

CALTECH NEWS

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DuBridge receives Millikan Award



John R. McMillan, president of The Caltech Associates, welcomed 600 guests attending the Millikan Award dinner given in the Century Plaza Hotel on November 24.

Bacher retires as provost; honored by dinner, revue

Robert F. Bacher, who came to the Institute in 1949 as chairman of the division of physics, mathematics and astronomy and director of the Norman Bridge physics laboratory, retired this fall as vice president and provost at Caltech—a position he had held since 1962.

To honor the retiring provost, the Caltech faculty gave a dinner at the Athenaeum on November 20, followed by a musical revue in Beckman Auditorium.

In a talk to 250 faculty members at his farewell dinner Bacher reviewed some of the problems universities face today. He cited abuse of academic freedom from within the university, intemperate verbal attacks from without, and inadequate financial support as reasons for the "perilous condition" of the university, but noted that Caltech has fared better than many colleges, both financially and in its lack of campus disruptions. Though the Institute has certainly not escaped the pinch of rising educational costs and insufficient funds, a policy of restrained growth—guarded by trustees who are sensitive to the changing economy—has put Caltech in a better position than many other schools.

Bacher also stated that the university's capacity for change has not been adequate and that "academic viscosity" may jeopardize its existence. "Change is not always for the better. A willingness to experiment, however, is a valuable asset if we always remember that Caltech should be a place to learn, a place to teach, a place to preserve our cultural heritage, and a place to extend the boundaries of our understanding."

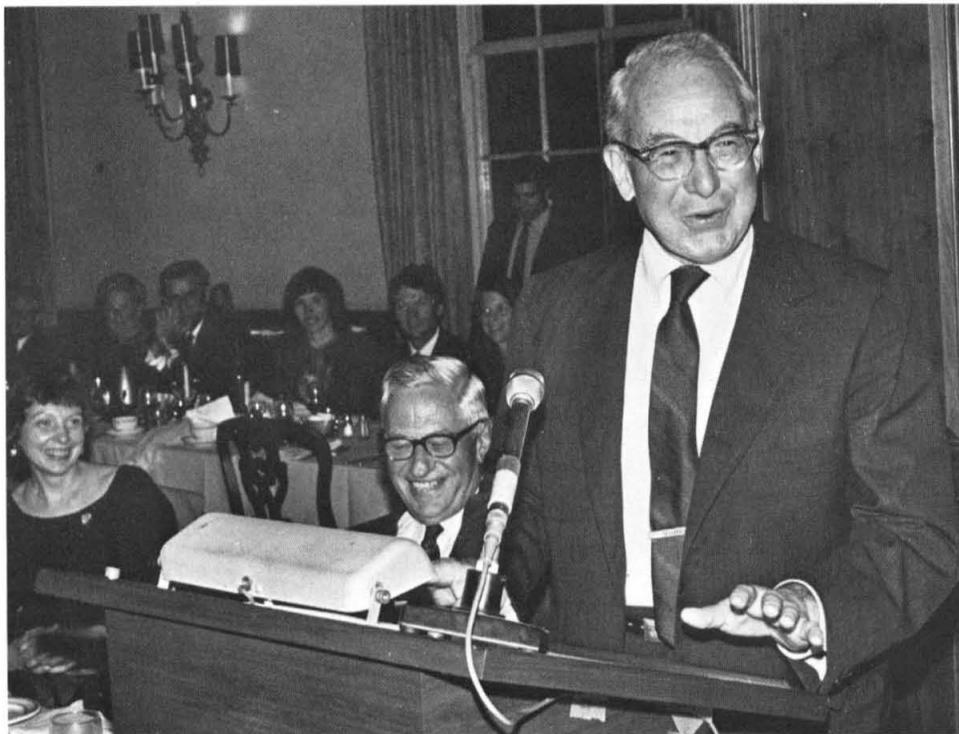
A gift from the faculty—an album of photographs and mementos—was presented to the Bachers by faculty chairman

Clarence Allen. Other speakers at the dinner were Arnold O. Beckman, president of the board of trustees; and Lee A. DuBridge, president emeritus and a long-time friend of the Bachers.

The musical revue, "The Bacher File," was written by Professor Kent Clark and Elliott Davis, and it featured members of the Caltech faculty and staff.

Bacher, who remains on the faculty as professor of physics, is a specialist in high energy physics and atomic energy. He

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Robert Bacher speaks to his colleagues at a farewell dinner held in the Athenaeum.

Lee A. DuBridge, president emeritus of Caltech, became the second recipient of the Institute's highest honor, the Robert Andrews Millikan Award, at a dinner attended by more than 600 civic, business, and educational leaders in the Century Plaza Hotel on November 24.

The award was created in memory of the man whose early leadership carried the Institute to a position of world renown, and is given to "an outstanding citizen who has made very great contributions to human welfare through the use or encouragement of scientific, engineering, educational, or other scholarly pursuits."

The Millikan Award consists of a model of the alpha-helix—a structural element in the protein molecule whose existence was proposed and confirmed at Caltech—and an honorarium of \$5,000. John W. Gardner received the first Millikan Award in 1968.

In accepting the award, DuBridge reflected upon the scientific cycle this country has gone through in the last 40 years. In the 1930's we were struggling to attain a position of scientific competence. World War II was followed by a period of major scientific enterprise, which brought great rewards and awards to American scientists and new highs in scientific expenditures. Today we see a scientific slowdown resulting from inflationary pressures, the Vietnam war, and negative attitudes toward defense-related research.

"The future of science and technology in this country will depend on how public attitudes change and develop. As long as people are doubtful or uninformed about the values and benefits of science, or as long as they are indifferent or even antagonistic—or think that science is the cause rather than one possible cure for human troubles, then government atti-

tudes at the state and federal level—and the attitudes of some philanthropic foundations too—will reflect this negativism.

"It behooves us all—scientists and friends of science—to reexamine the case for science, and the case for federal support of it. The case for the support of science and technology goes far beyond national security and national prestige—though they are importantly involved. The whole future of our country, the health and welfare of its people, the improvement of our environment, the attainment of better housing and better transportation, and our continued prosperity depend on more knowledge and the thoughtful, humane, and innovative use of knowledge."

Exchange Program initiated with Occidental College

The Caltech faculty and administration are concerned about getting more diversity into the academic and social lives of students. Though there aren't any easy solutions to this problem, a new exchange program with Occidental College is a step in the direction of academic variety.

Students at each school can now take courses at the other and get credit for them—up to the equivalent of one year of academic work. Caltech students probably won't be taking any math or science at Occidental, but they now have a wider range of humanities, arts, and social sciences to choose from. The program also makes it possible for the Institute to deal with the diverse interests of its students without overloading its own faculty, facilities, or funds.

