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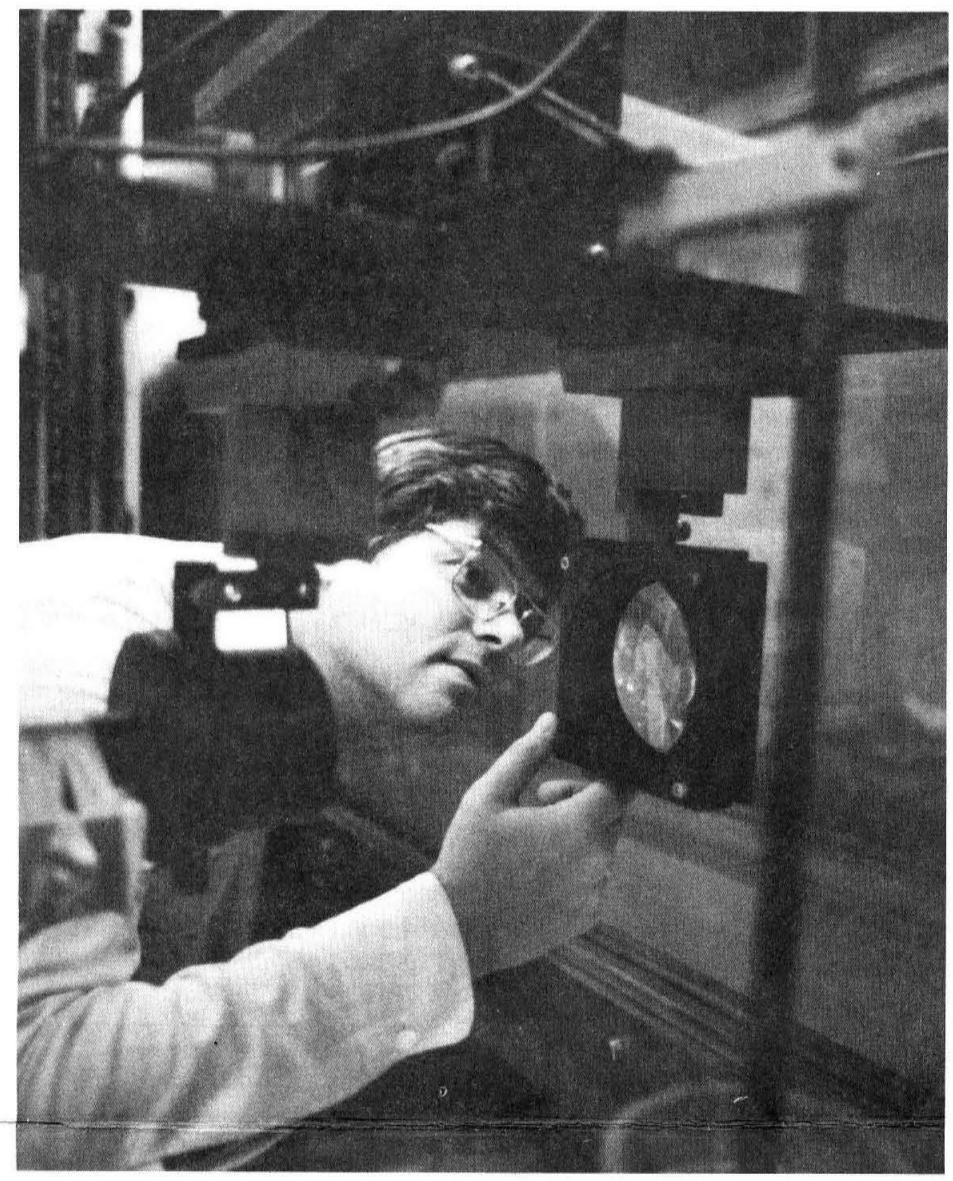
CALTECH NEWS

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY



Using the Doppler shift of laser light scattered by minute particles carried by a fluid, it is possible to measure the velocity of the fluid with high space and time resolution. This technique is being used by Dr. Paul E. Dimotakis, assistant professor of aeronautics and applied physics, and his co-researchers, to make fluid flow measurements that would have been difficult or impossible by other means. In the picture above, Dr. Dimotakis is seen aligning the optics of a system to be used in experiments that will investigate the turbulent flow that results when two streams of unequal velocity come together. The results from these experiments should provide a better understanding of turbulent combustion, pollution dispersion, chemical lasers, and other similar flows.

