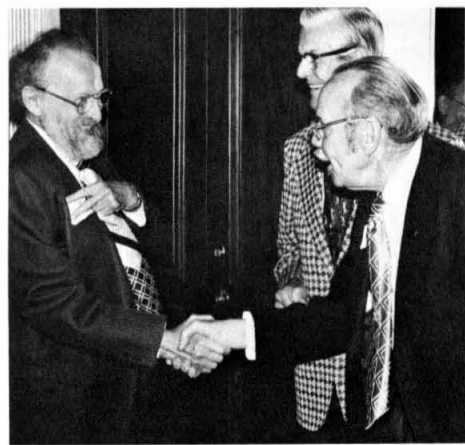
Class of '29 reunites at Sperling home

by Fred A. Wheeler, BS '29

The 45th anniversary reunion of 29 members of the class of 1929, enhanced by the presence of 23 wives, was celebrated with a barbecue party on the pleasantly warm evening of June 14 in the perfect setting of Peg and Milton Sperling's semi-tropical garden in South Pasadena.

Anthony Larrecq came all the way from New Jersey to attend. Donald S. Clark was welcomed as the class member with the distinction of 49 continuous years on campus, going for 50! The presence of 5 members who didn't graduate with the class attested to the strong ties that existed during the early years at CIT.

As a consequence of the outstanding success of the first reunion to include wives, a group of them, led by Peg Sperling, agitated effectively for an extended reunion to take place in the Caribbean or Hawaii.



William L. Holladay, right, tries to guess identity of former classmate.

No rut for them:

They find excitement as volunteers

by Winifred Veronda

"Being a volunteer for Caltech is a lot of fun. It really pulls you out of your rut—whatever your own rut may happen to be."—Charles F. Thomas, BS '35

"If you want a job done then ask a busy person to do it" is a cliché that has stayed in vogue because it is so true. And nowhere is it more true than at Caltech, where over 1,300 of the world's busiest and most dynamic people give many hours to help the Institute in a variety of ways.

Six of Caltech's volunteers were asked what motivates them to spend this time in working for the Institute. Their answers reveal individual reasons, as well as these reasons that they share: Being a volunteer for Caltech is exciting; working for the Institute carries the assurance of spending time that will produce results in the world; and volunteer activity is one

the Alumni Fund he has talked with many of his fellow graduates about the Institute and its programs. In this role he has found special satisfaction.

"In the process of raising money you generate a greater interest in the school among other alumni," he said. "You help to enlarge Caltech's constituency. This chance to turn other people on to the excitement of Caltech is particularly rewarding."

Charles F. Thomas, BS '35, manager, Western Region, Raytheon Company, is a member of the Alumni Fund Council and has worked for previous development campaigns; he has served on the board of the Caltech Y. His reason for working for Caltech is definite.

"Being a volunteer for Caltech really pulls you out of your rut—whatever your own rut may happen to be," he said. "I'd say to any alumnus: 'If you haven't tried it, don't knock it, because it's a

citing. Because Caltech is a unique institution, I have unique experiences through my involvement there. The people at Caltech are involved in special work and my association with them creates a more exciting life for me."

Active for some time in The Associates, Earl was invited to become a member of its board of directors. He now is chairman of the Membership Committee. Active on the Alumni Fund Council, he has worked to provide liaison between the fund and The Associates.

H. Warner Griggs, senior vice president for public affairs, Union Bank, is one of many Caltech volunteers who are not alumni; he became active in The Associates when he was based in the local area in an executive position with Union Bank, and he went on to become president of The Associates. When the Environmental Quality Laboratory was being organized, he helped to open doors between its staff and industry.

"Caltech is a fine institution—a credit to the community and to society," he said. "My association with it has been a source of much satisfaction. It's great to be part of a winning team."

J. Stanley Johnson, BS '33, MS '34, retired, is a member of the Visiting Committee for the Division of the Humanities and Social Sciences; he has been active on the Caltech Y Board of Directors and served as its chairman.

Johnson says he has always been concerned with the development of well-rounded people who will fill significant roles in society and who will influence decisions that are broad in scope.

"Many Caltech graduates go on to such roles," he said. "The humanities and social sciences and the Caltech Y help to broaden their awareness. By working for these programs I feel I'm making a contribution in a special area."

"Besides," he added, "coming down to the campus and talking with other people who are actively involved with the Institute is very satisfying."

It would be impossible for Caltech to put a dollar figure on the value of the time given by all its highly trained and—in their vocations—highly paid volunteers. If their services were not available, the Institute would suffer a critical loss.

Fortunately for all concerned, the relationship is a two-way affair. For, as the volunteers agree, working for Caltech is exciting—and even more than that, it's a lot of fun.

Caltech receives gift from Mrs. Larrabee

Caltech has received a gift of \$143,480 from Mrs. Irene C. Larrabee of Newport Beach, California; the gift is in the form of stock in L & F Industries of Huntington Park.

A machine equipment manufacturing firm, L & F Industries was founded by Mrs. Larrabee's husband, Ralph E. Larrabee, who died in 1969. Caltech alumnus Harry Boller ('38), who was a long-time associate of Mr. Larrabee, was instrumental in introducing Caltech to Mrs. Larrabee.



On campus for a volunteer assignment, Arthur O. Spaulding pays visit to scene of his undergraduate days—the Division of Geological and Planetary Sciences. Spaulding is typical of the more than 1300 individuals who serve the Institute in a volunteer role.

way that an alumnus can say "thanks" for an education that has made a very special difference in his life and career.

Arthur O. Spaulding, BS '49, MS '58, executive director, 1974 OCS Lease Sale, Western Oil and Gas Association, expressed his motivations in this way:

"I'm involved in a lot of activities in addition to my own career, even though sometimes it is hard to make the time for them. I realize that if I don't take on a volunteer assignment that is important, then the assignment simply may not get done."

"I want to believe that any activity I support will help to make the world a better place. I can be certain that this is true of the time I give to Caltech."