The agreement—worked out by an ad hoc committee on exchange programs, consisting of Francis Buffington (chairman), Lyman Bonner, Kent Clark, Noel Corngold, S. S. Gabriel, R. A. Land, Gary Lorden, Peter Miller, Harvey Risch, and Hallett Smith—has been approved by both schools. It is based on two guarantees: First, no exchange of money will be involved; and second, each institution will accept the admissions procedures of the home college as proof of the competence of the student.

Credit for the courses will be granted by a student's home school. A Caltech student who wants to participate needs the approval of his option, the division with courses most like the ones he proposes to take, and the registrar at the Institute. He must also be accepted by the instructor of the course he wants to take at Occidental. For reasons of draft status, health insurance, and veterans' benefits, a student is considered to be registered in his home institution for the total number of units being taken at both schools.

Graduate students are not excluded from the program, but most participants will probably be undergraduates. How-

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Robert Bergman on students: "I learn at least as much as I teach."

Faculty honors

Two Caltech professors have received Exceptional Scientific Achievement Awards from the National Aeronautics and Space Administration. Leverett Davis, professor of theoretical physics, was honored for measuring (with data from spacecraft) the magnetic fields in interplanetary space and the high frequency waves in the earth's magnetosheath.

Gerald Wasserburg, professor of geology and geophysics, was recognized for significant scientific accomplishments resulting from his examination of material returned from the lunar surface, especially his age-dating of the lunar samples. Wasserburg is vice chairman of NASA's lunar sample analysis planning team.

Sven Persson, Caltech graduate student in astronomy, has been named the recipient of the Virginia Steele Scott Graduate Award. The award, which carries a \$5,000 stipend, was established by Mrs. Scott in honor of her late father, Harry Steele, for whom the Steele Laboratory of Electrical Sciences is named.

Persson has been studying at Caltech since 1966, when he received his BS degree from McGill University. He is currently working with astronomy professor Guido Munch on a PhD thesis involving the helium spectrum of emission nebulae.

Jack E. McKee, professor of environmental engineering science, has been ap-

pointed chairman of the National Research Council's Committee on Air Quality Management. The committee, which functions under the National Academy of Engineering, is responsible to the federal government for assessing progress in air pollution control, including technological developments concerning major sources of air pollutants and the technology to abate the pollutants.

Sheldon K. Friedlander, professor of chemical engineering and environmental health engineering, has also been named to membership on the Air Quality Management Committee. He is chairman of the committee's panel on particulate emissions.

A new professorship will be established at Caltech with funds pledged by Clarence L. and Althea Johnson. The gift of \$650,000 is in the form of a trust and has been designated for a professorship in applied aerodynamics. Johnson, senior vice president and member of the board of directors of the Lockheed Aircraft Corp., is recognized as one of the world's leading designers of high-performance aircraft. He has pioneered the production of some of America's most revolutionary military aircraft in his "skunkworks" in Burbank, and his many awards include the Presidential Medal of Freedom, the National Medal of Science, and the Lawrence Sperry Award of the Institute of Aeronautical Sciences.

Robert Bergman awarded Dreyfus Foundation grant

Any list of famous American scientists and engineers would include the names of a number of Caltech's senior faculty members. Whether their future renown was recognized or recognizable when they were graduate students or junior faculty members is hard to discover now, but no doubt the seeds of many of their ideas were germinating in those days. Some of the Institute's younger faculty members and the work they are doing today will surely receive greater recognition and honors eventually; for some, the awards are already beginning.

One of these is Robert Bergman, 28, assistant professor of chemistry, who recently received a Camille and Henry Dreyfus Foundation Teacher-Scholar Grant of \$25,000. A native of Chicago, Bergman graduated cum laude from Carleton College in Minnesota in 1963. He went on to earn his PhD at the University of Wisconsin in 1966, working there with Jerome Berson, who is described by George Hammond, chairman of Caltech's division of chemistry and chemical engineering, as a "master of following through and keeping track of highly complex chemical schemes and making sense of them." Hammond says, "The combination of Berson and Bergman was a real meeting of minds—as a pair with an unusual and complex intellectual style, they would be hard to match." One of the results of this association was the publication of 15 research papers between 1965 and 1969. (Bergman also has 13 other published research papers to his credit.)

After spending 1966-67 as a NATO (North Atlantic Treaty Organization) postdoctoral fellow at Columbia University, Bergman came to Caltech as Arthur Amos Noyes Instructor in Chemistry. In 1969 he was appointed assistant professor. His research at Caltech has been directed toward the study of short-lived intermediates formed during chemical reactions in the gas phase and in solution. With his research group Bergman has been using stereochemical and kinetic techniques to investigate the structures of these intermediates and to study the characteristics of the very fast reactions which they undergo.

In addition to his growing reputation as a research chemist, Bergman is known as an enthusiastic and creative teacher. According to the Institute's senior faculty members who nominated him for the Dreyfus Foundation grant, he meets the foundation's criteria as a "young faculty member of exceptional promise who com-

bines interest and demonstrated ability in teaching and in performing imaginative research."

Bergman plans to use his grant to fund a two-year postdoctoral fellowship. The person chosen for the fellowship will work in Bergman's research group. He will also help in the development of a combined chemistry-chemical engineering laboratory course that Bergman is beginning to work out with Fredrick Shair, associate professor of chemical engineering. Students in this laboratory will first synthesize a number of compounds in an organic chemistry laboratory and then study the kinetics of their gas-phase isomerization reactions in a microflow reactor. Bergman and Shair feel that work in this laboratory will help overcome the reluctance of physical chemists and engineers to become involved in chemical synthesis, and help students who are interested in organic chemistry to become more comfortable while making physical measurements on the compounds they prepare.

Bergman is collaborating in another teaching experiment with John Richards, professor of organic chemistry, involving modification of the sophomore lecture and laboratory courses. Because Bergman and Richards consider the sophomore year a good time to begin the study of chemical reactions, and because they feel the barrier between inorganic and organic chemistry is somewhat artificial, they plan to offer a combination of these disciplines organized along a general reaction mechanistic framework. They also propose to revamp the subject matter to include additional descriptive chemistry.

In 1968-69, with Jesse Beauchamp, assistant professor of chemistry, Bergman did considerable revising of Ch 2, the advanced placement chemistry course for freshmen, and he is now mulling over ideas for modernizing laboratory courses in general. One of his major responsibilities is working with the graduate students and postdoctoral fellows who carry out research under his direction, and the informal, day-to-day interaction with them is one of the most gratifying—and productive—of his activities. "I learn at least as much as I teach," he says.