The Associates

Providing a base of strength

The Associates "act together and individually in very much the same way as the alumni of other institutions" to provide Caltech with a base of strength, President Marvin L. Goldberger told The Associates at their annual black tie dinner in the Beverly Wilshire Hotel in November.

"There are about 13,000 living Caltech alumni but there are over 120,000 living Stanford alumni," Goldberger said. "The significance of those numbers comes from the fact that the alumni of a private institution make up the real foundation of its connection to the community and society. They provide that famous old boy network (which is now becoming an old boy *and* old girl network) because alumni are easy to approach when an institution needs a contact to make its case.

"Many things can shake the loyalty of alumni between the time they graduate from an institution and the time they can bring their interest to work on its behalf. The Associates have chosen Caltech as mature men and women, and this gives our relationship a special quality.

"Your financial support is critical to us," he said, "particularly because it provides unrestricted funds with no strings attached. But you contribute in other ways that are even more important." As an example, he cited efforts by a member that were crucial in restoring federal budget cuts that would have spelled financial disaster for a research group at the Institute.

"This person gave us this support because he knows Caltech in detail through his membership in The Associates and he was willing to spend his political credit to enable us to make our case to individuals involved in political decisions."

Emphasizing the mutual interests of The Associates and the Institute, Goldberger said, "All of us share a commitment to the value of scientific research and to the importance of increasing our knowledge about the world and our understanding of it, quite apart from any hope of future payoff in the application of that knowledge. Many people give lip service to this idea, but all of us here *act* on it."

In alluding to another tie, Goldberger observed that The Associates and the Caltech faculty and administration "share a belief in the importance of scientific and technical education that is offered as an integral part of research.

"Caltech," he said, "is one of the premier institutions in the world, not only for research but also for education."

Goldberger stressed that the relationship between The Associates and the Institute is a two-way street, with both parties benefiting. Membership in The Associates offers the opportunity to take part in the actual process of scientific investigation and discovery through such events as the recent behavioral biology open house, he pointed out.

Weingart Laboratory funded

Caltech has received a $1 million grant from the Weingart Foundation to create the Weingart Laboratory of Molecular Immunology as part of the Institute's new research center, the Braun Laboratories of Cell Biology and Chemistry, a $14.4 million complex. Including the grant from the Weingart Foundation, over $10 million in gifts and pledges have been received for the new facility.

Research in the Weingart Laboratory will be conducted by Leroy E. Hood, Ethel Wilson Bowles and Robert Bowles Professor of Biology at Caltech. Hood, who has both MD and PhD degrees, heads the Institute's immunology program.

R. Stanton Avery, chairman of Caltech's Board of Trustees, said, "Research in the Weingart Laboratory will contribute significantly to our knowledge of immunology — a field basic to problems in medical science."

The immune system is believed to play a fundamental role in many arthritic diseases and various forms of cancer, as well as in the aging process. A better understanding of how it operates can increase our knowledge of hormonal disorders, allergies, problems of transplant rejection, and the body's ability to withstand infection.

Hood, Caltech's adviser to undergraduates planning a career in medicine, won a Camille and Henry Dreyfus Teacher-Scholar Grant in 1974 for outstanding teaching. His research has made important contributions to our understanding of the diversity and structure of antibodies, the body's first line of defense against bacteria and other invaders. He also has made significant advances in determining the structures of other proteins that are important in the immune system. His work is also concerned with the diversity of antibodies and the way they are generated; with the evolution of antibody molecules; and with the chemical structure of antigens, the invaders that stimulate the body to produce antibodies.

Hood and the other scientists conducting work in the new Braun building will have strong backgrounds in both fundamental science and medical research — qualifications that will facilitate the transfer of new knowledge into medical practice. Their work, related to the structure of the cell surface, will increase our understanding of such cell disorders as genetic and degenerative diseases and cancer.

Evaluated by students

Outstanding teachers lauded

Five Caltech faculty members have been named recipients of awards for teaching excellence by ASCIT (The Associated Students of California Institute of Technology). They are Donald S. Cohen, professor of applied mathematics; Joel N. Franklin, professor of applied mathematics; Robert H. Cannon, Jr., chairman of the Division of Engineering and Applied Science and professor of engineering; Peter W. Fay, professor of history; and Valentina Zaydman, lecturer in Russian.