Spaulding first became a Caltech volunteer as a member of the Long Range Planning Committee to determine the direction of the Alumni Association; he went on to become a member of the association board and to hold every office on it; he served as president in 1972-73.

"But the volunteer process works both ways," he emphasized. "I give of my time and my insights and in return I'm broadened through contacts at the Institute."

Glen H. Mitchel, Jr., BS '48, president, U. S. Import Equipment Distributors, Inc., believes so strongly in the importance of philanthropic activity that he gives the equivalent of one working day each week to voluntary causes.

"I feel a keen sense of responsibility to Caltech," he said. "My education has been of tremendous value to me. Because I attended the Institute, my life has been much different—and much better."

"Besides, my contacts with Caltech faculty really keep my head working. Hearing these fellows talk about their research is interesting and provocative. It would be very difficult to avail oneself of this opportunity without being a volunteer."

Mitchel is a member of the Alumni Fund Council; he has been active in The Associates and the Friends of Beckman Auditorium; he participated in previous development campaigns. As a worker for

heck of a lot of fun."

"By working for Caltech I grow in personal insight, I'm stimulated intellectually, and I clarify my own thinking through talking with alumni in other fields and through talking with faculty about their research."

Joseph B. Earl, BS '44, president, the O. K. Earl Corporation, Pasadena, added another dimension as he described his own reasons for working for Caltech.

"Caltech is a major institution in the local community—the community where we work and live," he said. "We need strong, healthy institutions as focal points from which the community can draw strength. Because it is growing and successful, Caltech is of tremendous benefit to the Pasadena area."

"In a more personal sense, what Caltech is reflects on me as an alumnus. If its reputation throughout the world is one of excellence, then I as an individual am held in higher esteem."

"I find working for Caltech to be ex-



On campus for Alumni Seminar Day are, from left—Mrs. Roland W. Lindhurst, Daniel J. Houghton, Mrs. Elise Mudd Marvin, and Dr. and Mrs. Arnold O. Beckman, chairman emeritus of the Caltech Board of Trustees. All are benefactors of Caltech programs.

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Meetings: University Club, 917 "H" St. Luncheon second Friday of each month at noon. Visiting alumni cordially invited—no reservations.

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14735 Aloha Ave., Saratoga, Calif. 95070

Meetings: Engineers' Club, 16th floor, Hong Kong Bank Bldg., San Francisco. Informal luncheons every Thursday at 11:45 a.m. Contact Harrison Sigworth, 894-2918, on Thursday morning for reservations.

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CALTECH NEWS

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Caltech's Geology Division:

Decades of leadership as pioneer

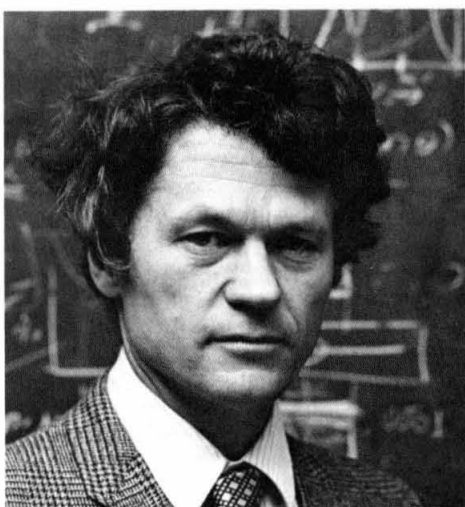
by Winifred Veronda

Twenty years ago a Caltech geologist was greeted with skeptical remarks from his friends in the more traditional divisions at other universities when he spoke of work in geochemistry under way at the Institute.

A decade later, those same skeptics were scrambling to enter the field of geochemistry—and Caltech's earth scientists were far down the road ahead of them.

This pattern has repeated itself many times as the Division of Geological and Planetary Sciences has pioneered in new areas of research. Today, led by a faculty that is ranked among the nation's finest, the division is involved in leading research that ranges from the earth's core to the surfaces of the moon and the planets, and on out to the edge of the universe.

Barclay Kamb, chairman of the division and professor of geology and geophysics, pointed out that these programs will receive important new impetus with



Barclay Kamb, professor of geology and geophysics and chairman of the Division of Geological and Planetary Sciences.

the completion of the Seeley G. Mudd Building of Geophysics and Planetary Science. The building will house groups in planetary science and geophysics, and also the Seismological Laboratory.

Kamb said, "The move will bring the division's geophysicists into closer contact with its geologists, geochemists, and planetary scientists, and we may expect beneficial results."

In discussing the future of the division, Kamb emphasized current work in progress in an area in which Caltech is making exploratory efforts. This research will, it is hoped, contribute to a fundamental understanding of what man is doing to his environment; it is part of a newly evolving field called environmental geochemistry.

Kamb said, "The environment is a complex geochemical system and human actions in relation to it frequently initiate chain reactions whose consequences we fail to comprehend. Learning to understand these chain reactions may ultimately be a necessary aspect of our survival."

Toxic metals

As one part of this long-range effort, Clair C. Patterson, geochemist, is analyzing the extent to which the level of toxic metals within man has increased, and how this process has occurred. He is questioning whether man has overlooked some metals that are essential to health—as we know calcium, copper, and zinc to be—and whether man is depriving himself of these nutritious metals through mechanized farming.

Kamb said, "Patterson's initial studies indicate that nutritious metals are purified of toxic metals at every stage in the food chain leading from soil and water to man. At the end of the food chain, man has developed a system that tolerates only small amounts of toxic metals. Geochemists at Caltech are investigating ways in which industrial pollutants bypass natural filters within the food chain and eventually become destructive to man."

"The findings of Patterson and his colleagues will influence future investiga-

tions of plant nutritionists, soil chemists, and agronomists; their studies could revolutionize the practice of agriculture by helping determine whether our crops are supplying us with proper nutrition."