In both teaching and research Bergman's aim is, of course, to inform, but he is also fascinated by the growth he sees as he helps his students understand their ability to do science and to mature in their motivations. In fact, his work is a vehicle for finding out about people—including himself. "No matter how exciting your research is," he explains, "it's hard to make an accurate estimate of its usefulness or long-range impact. What is always important and rewarding are the interactions with the people you are working with, especially the students. They make it worthwhile."

Interhouse Dance

Several student houses went to great lengths to make Interhouse Dance entertaining this year. Blacker House was converted into an old frontier town, complete with underground mining tunnel, saloon, and general store. Students danced and panned for "gold"—bits of brass and iron pyrite—as shown at the left. They exchanged the gold for "funny money" in order to buy refreshments.

Musical and theatrical talents created quite a show in Fleming House: Sheldon and the Schmucks performed American music from the early '50's, followed by the Fleming House Jug Band and a comedy-morality play entitled "Hot Noogies."

Ricketts House put up a mylar tent for a psychedelic light show and Dabney House encouraged Interhouse visitors to gamble in their Las Vegas-styled casino.



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HOMECOMING 1970

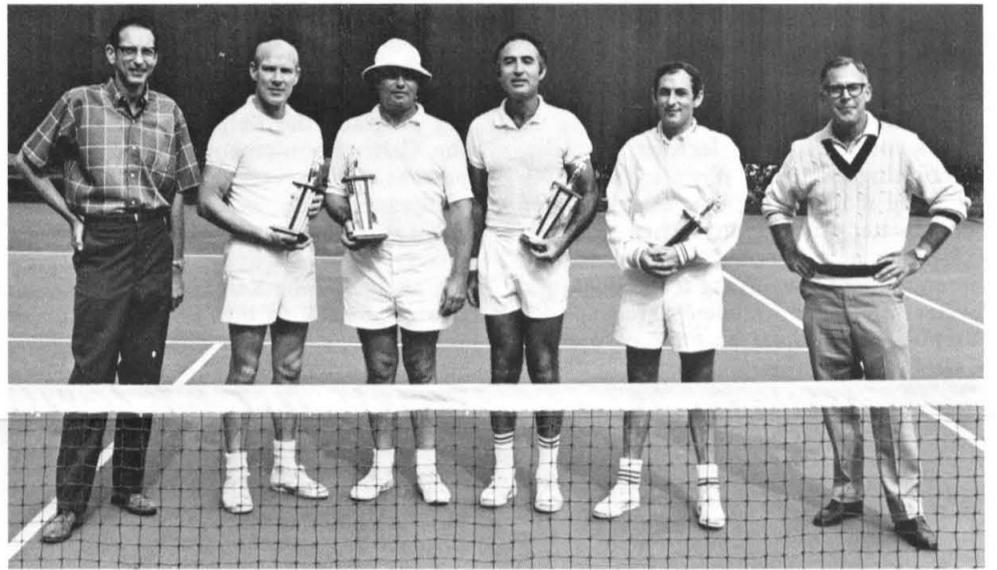


Five hundred alumni, families, and friends descended on the Caltech campus on October 23-24 for the third annual Alumni Homecoming.

The heavy schedule of athletic and social activities began on Friday afternoon with the first alumni tennis tournament. Norman Gottlieb, '46, climbed the 15-man ladder to claim first prize in singles; Andrew Nasser, '59, finished second; and Arthur Spaulding, '49, took the consolation prize. John Whitmore, '45, joined Gottlieb in beating Nasser and Richard Henry, '45, in doubles.

On Saturday morning the alumni challenged Caltech's varsity water polo team—and took an 8-4 dunking. Undaunted, the alumni dried off, headed to the football field for a picnic, and then watched Caltech's game against the UC Riverside frosh. The Beavers lost 22-7, but a half-time band concert and some imaginative cheering from the student rooting section helped to make up for the lack of touchdowns. After the game, Homecoming activities wound up with a cocktail party in the Athenaeum.

Below, Alumni Association president Bill Freed, left, joins winners of the Homecoming tennis tournament: Richard Henry, '45, John Whitmore, '45, Norman Gottlieb, '46, Andrew Nasser, '59, Arthur Spaulding, '49.



The Class of 1945 -- together again after 25 years

In 1945 academic work and the Navy V-12 program left Caltech students little time for anything but their studies. At least that's how the members of the class of '45 remembered their undergraduate days until they met for their 25th reunion last October 23.

With the help of some slides, photographs, and a little collective brain-picking, class president Gene Bolster and student body president Don Tillman gave a quick refresher course on the extracurricular activities of the class of '45 for the 105 alumni attending the reunion in the Athenaeum. Bolster and Tillman didn't have to talk very long to remind their classmates that life in 1945 wasn't all physics, math, and Lt. Murphy's push-ups.

For one thing, 1945 was the year that Caltech's football team went undefeated and unscored on, and the track team (bolstered with V-12 trainees that included Ken Shauer, Bill Frady, Hal Tyson, and George Gill) beat SC, UCLA, and Cal in a four-way track meet in the Coliseum.

School ran three semesters per year in those days, and some students worked at Railway Express or on the night shift in LA bakeries to earn spending money. School work was heavy, but there were time-outs for smokers and "exclusive" film-showings in the steam tunnels and student house basements, and the favorite beer hangouts in Pasadena—the Skip Inn, the Track, and Gambrinus'.

The class of '45 had other pastimes too.

One night someone used nitrogen triiodide to paint the Blacker House mess hall—silverware, rugs, door locks, and all. Explosions ensued—and the Navy restricted everyone in Ricketts for a month.

A few months later there was a rash of practical jokes. Just prior to a Navy in-

spection, one student's room was filled so full of newspapers that only the transom could be moved, while another student walked in to find his room completely tied up in an impassable web of wall-to-wall string. In Fleming House, the sophomores broke through the double-

bolted doors of several rooms, reversed the locks, turned on the water faucets in the sinks and showers, and then fled through the second-story windows, leaving the rooms shut tight behind them. It was a wet surprise for Bob Bennett and the others who had to break down the doors to get into their rooms later on.

Al Hibbs, one of the self-appointed midnight raiders, is remembered for his stellar performance the night he lowered a burning cross through the ceiling trapdoor of the lecture hall in Bridge during a debate between E. T. Bell and a Presbyterian minister on "Does God Exist?"

1945 was also the year that Les Levin, Bob Jenkins, John Maloney, and Dudley Smith finally finished a bridge game that they kept going for four straight years—complete with a four-year running tally.