The selections were made by the educational policies committee of ASCIT on the basis of student ratings of courses taught during the 1977-78 academic year. The results, published in a 35-page booklet, "The 1977-78 Teaching Quality Feedback Report" (TQFR), contain statistics and comments from questionnaires evaluating the instructors' clarity, enthusiasm, command of the subject, rapport with the class, and interest in the students as individuals.

Cohen, a member of the faculty since 1965, was given his award for his "excellent, lucid, and superb" lectures in his course, "Introductory Methods of Applied Mathematics." Cohen taught at Columbia University and Rensselaer Polytechnic Institute before coming to Caltech.

Franklin's course in matrix theory earned him his teaching excellence honor. Students praised him for "doing a great job in this class" for the past two years. A Caltech faculty member since 1957, Franklin formerly taught at New York University and the University of Washington.

Cannon was praised not only for his teaching ability but for his "great interest in his students" in his course, "System Dynamics." Cannon came to Caltech in 1974 from the U.S. Department of Transportation where he was assistant secretary for systems development and technology.

Historian Fay was lauded for his ability in "Introduction to Europe" to "make a good class great." Fay has been teaching at Caltech since 1955. Zaydman is a second-time winner of the teaching award, having received it in 1976, the first year the awards were given. A recent emigre from Moscow, Zaydman has been teaching at Caltech since 1974.

The earth's core as a camera lens

A Caltech scientist has found that studies of seismic waves converging at their antipode (the point on the globe opposite the earthquake's epicenter) can produce valuable new information about the earth's core as well as its mantle.

A graduate student in geophysics, Jose Rial is studying data from two kinds of antipodal waves produced by earthquakes: body waves that travel through the interior of the earth, and surface waves that undulate around the globe in the outer mantle.

According to Rial, the earth's core and mantle act like a camera lens, focusing the body waves at the antipode. These greatly intensified waves reveal the most minute action of the earthquake, as well as considerable detail about the strata that the waves pass through.

The surface waves, traveling around the earth in its outer mantle, are amplified by the sphericity of the globe, and they also focus at the antipode. Before Rial's study, only partial information on the surface waves in the mantle was available. This was obtained from readings taken at arbitrary distances between the waves' source and the seismometers. Rial's antipodal readings produce a stable average of the energy dissipation properties of the entire mantle — information never before available. From these dissipation averages scientists can determine the relative elasticity of the mantle material which the waves pass through. This in turn helps them to determine the mantle's composition.

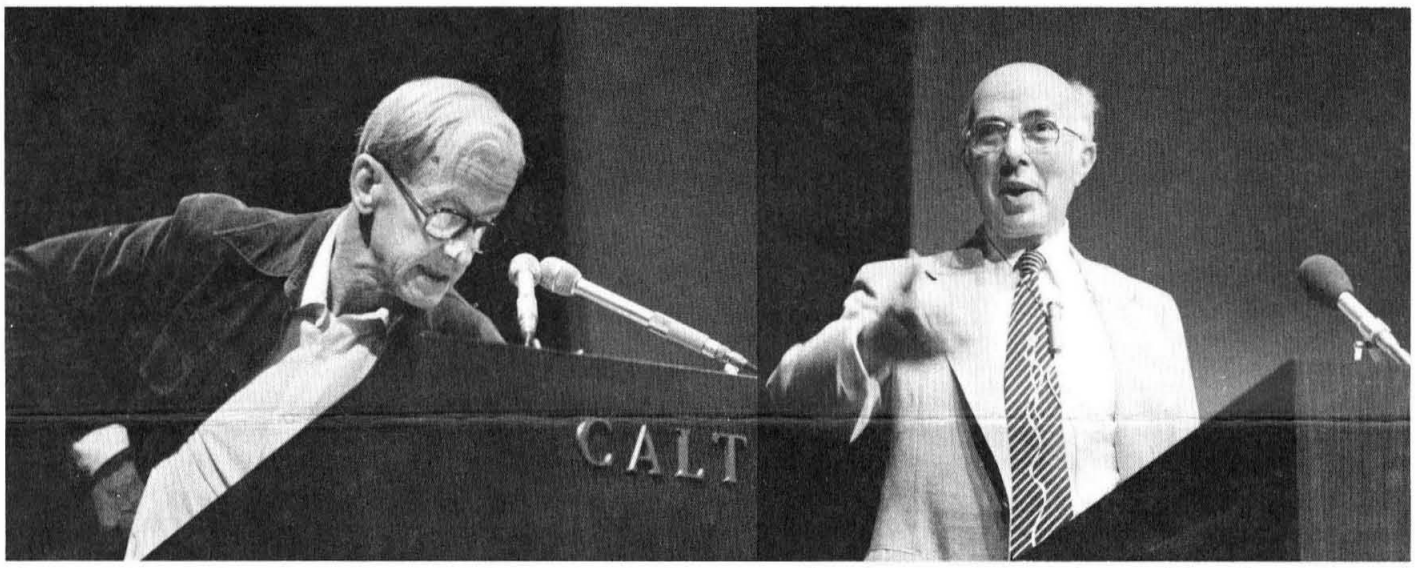
According to Rial, scientists can obtain detailed information on the earth's internal structure and on earthquakes from one seismic record through the new study method instead of laboriously combining data from hundreds of seismic stations.