In a related area, Kamb cited the work of Samuel Epstein, professor of geochemistry, who with his colleagues is studying the isotopes of oxygen. These isotopes are a kind of natural fingerprint that can be used to identify the source of a water sample and discover its history of evaporation and condensation.

An examination of the isotopic composition of water has enabled Epstein and his associates to determine the average worldwide temperature 2,500 years ago; to pinpoint temperature fluctuations in Antarctica 100,000 years ago; and even to know something about the earth's temperatures when dinosaurs roamed here 120 million years ago.

In still another area, Eugene M. Shoemaker, professor of geology, and his students are conducting pioneering research in paleomagnetism. Their particular interest is in tracing the history of reversals in polarity of the earth's magnetic field.

Magnetic field reversals

Kamb explained, "For some time, scientists have known that for about half of the time over the past 60 million years the north end of a compass needle would have pointed south because the polarity was reversed. We know that the magnetic field fades away almost completely every several hundred thousand years and then returns—either with the same or with reversed polarity. These reversals are worldwide events that can be used to establish a chronological record of the earth's history and to pinpoint simultaneous happenings at widely separated points—a powerful tool in determining ages of terrestrial events."

In addition to reading the record of these reversals as they are recorded in the earth's rocks, Shoemaker's goal is to find out what is happening to the magnetic field now. Over the past two centuries, it has been weakening at a rate that could cause it to disappear in a few thousand years—with wide-ranging effects. For example, the magnetic field helps protect us from cosmic radiation.

A combination of high-pressure experimentation and solid-state theoretical work is now being done by Don L. Anderson, professor of geophysics and director, Seismological Laboratory; Thomas J. Ahrens, associate professor of geophysics; and their colleagues. Their efforts are beginning to yield conclusions about the way minerals as we know them at the surface are structurally transformed into dense and unfamiliar forms as we go deeper into the earth.

"Their efforts are leading us closer to a real understanding of what the earth's

James A. Westphal, associate professor of planetary science, shows computer-enhanced photograph taken with special television tube that he designed, in photo below. Called the SIT, the device greatly enhances the photographic power of the 200-inch Hale telescope at Palomar Observatory. Right: James H. Whitcomb, senior research fellow in geophysics, is a leading participant among Caltech scientists working on earthquake prediction. Here, he shows seismological record of quake he had predicted for the Riverside area.



interior is like," Kamb said. He explained that Ahrens is tackling the study through application of methods of shock-wave physics. The apparatus with which he is working can generate shock pressures up to more than one million atmospheres.

Kamb said that methods of measuring the internal energy, volume, elasticity, temperature, and spectra of rocks and minerals at high pressure are being developed in the laboratory.

"Caltech is a world leader in applying these methods to the geophysical problems of the earth's interior," he said.

Processes in the earth's interior are probably responsible for what happens geologically at the surface; Caltech geologists hope ultimately to understand in detail the connections between the two. Since the February 9, 1971, San Fernando earthquake, they have made considerable advances in their ability to predict earthquakes, through a better understanding of rock mechanics and how huge bodies of rock respond when they are stressed.

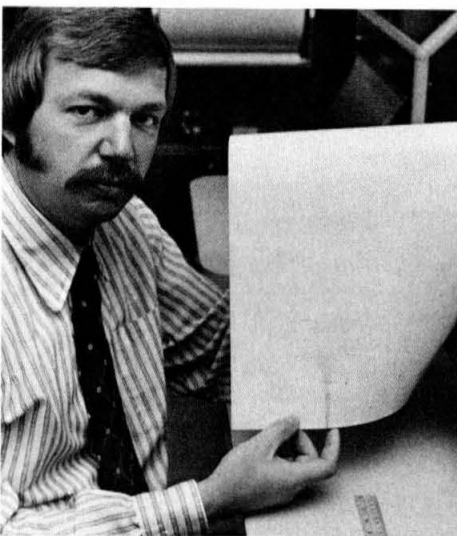
Kamb said, "For ten years, our seismological network has been deeply involved in problems of earthquake recording. We expect work in this area to move ahead rapidly in the next decade. We have the equipment, the talent, and the location for this effort; we are in a wonderful laboratory for the study of seismological phenomena."

Probably there is only one other geographic area that provides an equally good laboratory, and that is Japan. Kamb indicated that eventually he would like to see the development of closer working relationships with Japanese seismologists—even to the extent of sharing laboratory equipment.

Earthquake prediction system

In the meantime, Caltech and the U. S. Geological Survey are planning an earthquake prediction system. In a cooperative project, they will install a large number of seismographs in southern California within the next two years, in addition to those already in existence. The stations will transmit continuous seismic recordings to the Caltech Seismological Laboratory. If the Caltech-USGS project is successful, within five years seismologists may be able to predict within reasonable limits the occurrence of earthquakes in areas that are heavily instrumented.

While these members of the division are helping man learn more about what is happening on the earth's surface and within its interior, others are focusing



Eugene M. Shoemaker, professor of geology, with drill used to take core samples of rock—used in studying record of the history of the earth's magnetic field.

their attention much farther afield. Head of the television team for Mariner 10, Bruce Murray, professor of planetary science, is substantially responsible for the 3,000 close-up photographs of Venus that were taken on this mission. Changes in the spacecraft radio system that were his recommendation resulted in thousands of pictures being taken—rather than the hundreds that had originally been planned.

Murray's theories were verified; the photographs show stable and recurring clouds that record the motions high in Venus's atmosphere where the pressure is 10 to 20 percent that of the earth. These clouds are unlike those of the earth, and members of the television team are trying to deduce their cause.

Even more important photographs were obtained when Mariner 10 reached its primary target—Mercury. A week-long picture-taking mission, at close approach, provided photographs as good as the best Mariner 9 shots of Mars.

But Venus and Mercury are like next-door neighbors compared to the far more distant objects now being probed by Caltech astronomers—with the help of James A. Westphal, associate professor of planetary science. A revolutionary detection system called a SIT—for Silicon Intensified Target—designed by Westphal is enabling Caltech astronomers to obtain better answers to two questions that have plagued cosmologists for generations: will the universe continue to expand forever, or will it eventually shrink back into itself in another big bang?