In the spring, the varsity baseball team won the Southern California Intercollegiate championship under Coach Hal Musselman; J. Robert Oppenheimer joined the Caltech faculty to teach physics; and 12 fatigue guinea pigs "volunteered" for an experiment to see how long they could stay awake.

1945 was also the end of an era at Caltech. "Uncle Bobby" Millikan retired, and the war finally came to an end. Post-war days brought a more placid atmosphere to the campus—but it is interesting to speculate what things might have been like if the class of '45 hadn't been so preoccupied with their studies and the V-12 program.



Class members Bill Frady, John Cardall, Stanley Clark, and Bob Tookey get together with class president Gene Bolster to look at some sports photos from 1945.

Scuba diving: one of PE's new adventures

To many Caltech students, physical education is only a bore. Period. And that includes baseball, football, laps around the track—or any of the other standard PE activities. The PE department faced up to this fact a few years ago and began offering some sports that Caltech students might actually want to learn—which turned out to include mountain climbing, sailing, skiing, karate, and scuba diving.

Scuba diving, now in its third year of instruction, is still one of the most popular. The class is offered each term during the school year and is taught by Lawlor Reck of the athletic department and Jim Mayer, a volunteer who is also associate professor of electrical engineering at Caltech.

The class is open to anyone in the Caltech community, and the only requirement is to pass a basic swimming test. Students buy their own masks, fins, and snorkels; but Caltech supplies the air tanks, weight belts, and inflatable vests.

Each class is open to 14 students and is divided into four areas of instruction: classroom lecture, pool instruction, individual practice, and ocean dives.

As an introduction, students get 15 hours of classroom lectures covering everything from the physics and physiology of scuba diving to spearfishing and underwater photography. Then there are 15 hours of supervised pool instruction in equipment use, diving techniques, and water safety—and students are expected to put in an equal amount of practice

time on their own. Finally, the class moves into the ocean for instruction in beach and boat diving techniques.

At the completion of the course, students are awarded certificates from both the Los Angeles Department of Recreation and Parks and the National Association of Underwater Divers (NAUI). The certification lets them buy diving, air, and other equipment at scuba shops throughout the country.

For many of the newly trained scuba divers, the class is just the beginning, and they continue their diving activities on a regular basis by joining the Kelpers, a Caltech scuba diving club formed nearly a year ago which now has over 50 members divided equally among undergraduate and graduate students, faculty, and employees. The Kelpers sponsor about two outings a month; usually one- or two-day boat trips in the southern California and Channel Islands regions. One recent trip took the members to Ensenada.

Club dues are \$2 per term for members who have their own equipment, and \$3 for those who use Caltech's scuba class equipment. Through an active fund raising program, the Kelpers have increased the Caltech equipment inventory by 20 percent, and have purchased specialized equipment such as underwater diving lights. In order to decrease equipment upkeep costs and expenditures for refilling air tanks, the Kelpers are now trying to raise \$2,200 to buy an air filling station to be installed in the Caltech gym.



Scuba class students practice buddy-breathing on the bottom of Caltech's pool.



Members of the Kelpers scuba club inspect their equipment during a recent outing.



Joe Rhodes, right, marked his return to the campus with an Olive Walk talk and a seminar.

Rhodes returns; speaks on Scranton Commission report

At 22, Joseph Rhodes Jr., '69, may well be one of Caltech's best known alumni—and he isn't even a scientist. Rhodes, who set a lot of Caltech precedents as an undergraduate—including being elected student body president twice—made his first official return to the campus on November 17.

In an Olive Walk talk and drop-in seminar at Winnett Center, Rhodes covered a wide range of topics including his impressions of the Scranton Commission on Campus Unrest (of which he was the youngest member), President Nixon's reaction to the commission's report, and current Administration policies.

Rhodes, who is now a junior fellow scholar at Harvard, immediately established his position on the Scranton Commission when, shortly after his appointment last June, he issued a public statement criticizing Administration policies. Vice President Agnew considered this prejudicial and asked Rhodes to resign. He refused.

His next move was to organize a staff, independent of the commission and composed of nearly 60 students from Harvard and other schools, to carry out his own investigation in order "to provide a threat of a minority report in case the commission report was bad." As it turned out, a minority report wasn't needed as the commission's conclusions were unanimous.

As to President Nixon's reaction to the report Rhodes said: "The President's campaign was a very precise response to our report." Rhodes had hoped the President would respond by continuing the probe

with his own staff. "I had hoped the President would have taken the opportunity to heal the divisions of the country, but the campaign showed he wasn't very interested."

Rhodes had other thoughts on the President. For one thing, he thinks the country is in for a rough two years. ("I'm very worried it may be in the President's interest to create more confrontations.") He also disagrees with people who think that President Nixon, having seen his campaign policies rejected at the polls, will temper his actions. ("If anything, he won't think he's gone far enough.")

Rhodes has been a Washington commuter ever since his undergraduate days at Caltech. In his senior year he served as a consultant to the Department of Health, Education and Welfare and to the Commissioner of Education. At HEW's request, Joe formulated a plan to bring more young people into the governmental process.

As a junior fellow, Rhodes is one of four young scholars who are given \$6,000 a year to pursue whatever projects they choose. He is doing research on the various forms of prejudice in Victorian England. He also leads a special educational project for the Ford Foundation at the Universities of Massachusetts and South Carolina.

Oxy exchange

Continued from page 1

ever, except in very unusual circumstances, the program is not open to Caltech freshmen.

Eventually, the exchange program will include other colleges, but Occidental was a natural first for several reasons: The academic terms of the two schools match; travel time between them is short; and Caltech and Occidental have a well-established academic relationship through the 3-2 plan, whereby students enrolled at Occidental (or any of several other liberal arts colleges) may follow a prescribed course there for three years, then transfer into the third year of the engineering option at the Institute for two years, and receive both an AB and a BS at the end of the five-year period.

Records in the registrar's office at Caltech show eight Occidental students at Caltech this term—six men and two women. Five Caltech students indicated that they planned to register for courses at Occidental this fall, but the actual number will not be known until grades come in at the end of the quarter.



NEW YEAR'S SPECIAL

On January 1, 1971, all Caltech alumni and their families are invited to attend:

—Continental breakfast in the Athenaeum, 8:00-9:15 a.m.

—82nd Annual Tournament of Roses Parade, reserved grandstand seats at Holliston and Colorado Streets, 9:15-11:30.

—Cocktail hour and buffet luncheon in the Athenaeum, 12:00 noon.

—Bus available from campus for those with Rose Bowl Tickets.