Increased telescopic power

Westphal's detection system is a special type of television tube that produces a picture with 1,000 gray tones from black to white instead of the approximately 40 gray tones produced by conventional photo emulsions. In addition, the SIT measures brightness 5 times more precisely than photo emulsions and produces pictures 10 to 100 times faster.

The SIT greatly increases the power of the 200-inch Hale telescope at Palomar Observatory; its speed and accuracy combine to provide a net advantage of from 20 to 50 times the speed and accuracy of the photographic method. The result is like having 3 to 10 times as many observing nights a year—or three times as many giant telescopes.

As Kamb considers the future teaching of young people within the division, he is pleased that undergraduate enrollment is rising.

"Students sense that an understanding tant in terms of the future of the human race," he said. "They also are very conscious of the job market, and are aware that increasing interest in the field is a of the world in which we live is important encouraging sign for all those who want to make geology their career."



Caltech's star runners: left to right—Gregory Griffin, Haywood Robinson, and Alan Kleinsasser.

Caltech runners break or tie eight records

by Robert M. Kieckhefer, BS '74

Led by the record-breaking performances of three runners, the track team posted a 5-4 record this spring to highlight the athletic year at Caltech. Seniors Alan Kleinsasser and Haywood Robinson and junior Gregory Griffin broke or tied eight school records, including one held for 47 years.

Middle-distance star Kleinsasser excelled in the 880-yard run, and received an All-American award for placing fifth in the event at the NCAA College Division Nationals at Charleston, Illinois, in May. His fastest time in the 880 was 1:51.2—a new Caltech record. He also set a new mile record for the school of 4:10.8—11.2 seconds lower than the 1970 mark.

Kleinsasser was undefeated in the mile and 880 in the conference this year, and during his four years at Tech he posted a dual-meet record of 52 wins, 4 seconds, and 2 thirds in these events. In addition to sharing the Goldsworthy Track Trophy and the Outstanding Caltech Athlete Trophy with Robinson, he has been nominated for an NCAA postgraduate scholarship for 1974-75.

Three times this spring, Robinson, Tech's premier sprinter, tied the 100-yard dash mark of 9.7. This record, established by Murray Schultz, had been untouched since 1927. Haywood also lowered the 220 record to 21.4—a full second less than his previous mark. He led the 1974 spikers in scoring with 97¼ points, and was undefeated in the 100 in the conference. In the Nationals, he advanced to the semifinal heat of the 100 before being eliminated.

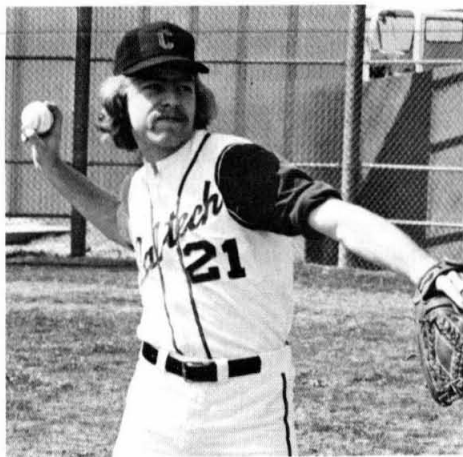
Griffin set school records in four distance events: the 2-mile, 3-mile, 6-mile, and 26-mile, 385-yard marathon. Although he failed to place in the 6-mile at the Nationals this year, he is looking forward to running for Tech next season.

In addition to these outstanding performances on the track, one Caltech record was set in the field events. Douglas Herbert's discus throw of 150-1 broke the previous record by more than three feet.

Such performances paced the track team to a 5-4 dual-meet record, the only winning season recorded by a Caltech varsity team in 1973-74. The team placed third, after Occidental and Pomona-Pitzer Colleges, in the conference standings; seventh in the NAIA District III Championships; and 38th in the Nationals. The spikers also entered international competition this year and defeated Tijuana Tech, 80-25.

Caltech fared badly this year in the three other spring sports, garnering only 2 victories in 50 contests. The baseball record was 1-23; tennis, 1-15; and the golf team had to forfeit all its matches because it lacked the required 6 players.

Senior Robert Pleva, sophomore John Dilles, and freshman Edward Rea led the baseball team this year; they received all-conference honorable mention awards and shared the Alumni Baseball Trophy. Pleva, the team captain, led the Beavers in hitting with a .365 average; he has consistently played well in his four years on the team.



Baseball team captain Robert Pleva.

Edward Rea was the team's top pitcher and in coming years will probably help the Caltech nine greatly. His top performance came in the second game against La Verne College, when he held the NAIA's top-ranked team to three hits and three runs, all of which were unearned. The only baseball win was a 12-9 victory over Pacific Christian College.

The tennis team also failed to win a league match, but had a few close contests and two outstanding performers. The best conference match of the season, a 7-2 loss to Whittier College, included two matches in which the Techers lost in three sets, and other two-set matches with close scores. Tech's only victory was over Loyola University of Los Angeles, 6½-2½, early in the season.

Timothy Ahern and David Dummit, the top-ranked men on the team, represented Caltech at the Ojai Tournament this year, but were eliminated in the first round in both singles and doubles competition.

Although the golf team forfeited all its matches, one of the team members received conference honors. Steve Poon, a senior, was awarded the Jesse Clark Memorial Golf Trophy by vote of his fellow SCIAC players, for his sportsmanship and golfing performance over the past four years. Phillip Nygren and Curtis Meissner, the other members of the 1974 team, will form the nucleus of the team next year.

The third term ended with dreams of football bonfires on Pasadena streets next fall.

In class of '74:

Chemical engineers: most wanted graduates

If you're a graduate in chemical engineering this year, you're on the "most wanted" list.

If you're a graduate in another field of engineering, you've probably been attracting more attention from recruiters than those students in recent graduating classes.