Reservations (\$12.00 per person) should be made through the Caltech Alumni Office.

Coming events

Sunday, Jan. 17, 8:15 p.m. Dabney THE LOS ANGELES WIND QUINTET performs music by David Steinman, Jean Francaix, Ramiro Cortes, and Gunther Schuller in a Dabney Lounge chamber music concert. Free.

Friday, Jan. 22, 8:30 p.m. Beckman ARMCHAIR ADVENTURES presents "Yankee's Grand Tour of Europe," a film about the voyage of the 50-foot ketch that has sailed eighteen times across the waterways of Europe. Tickets: \$2.50-2.00.

Saturday, Jan. 23, 8:30 p.m. Beckman RICHARD E. LEAKEY, administrative director of the National Museum, Nairobi, Kenya. Presented in cooperation with the L. S. B. Leakey Foundation for Research Related to Man's Origins. Tickets: \$2.50, students—\$2.

Sunday, Jan. 24, 8:00 p.m. Pasadena Art Museum. Continuing ENCOUNTERS series: Roger Reynolds, avant garde composer in multi-media environment, using tapes and projections. Tickets: \$3.50, students—\$2.00.

Monday, Jan. 25, 8:30 p.m. Beckman LASER ART, a lecture by Elsa M. Garmire, research fellow in electrical engineering. Caltech Lecture Series. Free.

Saturday, Jan. 30, 11:00 a.m. and 1:00 p.m. MARAIS and MIRANDA: opening of a new children's series with the famed balladeers. Series tickets: children—\$4, adults—\$6; individual performances: children—\$1.25, adults—\$1.75. Beckman Auditorium.

Sunday, Jan. 31, 3:30 p.m. Beckman NEW YORK PRO MUSICA performs songs, dances, and sacred works of Renaissance Europe in a Coleman Chamber Concert. Tickets: \$5-4-3.

Monday, Feb. 1, 8:30 p.m. Beckman THE MOON AND THE PLANETS IN THE SOLAR WIND, a lecture by Conway W. Snyder, JPL's Space Sciences Division. Caltech Lecture Series. Free.



Muddy Victory To most competitors, the taste of victory is sweet, but to the participants in Caltech's traditional Mudeo, the taste is always the same—mud. But regardless of the taste, this year's freshman class is still savoring its November 13th mud-bath victory over the sophomores. Equipped with girls for the first time, the freshman team obviously had the sophomores bedazzled and captured three of the five main events.



Bacher retires

Continued from page 1

received his BS and PhD from the University of Michigan before coming to Caltech in 1930 as a National Research Council fellow. After returning to the East Coast to do research at MIT, Michigan, Columbia, and Cornell, Bacher was appointed instructor in physics at Cornell in 1935. He was put in charge of the university's cyclotron in 1938, promoted to assistant professor in 1940, and to full professor in 1945. In 1946 he became director of Cornell's Laboratory of Nuclear Studies.

On leave from Cornell during World War II, Bacher worked with Lee DuBridge at the MIT Radiation Laboratory, where he was in charge of radar receiver and indicator components and radar beacons. From 1943 to 1946, he worked at the Los Alamos Laboratory in New Mexico on the atomic bomb project—first as head of the experimental physics division, then as head of the bomb physics division.

In 1946 Bacher was appointed to the Atomic Energy Commission—the only scientist in the group—and from 1957 to 1960 he served on President Eisenhower's Science Advisory Committee. In the fall of 1958, he was named one of three American delegates to the Geneva conference on the cessation of nuclear weapons testing.

Among Bacher's many contributions to high energy physics while at Caltech were the creation of an experimental program in high energy physics and the construction of the 1.5-billion-electron-volt synchrotron, which he started shortly after his arrival in Pasadena in 1949. Working with the synchrotron, Bacher and a group of other Caltech physicists succeeded in the photo-production of heavy mesons and hyperons from hydrogen by 1957. Bacher's appointment as provost in the fall of 1962 made it increasingly difficult for him to keep up with the projects he had initiated. Now that he has resumed teaching, he hopes "to find out a few of the many, many things that have been happening" in high energy physics.

Address Unknown

The Institute has no record of the addresses of these alumni. If you know the current addresses of any of these people, please contact the Alumni Office.

- 1906 Norton, Frank E.
- 1907 Miller, James C., Jr.
- 1911 Lewis, Stanley M.
- 1916 Allen, Robert N.
- 1917 Beattie, Joseph A.
- 1921 Arnold, Jesse
- 1922 Cox, Edwin P.
- 1923 Neil, W. Harvey
- 1924 Gridley, Horace V. Tracy, Willard H. Waldo, Cornelius T.
- 1925 Hamilton, James H. Waller, Conrad
- 1926 Anderson, Arthur B. Chang, Hung-Yuan Hayward, Claude D. Huang, Y. H. Yang, Kai Jin
- 1927 Peterson, Frank F. Moore, Bernard N. Thompson, Donald R.
- 1928 Chou, P'ei-Yuan Martin, Francis C.
- 1929 Briggs, Thomas H., Jr. Kibort, Leon Lau, Kam Hu Nelson, Julius Robinson, True W. Uytterhoeven, Willem
- 1930 Chao, Chung-Yao
- 1931 Moyers, Frank N. Reynard, Willard G. White, Dudley
- 1931 Ho, Tseng-Loh Saygol, Charles C. West, William T. Woo, Sho-Chow Yoshioka, Carl K.
- 1933 Burk, Thomas C. Downie, Arthur J. Koch, Arthur Larsen, William A. Michal, Edwin B. Muller, Jerome J. Murdock, Keith A. Plank, Dick A. Rice, Winston R. Shappell, Maple D. Smith, Warren H.
- 1934 Harshberger, John D. Liu, Yun Pu
- 1935 Antz, Hans M. Bertram, Edward A. Evans, M. Harrison Huang, Fung-Chang McNeal, Don Rivas, Dagoberto Snow, Neil W.
- 1936 Chu, Dien-Yuen Dunn, Clarence L. Meng, Chao-Ying Tan, Chia-chen Van Riper, Dale H. Young, Larry L.
- 1937 Burnight, Thomas R. Cheng, Ju-Yung Easton, Anthony Fan, Hsu Tsi Jones, Paul F. Lotzkar, Harry Maginnis, Jack Servet, Abdurrahim Shaw, Thomas N. Shuler, Ellis W. Shults, Mayo G. Yin, Hung C.