If you graduated in the sciences, you're probably looking down the long road toward a PhD and postdoctoral training; if not, then your immediate job pickings are pretty slim.

In discussing the job picture for Caltech graduates this year, William F. Nash, Jr., director of placements, said, "The active, individualized recruiting of chemical engineers at Caltech this spring has been phenomenal."

"To a large degree, this activity is a symptom of the petroleum crisis; the design and construction of petroleum plants have accelerated, and many companies are in serious need of chemical engineers to fill newly created job openings. Chemical engineers also are being hired in substantial numbers for environmental engineering work."

"This picture contrasts with that of three or four years ago when the job market for chemical engineers was relatively tight. It is one example of the difficulty facing any student entering college and trying to determine what the job market will be like when he graduates several years in the future."

Nash said companies have been recruiting engineers in all fields more actively this year than had been true for some time. But he noted that the engineer in greatest demand is the one with an MS degree.

"Today, employers generally can find enough graduates with master's degrees to fill their openings," he said. "They hire these people rather than those with only a BS. But fewer PhD's are being offered jobs in engineering because of cuts in industrial research programs. Many engineering students are realizing that their best bet is to get a master's degree but not to go further."

Although statistics are not yet available, Nash expects to see a reversal this year in what had been a decline—under way since 1966—in the number of Caltech graduates going on to graduate school.

In 1966, 85 percent of those receiving a BS from the Institute went on to graduate school; by 1973, that number had dropped to 60 percent, in line with a nationwide trend. The trend was attributed primarily to two factors: the ending of the draft and a decline in fellowships and other stipends available to graduate students.

Nash believes the uptrend this year is due to a lack of jobs for graduates in science at the BS level and to an awareness that graduate work is almost essen-

tial for a successful career in science—in spite of the time and financial pressures involved in completing it.

He pointed out that the typical pattern for a Caltech science major is to move into an academic position after obtaining a PhD and spending a few years in postdoctoral training. More than half of the men and women who received a PhD from Caltech last year are now postdocs.

For those graduates in science who don't go this route, job pickings this year are slim. Exceptions are students graduating in physics or mathematics, who generally can enter the computer science field if they have only a BS degree.

Graduates in the humanities are following the trend toward continuing study that is characteristic of Caltech students. Of the 14 men and women who received degrees in the humanities in June, 10 will go on to graduate school, 3 have taken jobs, and 1 is undecided.

A group of Caltech students having increasing difficulty in finding employment are those from foreign countries who are in the United States on temporary student visas. Non-citizens make up a significant percentage of those receiving degrees from the Institute at all levels. In 1973, they comprised 14 percent of those receiving BS degrees; 29 percent of those receiving MS degrees; and 31.5 percent of those receiving PhD's.

"The great majority of these graduates want to stay in the United States—even though initially they may have intended to return home," Nash said. "But as the job picture in this country has tightened, fewer employers are willing to deal with the difficulties involved in hiring persons who are on temporary visas when qualified U. S. citizens are unemployed."

"As a result, many graduates from foreign countries eventually take jobs in other fields, so strong is their determination to stay."

Pol Duwez receives two European honors for his alloy work

Pol E. Duwez, professor of applied physics and materials science, has been twice honored in Europe for his role in developing alloys that are expected to receive wide use in industry.

Duwez received the Prix Gouverneur Cornez, given annually in Belgium to a person who has "served society in science, literature, or art, or in promoting social progress or international peace." Former recipients include several Nobel laureates.

In Paris, Duwez received the Paul Lebeau Medal, the highest award of the French Society for High Temperature Research.



Commencement was over and students in Fleming House decided to celebrate the event with a real blast. They loaded their 1876-vintage French cannon—borrowed from Southwestern Academy in 1972—with a modest charge of powder; then they persuaded David R. Smith, master of student houses, to provide the finishing touch. Smith reported no unpleasant after-effects from the firing—other than nervousness.

STUDENT AWARDS

Continued from page 3

Award. The honor goes to the junior in the top five percent of his class who shows outstanding promise for a creative professional career.

Lee has demonstrated both talent and maturity in experimental and theoretical physics, his letter of nomination states. His research includes the use of a nuclear technique to study a difficult problem in geology and archeology—the hydration mechanism for obsidian.

Green Award

Kenneth S. Jancaitis, of Leominster, Massachusetts, a junior, won the \$500 George W. Green Memorial Award for research and creative scholarship.

His research, primarily in electromagnetic theory, will affect the design of new types of accelerators. In addition, Jancaitis is working on the theory of muon capture by atoms.

Hinrichs Award

Graduating seniors Haywood J. Robinson, of Los Angeles, a biology major, and Bryan C. Jack, of Tyler, Texas, an economics major, were co-winners of the Frederic W. Hinrichs, Jr., Memorial Award. Each received \$100. This award, kept secret until commencement, goes to seniors who, in the opinion of the undergraduate deans, have made the greatest contribution to the welfare of the student body and who show outstanding qualities of leadership, character, and responsibility.

Honeywell Award

Eugene W. Myers, Jr., a junior from Darien, Connecticut, was selected to receive the Honeywell Award as the outstanding junior in undergraduate engineering and science. He was given \$200 and a silver tray.

An engineering major, Myers is studying information sciences and is especially interested in the simulation of digital computer circuits. He plans to do graduate work in information sciences and to enter industry.

Macpherson Prize

The David Joseph Macpherson Prize in Engineering was awarded to Siu Joe Poon of Hong Kong. The prize is awarded to the graduating senior in engineering who best exemplifies excellence in scholarship.

Poon, an electrical engineering major whose interests lie in the field of solid-state physics, is conducting research on the properties of the first bulk amorphous superconductor. He plans to do graduate work in superconductivity and related problems in solid-state physics at the University of Illinois.

McKinney Prize

Dale E. Bredezen of Fort Lauderdale, Florida, and Barry A. Cipra of Overland Park, Kansas, each received \$350 as co-recipients of the Mary A. Earle McKinney Prize in English.