- 1938 Goodman, Hyman D. Gross, Arthur G. Gutierrez, Arnulfo G. Li, Yuan-Chen Lowe, Frank C. Rhett, William Tsao, Chi-Cheng Wang, Tsun-Kuei Watson, James W. Woodbury, William W.
- 1939 Burns, Martin C. Griffiths, John R. Jones, Winthrop G. Liang, Carr C. C. Oakley, Spencer W. Wilson, Harry D.
- 1940 Akman, Seyfi M. Bretell, George A. Compton, Arthur M. Gentner, William E. Gibson, Arville Green, William J. Hsu, Chang-Pen Karubian, Ruhollah Y. King, James L. Lovoff, Adolph Menis, Luigi Tao, Shih C. Torrey, Preston C. Wang, Tsung-Su
- 1941 Clark, Morris R. Easley, Samuel J. Geitz, Robert C. Harvey, Donald L. Kuo, I. Cheng Standridge, Clyde T. Weaver, Robert L. Yui, En-Ying Zola, Colman
- 1942 Emre, Orhan M. Go, Chong-Hu Ip, Ching-U Levin, Daniel Martinez, Victor H. Reimers, George I. Robinson, Frederick G. Widenmann, John A.
- 1943 Angel, Edgar P. Brown, James M. Bryant, Eschol A. Burlington, William J. Daleon, Benjamin A. Eaton, Warren V., Jr. Hamilton, William M. Hillyard, Roy L. Hu, Ning Johnsen, Edwin G. Kane, Richard F. King, Edward G. Koch, Robert H.

- La Forge, Gene R. Leeds, William L. Ling, Shih-Sang Lundquist, Ronald E. Mampell, Klaus McNeil, Raymond F. Mowery, Irl H., Jr. Neuschwander, Leo Z. Nesley, William L. O'Brien, Robert E. Patterson, Charles M. Rivers, Nairn E. Roberts, Fred B. Rupert, James W., Jr. Scholz, Dan R. Shannon, Leslie Smitherman, Thomas B. Stirling, Cedric W. Sweeney, William E. Tindle, Albert W., Jr. Vicente, Ernesto Washburn, Courtland L. Weis, William T.
- 1944 Alpan, Rasit H. Amster, Warren H. Barriga, Francisco D. Bell, William E. Benjamin, Donald G. Birlik, Ertugrul Burch, Joseph E. Burke, William G. Cebeci, Ahmed Cooke, Charles M. De Medeiros, Carlos A. Fu, Ch'eng Yi Goehring, E. J. Harrison, Charles P. Johnson, William M. Labanauskas, Paul J. McBreen, Kenneth L. Onstad, Merrill E. Ours, Statton R. Pi, Te-Hsien Preston, Floyd W. Riddlehuber, Jim M. Silgado, Enrique F. Stanford, Harry W. Stein, Roberto L. Sullivan, Richard B. Sunalp, Halit Tanyildiz, Rafet S. Trimble, William M. Unayral, Nustafa A. Wadsworth, Joseph F., Jr. Wight, D. Roger Wolf, Paul L. Writt, John J. Yik, George
- 1945 Ari, Victor A. Clementson, Berhardt C. Gibson, Charles E. Ho, Chung Pen Jenkins, Robert P. Leech, John L. Loo, Shih-Wei Rice, Jonathan F. Swanson, Don R.

- Turkbas, Necat
- 1946 Allison, Charles W., Jr. Austin, Benjamin Behroon, Khosrow Bowen, Mark E. Brinkhaus, Harvey H. Burger, Glenn W. Chen, KeYuan Dagnall, Brian D. Dyson, Jerome P. Esner, David R. Fateh, Hassan F. Freire, Luis E. Halvorson, George G. Hoffman, Charles C. Ingram, Wilbur A. Lewis, Frederick J. Maxwell, Frederick W. McConaughay, James W. Prasad, K. V. Krishna Salbach, Carl K. Shepard, Arthur C. Smith, Harvey F. Srinivasan, Nateson Tung, Yu-Sin Webb, Milton G.
- 1947 Asher, Rolland S. Atencio, Adolfo J. Chung, Ta-San Clarke, Frederic B. Clements, Robert E. Collins, Hugh H. Giamboni, Louis A. Hsu, Chi Nan Huang, Ea-Qua Leo, Fiorello R. Linton, William M. Manoukian, John Mollo, Michael K. Moorehead, Basil E. A. Olson, Raymond L. Rust, Clayton A. Sappington, Merrill H. Satterfield, Loys M. Thompson, Russell A., Jr. Torgerson, Warren S. Vanden Heuvel, George R. Wan, Pao K. Wellman, Alonzo H., Jr. Wimberly, Clifford M. Winters, Edward B., Jr. Ying, Lai-Chao
- 1948 Au, Yin Ching Bunce, James A. Chu, Tao-Hung Chuang, Feng-Kan Clark, Albert R. Collins, Burgess F. Crawford, William D. Holm, John D. Hsiao, Chien Hsieh, Chia Lin Inonu, Omer I. Latson, Harvey H., Jr.

- Mason, Herman A. Oliver, Edward D. Slusher, John T. Stein, Paul G. Swain, John S. Tang, Yu-Wei Voelker, William H. White, Richard S., III Winniford, Robert S. Woods, Marion C. Yanak, Joseph D.
- 1949 Allen, Thomas E. Andrews, Thomas J. Baumann, Laurence I. Bottenberg, William R. Brown, John R. Bryan, Wharton W. Cheng, Che-Min Cooper, Harold D. Dodge, John A. Foster, Francis C. Hardy, Donald J. Heiman, Jarvin R. Hylton, Frank G. Krasin, Fred E. Krauss, Max Leroux, Pierre J. Lowrey, Richard O. McElligott, Richard H. Mitchell, Max O. Parker, Dan M. Petty, Charles C. Ringness, William M. Shibata, Harry H. Simpson, Colin G. Solomon, Salim Wilkening, John W.
- 1950 Bryan, William C. Forrester, Herbert A. Li, Chung H. McLellan, Albert E. Pao, Wen Kwe Paulson, Robert W. Schmidt, Howard R. Scheider, William P. Tang, You-Chi Welte, Robert S. Whitehill, Norris D.
- 1951 Arosemena, Ricardo M. Davison, Walter F. Goodell, Howard C. Lafdlian, Jacob P. Li, Cheng-Wu Lo, Shih-Chun Padgett, Joseph E., Jr. Rappaport, Harry P. Summers, Allan J.
- 1952 Arbo, Paul E. Aroulis, Elias G. Bissett, Charles F. Bucy, Smith V. Harrison, Marvin E. Lang, Frank C., Jr.

- Lunday, Adrian C. Luo, Feilin Robison, William C. Roy, Nikhilesh Shelly, Thomas L. Sutton, Donald E. Wilson, Howard E. Woods, Joseph F.
- 1953 Dirickson, Luiz H. Graf, Robert E. Lennon, Stuart G. Mishaan, Alberto P. Peters, Alphonse P. Shear, Herbert Takahashi, Nobuyoshi
- 1954 Biles, Shelton B., Jr. Guebert, Wesley R. Henry, Irvin G. Jimenez, Herberto Rogers, Berdine H. Scott, Francis F.
- 1955 Bjornerud, Egil K. Huber, William E.
- 1956 Albright, Norman W. Bradford, Robert E. Edwards, Robert W. Feige, Jacques Gold, E. Mark Kelly, James L. Kontaratos, Antonios N. Lins, Antonio P. C. MacDuffie, Duncan E. Spence, William N. Srinivasan, Prabandam Tang, Chung-Liang
- 1957 Constanty, Michel J. Edsworth, John F. Taylor, Stanley G. White, Ray H.
- 1958 Braham, Harold S. Knight, Harold G. Stenberg, Gunnar E. Wille, Milton G.
- 1959 Allard, Raymond W., Jr. Baekelandt, Victor Baez-Duarte, Luis Bailey, John S. Byun, Chai B. Cheng, Hung Guillemet, Michel P. Hamel, Armando Hemmingway, Richard E. Jewett, Robert I. Morane, Didier Roth, Stanley Smith, Homer L. Thornton, Robert M.

- 1960 Cauley, Joseph M. Lagarde, Jean B. Thompson, Michael R. Widess, Paul R.
- 1961 Allen, Charles A. Dowty, Earl L. Foster, Richard A. Kitten, Roland Lushene, Robert E. Ruegg, Heinz W. Schweitzer, Glenn E. Wilkinson, John F.
- 1962 Cousin, Michel M. d'Arbaumont, Michel Dorlhac, Jean-Pierre Ingber, Lester Lyon, Alexander N. O'Riordan, Padraic D. Pines, Barry N. Russell, Robert K. Takahashi, Masaaki
- 1963 Facon, Pierre J. Peterson, James M. Samuelson, Lee W. Slager, Jack R. Wu, John Y.
- 1964 Atkin, Curtis L. Gorostiza, Luis G. Howenstine, Robert J. Marley, Robert R. Puhl, Andreas Ts'ao, Hsueh-sheng
- 1965 Aimelet, Bernard A. Gazzaniga, Michael S. Royer, Jeffrey P. Ryan, Peter M. Solelhae, Bernard C. Stackler, Benjamin Stephens, Melvin M., II
- 1966 Eris, Altan K. Feroz, Shaikat, H. M. Glazer, Edward S. Serafin, Robert E. Street, Donald R.
- 1967 Beeson, Michael J. Blondy, Philippe J. M. Boyd, James R.
- 1968 Core, Nolan G. Fowler, William G. Knott, Gary D.
- 1969 Cerne, James P. Markowski, Gregory R.

PERSONALS

1929
V. LYMAN HOLDAWAY, MS '30, has retired from Bell Laboratories in Murray Hill, N.J., after a 40-year career. He was a member of the active optical device department.

1933
TRENT R. DAMES, MS '34, has been elected to a two-year term as national vice president of the American Society of Civil Engineers, Zone IV. Dames is executive partner and co-founder with WILLIAM W. MOORE, '33, of the firm of Dames and Moore, consulting engineers in the field of applied earth sciences.

1938
YUAN C. LEE, formerly with Lockheed, is now president of Environics, Inc. of Newport Beach.

JOHN L. MERRIAM, professor in the agricultural engineering department at Cal Poly, San Luis Obispo, has returned to teaching this fall after spending the summer of 1969 in Saudi Arabia and the following year in Thailand planning irrigation systems and water supply.

ELBURT F. OSBORN, PhD, vice president for research at Pennsylvania State University, was named the new director of the Bureau of Mines on October 7 by President Nixon. The post, vacant since February, involves enforcing federal mine safety laws.

1943
N. ORVIS FREDERICK, MS, has been promoted to supervisor for the southern Rocky Mountain region of the U.S. Geological Survey.

1947
KENNETH N. TRUEBLOOD, PhD, chairman of the department of chemistry at UCLA, is now dean of the College of Letters and Science.

1948
DAVID S. STOLLER, MS, has been appointed to the faculty of California State College, Fullerton, as professor of business administration.

1952
RICHARD H. FULLER, former director of the engineering development laboratories for the Univac Federal Systems in St. Paul, Minn., is now general manager of the Sperry Rand Research Center in Sudbury, Mass.

1955
HOWARD L. STROHECKER, MS, a colonel in the United States Army Corps of Engineers, has become district engineer in Savannah, Ga. Savannah district is responsible for water resources activities in eastern Georgia and the Savannah River Basin in North Carolina, South Carolina, and Georgia.

1962
BRUCE ABELL, formerly managing editor of Caltech's *Engineering and Science* and the creator and original editor of *Caltech News*, is now deputy head of the Publications Resource Office of the National Science Foundation. He and his wife, Nancy, and their daughters, Julie and Robin, are living in Maryland. He writes that DOUG SMITH and ROGER NOLL, also class of '62, are now in Washington. Smith is a geologist with the Carnegie Institution, and Noll—on leave of



Holdaway '30



Dames '33

absence from Caltech—is an economist at the Brookings Institution.

1964
FRANK WINKLER writes that he completed his PhD in physics at Harvard in May 1970. Since September 1960 he has been an assistant professor of physics at Middlebury College, Vt. researching and developing methods of separating municipal garbage for recycling.

1965
RICHARD N. LANE, PhD '68, previously with the General Electric Company in Santa Barbara is now director of communications studies at Systems Applications, Inc., in Beverly Hills.

ARDEN B. WALTERS has accepted an appointment as an assistant professor in the University of Southern California's department of chemical engineering.

RODGER F. WHITLOCK writes that he completed work for his PhD in chemistry at the University of Rochester in June and is now on a postdoctoral fellowship at the University of Victoria, B.C.

1966
WALLACE L. OLIVER JR. writes that he received his PhD in chemistry at Northwestern University, Evanston, Ill., in June and is now taking a year's postdoctoral work at the University of Liverpool, England. On January 2, he will marry Miss Sarah Ann Sweet in Fort Wayne, Ind.

DONALD S. REMER, MS, PhD '70, has joined Enjay Chemical Company in Baton Rouge, La. as a chemical engineer in the process engineering department.