The two graduating seniors were selected by a faculty committee as winners of the annual prize for proficiency in writing—Cipra on the basis of five short stories, and Bredezen for his critical, non-fiction essays.

Royal Society Silver Medal

Kenneth S. Suslick, of Glencoe, Illinois, is this year's winner of The Royal Society for the Encouragement of Arts Manufactures and Commerce Silver Medal, which is given on the basis of outstanding academic records and significant participation in student activities.

Suslick has been active in both campus and student house politics. He served as president of Lloyd House, and was chairman of ASCIT's Educational Policies Committee, and a member of the Faculty Academic Policies Committee.

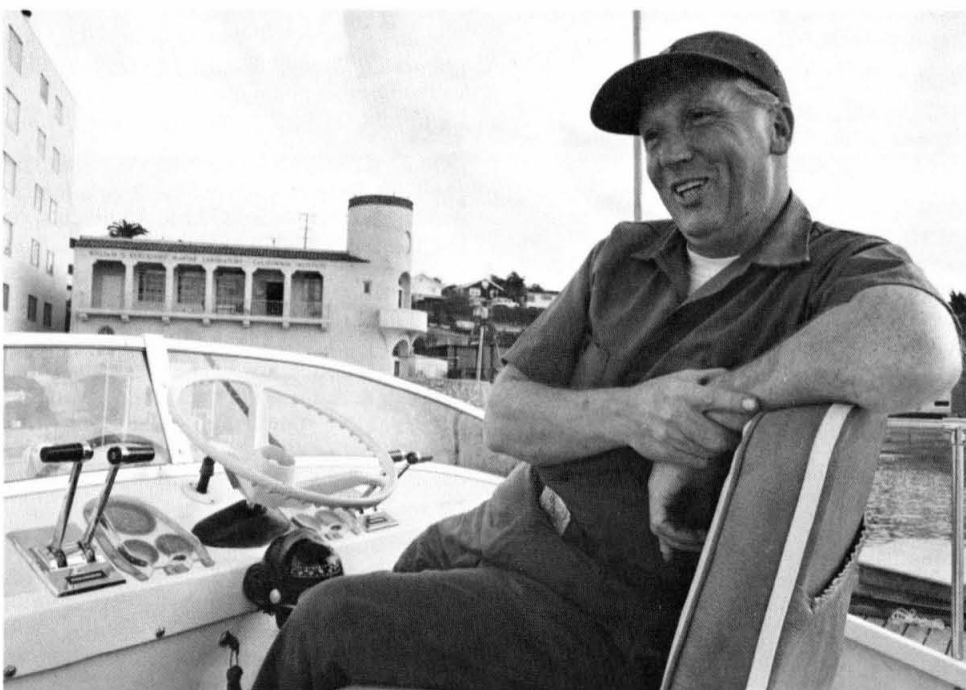
Shepard Award

Five students shared the Don Shepard Award, given to students who would find it difficult to engage in extracurricular and cultural activities without additional financial help. The recipients are selected on the basis of their scholastic standing.

The winning students are Claude W. Anderson, of Colonial Heights, Virginia, a junior; Jose I. Cabeson, of Framingham, Massachusetts, a freshman; Margaret Evans, of New York City, a sophomore; Kathleen L. Kong, of Huntington Beach, a freshman; and Gary R. Wakai, of San Mateo, a sophomore.

As research boat captain:

Caltech inherits a Scottish seaman



Capt. Bill Smith of the Institute's 31-foot research boat, the *Sea Urchin*.

Just in case you hadn't heard, Caltech has become the proud inheritor of a centuries-old, seafaring tradition in the person of a 46-year-old Scotsman named—of all things—Bill Smith.

Bill is a quiet man whose speech is full of long, rolling r's and deep, throaty consonants, and who surprises you by bursting out occasionally with a rollicking seaman's laugh. He is captain of the Institute's new 31-foot research boat, the *Sea Urchin*, moored at Kerckhoff Marine Laboratory near Newport Beach.

And once you hear his voice, you can't do anything but believe he is what he says he is—the eldest son of the eldest son of the eldest son of the eldest son of the eldest son in a seafaring family out of the Clan Mackenzie.

His grandfather, William Hepburn, went to sea aboard a sailing vessel in 1885 at the age of 16, became the master of a clipper at 25, and shipped out as captain of a Danish whaler in the first decade of the twentieth century.

Bill, raised by his grandfather, has continued the tradition. A veteran of the British Navy, he served in the North Atlantic and the Baltic Sea. As a member of Great Britain's Marine Service, whose trading ships crisscross the world, he has shipped out on ocean liners and freighters to the Far East, Hong Kong, and Japan. Bill has been skipper of everything from a 20-foot workboat to a 131-foot, 161-ton luxury yacht.

But his seafaring career has not been without its twists and turns, as he himself will tell you—if he can be pinned down long enough. The story comes out in fragments during brief interludes between his fast and furious stints at various maintenance jobs aboard the *Sea Urchin*—cleaning the bilges, overhauling the boat's twin 210-horsepower diesel engines, polishing the metal work, and checking the hull.

Bill's introduction to the sea came at the age of two. His grandfather took him out to the shores of the North Sea near his home in Edinburgh and Bill fell flat on his face in the water. On his seventh birthday, he received an 18-foot sailboat from his grandfather.

"He made it by hand," Bill says. "She was my pride and joy. I hardly set foot on dry land until I was eighteen. Ah, she was a beauty!"

When he was conscripted to serve in the British armed forces during World

War II, Bill hoped he could join the Navy. But he had reckoned without the influence of one of his uncles, who was serving with the airborne commandos.

"The British forces at that time had a peculiar system of enlistment—an older relative in a particular service could claim you for his branch if you qualified," says Bill. "I would have preferred the Navy, but on the whole I enjoyed the Air Force experience, except for jumping out of airplanes."