Obituaries

1921
HORTON H. HONSAKER on October 24, in Altadena, of a heart attack. A resident of southern California since 1908, he was an engineer with Pacific Telephone Company until his retirement in 1960. He is survived by his wife, Russell, a daughter, three sons, and eleven grandchildren, and his brother, JOHN HONSAKER, '22.

1924
MARTIN L. BEESON on August 5, in Orange County Medical Center. He is survived by his wife, Florence, a son, William M. Beeson, and four grandchildren.

1929
THOMAS J. NOLAND JR., MS '31, on June 24. He was a structures engineer for McDonnell Douglas Corporation.

1933
CHARLES E. HABLUTZEL, PhD. He had retired in 1965 from the United Gas Corporation of Shreveport, La.

1934
H. M. A. RICE, PhD, on September 9, in Ottawa, Ontario. Retired from the position of senior geologist for the Geological Survey of the government of Canada, he is survived by his wife, Lorna.

1935
JESSE E. HOBSON, PhD, on November 5. He was president of Heald, Hobson & Associates of Beverly Hills.

1950
RONALD L. QUANDT, MS '51, on October 11, in Santa Monica. Employed by Hughes Aircraft, he was a U.S. Ski Association official and a member of Tau Beta Pi Association. He is survived by his wife, Ramona, a daughter, and a son.

ALUMNI ASSOCIATION OFFICERS AND DIRECTORS

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VICE PRESIDENT Reuben B. Moulton '57	TREASURER Robert V. Meghreblian '50
Clifford C. Burton '40 Craig T. Elliott '58 Raymond L. Heacock '52 Earle C. Hefner '51 William C. House '40 Mike O'Haver '29	Cornelius J. Pings '51 Charles A. Ray '61 Douglas G. Ritchie '57 Warren G. Schlinger '44 George E. Solomon '50 David B. Wilford '48 Treasurer Emeritus: John R. Fee '51

EXECUTIVE DIRECTOR
James B. Black

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New York, New York 10017
Vice President Rodman Jenkins '50
400 East 57th Street
New York, New York 10022
Secretary-Treasurer Harry J. Moore Jr. '48
IBM Corp.
Route 22, Armonk, New York 10504

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3A Edward Road, Woburn, Mass. 01801

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205 5/E Walden St., Cambridge, Mass. 02140

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4720 Sedgwick St., N.W., Washington, D.C. 20016
Vice President Bernard B. Watson '35
Research Analysis Corporation, McLean, Va. 22101
Secretary-Treasurer John T. Cookson, Jr. '66
1225 Noyes Drive, Silver Spring, Md. 20910

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222 Oak Knoll Rd., Barrington, Ill. 60010
Vice President Walfred E. Swanson '36
1415 Fairway Dr., Lake Forest, Ill. 60045
Secretary-Treasurer Howard E. Jessen '46
225 Ridge Ave., Winnetka, Ill. 60093

SAN FRANCISCO CHAPTER
President Harrison W. Sigworth '44
10 Casa Vieja, Orinda, Calif. 94563
Vice President Curt D. Schulze '56
1329 Terrace Drive, Millbrae, Calif. 94030
Secretary-Treasurer Thomas M. Menzies '65
2990 Cowper St., Palo Alto, Calif. 94306
Meetings: Engineers' Club, 16th floor, Hong Kong Bank Bldg., San Francisco. Informal luncheons every Thursday at 11:45 A.M. Contact Mr. Sigworth, 434-7700, Ext. 2918, on Thursday morning for reservations.

SACRAMENTO CHAPTER
President William D. Pyle '49
3920 Dunster Way, Sacramento, Calif. 95825
Vice President Dudley E. Bennett '47
4124 Zephyr Way, Sacramento, Calif. 95821
Secretary-Treasurer Harris K. Mauzy '30
2551 Carson Way, Sacramento, Calif. 95821

Meetings: University Club, 1319 "K" St. Luncheon first Friday of each month at noon. Visiting alumni cordially invited—no reservation.

SAN JOAQUIN-MOJAVE CHAPTER
President Ed Joujon-Roche '28
2700 Loma Alta, Bakersfield, Calif. 93306
Secretary-Treasurer William F. Edmondson '52
1831 Truxton, Bakersfield, Calif. 93306

SAN DIEGO CHAPTER
President David B. Wilford '48
6581 Avenida Wilfredo, La Jolla, Calif. 92037

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.....

ALUMNI ASSOCIATION

CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

BALANCE SHEET
June 30, 1970

ASSETS

Cash on Hand and in Bank	\$ 3,625.13
Investments:	
Share in C.I.T. Consolidated Portfolio	\$191,744.31
Deposits in Savings Accounts	23,186.56
Investment Income Receivable	8,267.82
Accounts Receivable	902.13
Postage Deposit, etc.	351.29
Furniture and Fixtures, at nominal value	1.00
Total Assets	\$228,078.24

LIABILITIES, RESERVES AND SURPLUS

Accounts Payable	\$ 1,077.00
Deferred Income:	
Membership Dues for 1970-71 paid in advance.....	\$ 17,355.21
Investment Income for 1970-71 from C.I.T. Consolidated Portfolio (earned during 1969-70)	8,267.28
Life Membership Reserve	194,664.31
Reserve for Directory	2,455.12
Surplus	4,258.78
Total Liabilities, Reserves and Surplus	\$228,078.24

STATEMENT OF INCOME, EXPENSES AND SURPLUS

For the Year Ended June 30, 1970

INCOME

Dues of Annual Members	\$35,397.40
Investment Income:	
Share from CIT Consolidated Portfolio	7,634.47
Interest on Deposits in Savings Accounts	1,546.92
Annual Seminar	6,468.50
Program and Social Functions	3,532.00
Total Income	\$54,579.29

EXPENSES

Publications	\$18,882.28
Annual Seminar	8,047.81
Program and Social Functions	8,280.17
Administration	9,492.40
Directory Appropriation	2,500.00
Membership Committee	2,732.94
Area and Chapter Meetings	3,220.06
Student Programs	3,520.31
Total Expenses	\$56,675.97
Excess of Expenses over Income	\$ 2,096.68
Surplus, July 1, 1969	6,355.46
Surplus, June 30, 1970	\$ 4,258.78

AUDITOR'S REPORT

Board of Directors, Alumni Association, California Institute of Technology

I have examined the Balance Sheet of the Alumni Association, California Institute of Technology as of June 30, 1970, and the related Statements of Income and Expenses and Surplus for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as I considered necessary in the circumstances.

In my opinion, the accompanying Balance Sheet and Statement of Income and Expenses and Surplus present fairly the financial position of the Alumni Association, California Institute of Technology at June 30, 1970, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Calvin A. Ames
Certified Public Accountant