"I told myself that as soon as my time was up I would join the Navy and nothing was going to stop me. But they told me they would give me my choice—a settlement in cash, vocational training, or a college education. That last sounded like fun, so I decided to try it. Boy, was I green!"

He went to the University of Edinburgh—and had fun for exactly three months. Then the government inspectors arrived and called him on the carpet twice for not keeping his grades up. Twice was enough. He hit the books hard and three years later, in 1949, he graduated with a degree in electrical engineering. It took him just two weeks to decide what to do next: join the Navy.

His electrical-engineering training qualified him as a radio operator. But in the British Navy, because the crews are small, each man must have a second specialty. Bill became a diver.

Bill's closest brush with danger came after he left the Navy and was earning a living as a commercial diver.

"I was working on a bridge-construction project near the Firth of Forth in Scotland and my job was to work underwater, loading bricks into an immense ten-foot-wide, ten-foot-deep pot," he recalls. "It was almost time for a change of shift, and my mate went up with a full pot while I waited below."

"When they started to return the pot, it hit an abutment of the bridge, flipped over, and sank into the river on top of me."

They had Bill up from the bottom, uninjured, within minutes. But his wife, who was expecting their first child, wasn't so lucky. She had been sitting in a coffee shop waiting for him to come up. When she heard the warning siren alerting the camp to the accident, she fainted.

"Both she and the child were all right, but it was clear I had to get out of the diving business," Bill says. "So until something better came along I decided to ship out as a wireless operator on ocean liners."

The something better came along two years later, in 1962: a chance to come to the United States under the sponsorship of his brother-in-law. But after Bill and his family arrived, it was quite a while before he got the deck of a ship under his feet again. First came jobs as an electronics technician, a television repairman, and a cross-country bus driver, among other things.

Although the 31-foot *Sea Urchin* is a smaller craft than he is used to, Bill considers the assignment with Caltech a prime one.

He works with Wheeler North, professor of environmental science, in his efforts to reestablish kelp beds along the coastline. He often takes Charles J. Brokaw, professor of biology, out to get sea urchins, and Roy J. Britten, senior research associate in biology, out to get sea hares. And there are numerous trips for all sorts of ocean samples.

"These scientists and their students, they are right interesting people," says Bill. "I'm picking up a lot of stuff about the sea and the things that live there that I didn't know. And these marine biologists are a different kind of people than those I usually deal with, easier in some ways and harder in others."

"They know a lot about diving and the ocean, but they are more bookish than they are nautical. So I have to tread more or less delicately. But they seem bright and have picked up things pretty fast."



Bilges cleaned, engines overhauled, and metal work polished, Capt. Smith is ready to move out to sea.

PERSONALS

1941
MERRITT V. EUSEY, JR., formerly regional sales manager for the Powers Regulator Company in Detroit, Michigan, was promoted to national accounts manager of the company's Control Systems Field Operation Division. Eusey's headquarters will be Powers' regional office in Ferndale, Michigan.

1944
JOHN A. ZIVIC is general manager of the Phelps Dodge Brass Company in Los Angeles. He had been technical director with the company.

1947
ORIN J. DEMUTH, MS '48, formerly supervisor of thermophysics for the Aerojet Nuclear Company in Sacramento, California, now is supervisor of that company's Model Evaluation Section in Idaho Falls, Idaho.

1949
ROBERT D. FORESTER, MS '50, PhD '53, was elected executive vice president of the Xenex Corporation, distributor of a polyurethane coating, Crandalon, in Houston, Texas.

1950
DONALD A. DOOLEY, MS, PhD '56, has been elected a senior vice president of the Perkin-Elmer Corporation and named general manager of its Optical Group. With headquarters in Wilton, Connecticut, the Optical Group is a leading developer of optical and electro-optical systems, primarily for national security and space programs. Dooley had been senior vice president of the Systems Development Corporation in Santa Monica, California.

1951
EUGENE SEVIN, MS, writes: "My position since 1970—professor of mechanical engineering and chairman of the department, Ben Gurion University of the Negev, Beer Sheva, Israel. On sabbatical leave during 1974-75 at the Air Force Civil Engineering Research Facility, the University of New Mexico, Albuquerque. I would welcome contact with those interested in exploring joint research activities in problems of 'desert engineering,' and the possibility of exchange positions with our university."

DONALD L. SMATHERS formerly production manager for DuPont in Wilmington, Delaware, now is president of the Nick-Kote Corporation in Wilmington.

1956
ERIC A. JOHNSON, MS '57, is a chemical engineer with the Ralph M. Parsons Company in Los Angeles.

1959
MICHAEL E. FOURNEY, MS, PhD '63, formerly an associate professor in the Department of Aeronautics at the University of Washington in Seattle, now is an associate professor of engineering and applied science at UCLA.

1961
FURMAN Y. SORRELL, JR., MS, PhD '66, who directed the graduate program at North Carolina State University from 1970 to 1973, is an associate professor of engineering mechanics at that university. He will take a year's leave of absence to work as an associate with the consulting engineering firm of D. Y. Perry Associates. Sorrell and his wife, Marion, have a two-year-old daughter.



Dooley MS '50, PhD '56



Eusey '41

1963
HARRIS GOLD, PhD, is a general partner of Water Purification Associates, which recently opened new offices in Cambridge, Massachusetts. The company is a technical consulting service specializing in systems analyses and high technology configurations for water purification, water reuse, and pollution control. For the last four years, while employed at the Avco Systems Division in Walmington, Massachusetts, Gold worked on the development of a new process in ion exchange. He lives in Lexington, Massachusetts.

JOHN A. KIGER, JR., PhD '68, is an assistant professor in the Genetics Department at UC Davis. He had been an assistant professor in the Department of Biochemistry and Biophysics at Oregon State University in Corvallis, Oregon.

1964
JAMES R. BARNES, MS, ME '66, formerly chief mechanical engineer for Royco Instruments, Inc., in Menlo Park, California, is engineering manager of the Hewlett Packard Company-Boise Data Systems Division in Boise, Idaho.

ROBERT C. LIEBERMANN was promoted to senior research fellow in the Research School of Earth Sciences of the Australian National University in Canberra. He and his wife, Barbara, became the parents of their second daughter, Erica Jean, on November 29—a sister for Karen, age four.

1966
GEORGE T. LENGUEL, MS, is a senior engineer for the General Atomic Company in San Diego, California. He had been with the Humble Oil and Refining Company in New Jersey as a process engineer.

1967
DOUGLAS C. EATON is an assistant professor of physiology at the University of Texas medical branch in Galveston.

1968
DONALD R. GORAL, formerly a graduate student at the University of Wisconsin in Madison, is a graduate student and research assistant in linguistics at UC Berkeley.

1969
FRANK J. RYAN is a member of the technical staff of Ocean Data Systems, Inc., in Monterey, California. He had been a graduate student in the Physics Department at the University of Washington in Seattle.

1970
STEFAN C. RIESENFELDT, formerly a programmer for the Burroughs Corporation in Pasadena, California, is a candidate in the MBA program at the Stanford Graduate School of Business at Stanford University.

1973
STEPHEN JAMES BISSET writes: "I write to inform my former colleagues of my recent

appointment as an ultra multi-faceted microprocessor designer for the INTEL Corporation. While not yet highly commended for the nonetheless consummate excellence of my work, I do not attribute this to the fine training in abstract thought received at Caltech, but rather to my own innate stature as an intellectual giant. Having forsaken the noble pursuit of science, I nevertheless continue to utilize my skills when expedient in pursuit of happiness through personal and financial power."

OBITUARIES

1924
HOWARD W. GOODHUE on February 25, 1974, in Buenos Aires, Argentina. He was employed by the U.S. Department of the Army in the Engineering Division Civil Works Office in Washington, D. C.

1926
LAWRENCE G. MAECHTLEN on February 19, 1974. He was a resident of Riverside, California.

1938
JOHN G. McLEAN of cancer on May 20, 1974. He was a member of the Caltech Board of Trustees and was chairman and chief executive of the Continental Oil Company in Stamford, Connecticut. His home was in Darien, Connecticut, where his widow, Patricia, and children, Deborah, John, and Jeffrey, live.

1948
JACK W. KEUFFEL, PhD, in May of a heart attack. A physics professor at the University of Utah and director of a neutrino research project at the Silver King mine at Park City, Utah, he pioneered in the study of neutrinos and other forms of cosmic radiation.

1951
RIDDELL L. "Pete" HAWK, MS, of a heart attack on May 18, 1974. He was owner and president of R. L. "Pete" Hawk Company, Realtors, in Houston, Texas. Hawk, who lived in Houston, is survived by his wife, Peggy; his daughter, Hollie, and his son, Thomas, both of Houston; and his son, Eugene, of Dallas.

Ditch Day '74:

Banner year for finesse stacks

by Daniel Muzyka
Class of 1975

The morning of Friday, May 24, was like no other this year at Caltech. One heard sounds of jack hammers and of carbide saws tearing into steel, and saw the brilliant lights of arc welders and small groups of people peeping intently into rooms. It was obvious what was happening—Ditch Day!

This is the day when freshmen get to revenge the accumulated excesses of their senior house brothers and sisters. Each senior class elects the day, a coveted piece of intelligence information.

Any senior who is questioned about the date of this event answers "Ditch Day is tomorrow." Any senior caught on campus during Ditch Day is liable to be tied to a tree and not released until 5 p.m. One brave senior who dared to come to campus during this most recent Ditch Day found himself modeling a bicycle chain and lock for hours.

Stacks barring senior rooms are of two varieties: finesse stacks and force stacks. Finesse stacks, permitting entry after fulfillment of stated requirements, were especially popular this year.

One senior, not wanting to tax the attackers, merely placed a list of freshmen in his house by his door, followed by a biblical quotation that each was to read. The reward was one of the largest caches of food on campus.

Many seniors resorted to digital gadgetry this year, with door latches controlled by microcomputers. Clues to the information which had to be encoded into these electronic devices often were sought by a dozen people.

Force stacks, which make a room a veritable fortress, are some of the most

challenging pieces of workmanship that freshmen must face. Overshadowing all force stacks on campus this year was that of Lou Sheffer of Page House. Sheffer's stack consisted of reinforced concrete, boiler plate, wire mesh, and ball bearings. It withstood attacks with carbide saws, axes, and arc welders.

Late in the afternoon, it appeared that this tribute to structural engineering might never be breached. But finally, at 5:15 p.m., the stack was broken.

Seniors who lacked the foresight to leave a bribe faced the trauma of the reverse stack. One unfortunate senior returned to find that his room had been turned into a barnyard, complete with a pig-slopping pen, a sty, and, of course, a pig.

The president of Ruddock House found

that his room had been dismantled and reconstructed in a courtyard. But the most traumatic return must have been that of the individual who found that his room had been entered and cleaned!

When asked what was most interesting about this year's Ditch Day, David Larwood, senior class vice president who helped organize the event, said, "This was a good year for finesse stacks. Of course, glitches got some of them, like the stack of the senior whose electronic device wouldn't open even for him. But these devices were really what set this year's Ditch Day apart from all the others."

When asked whether he had any words to pass on to the freshman class, Larwood said, "Ditch Day is tomorrow." It's hard to break an old habit.



No, he's not conducting an electrical engineering experiment; he's an underclassman reassembling—after a successful entry—an electronic device that controlled a door latch on Ditch Day.

Two on faculty elected to oldest honor society

Two Caltech faculty members, John D. Roberts, Institute Professor of Chemistry, and Roger W. Sperry, Hixon Professor of Psychobiology, have been elected to membership in the American Philosophical Society. Roberts was named to the oldest honorary society in the United States for his investigation of molecules through nuclear magnetic resonance, and Sperry for his research on the brain.

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