For example, data from Rial's studies of the earth's structure suggest that there is a sharp demarcation between the solid inner core of the earth and the molten outer core that surrounds it. The demarcation may help scientists understand the evolution of the earth at its earliest stages.

This new method of studying the earth's internal structure may also be applied to the exploration of the internal structure of other planets, says Rial. An explosion could be set off by a lander on one side of any of the solid planets, and monitored by seismometers on a lander on the other. Such an experiment would give as much information about the makeup of the planet as would take years to obtain by any currently known method.

Rial made his observations from the records of three large earthquakes — the only three in a 20-year period of earthquake monitoring that were recorded by seismometers at their antipodes. The three include a 7.1 magnitude New Zealand tremor of 1968, recorded in Portugal; a 1977 8.3 magnitude Indonesian earthquake recorded in Portugal, and a 1977 6.5 magnitude Peruvian earthquake recorded in Indonesia.

Celebrating 50 years of Caltech biology



About 600 alumni and former members of Caltech's Division of Biology converged on the campus in November to celebrate the division's 50th anniversary via a symposium packed with news of biological research. Three Nobel laureates were among the speakers—including Max Delbrück and George W. Beadle, above. Delbrück, Caltech's Board of Trustees Professor of Biology, Emeritus, led a session on "Phage," and Beadle, president emeritus of the University of Chicago, talked on "The Origin of Maize." Beadle is a former Caltech biology division chairman.

Cosmic eavesdroppers

Nobel laureates tune in on the universe

When a pair of telephone company employees get the Nobel Prize for "listening in," explanations are in order. Of course, Bell Telephone Laboratories is no ordinary telephone company, and its two researchers, Arno A. Penzias and Robert W. Wilson, who shared half of the 1978 Nobel Prize in physics, weren't eavesdropping on an ordinary party line. Somewhat to their own amazement, they were tuned in to the universe, and what they heard was a faint echo of creation.

Wilson, a 1962 PhD graduate of Caltech in physics, went to work for Bell Labs in 1963. There, he and Penzias teamed up to modify a horn radio antenna so it could communicate with the first Telstar satellite. The object was to attain the best possible signal-to-noise ratio. They were able to achieve that goal adequately for Telstar purposes but not to satisfy their own scientific perfectionism because they couldn't get rid of a persistent background noise in the receiver. In a remarkable example of serendipity, a chance conversation in 1964 led them to identify that noise as a remnant of the primordial fireball. As the Royal Swedish Academy of Sciences put it, "This has made it possible to obtain information about cosmic processes that took place a very long time ago, at the time of the creation of the universe."

Texas-born Wilson is the youngest of all this year's Nobel prizewinners — a mere 42. He attended Rice University before coming to Caltech, receiving his 1957 BA in physics. At the Institute he had two research advisers — first, John Bolton, professor of radio astronomy, and — after Bolton returned to Australia — Maarten Schmidt, professor of astronomy and now director of the Hale Observatories. The help of those two men, plus the nature of his research in radio astronomy, must have been good training because his prizewinning work was done very shortly after he left Caltech — in 1963 and 1964.

The winning of this prize by Wilson brings the total number of Nobel Prizes that have been awarded to Caltech faculty and alumni to 18.

Uranus's rings photographed

Caltech astronomers have obtained the first direct picture of the recently discovered rings of Uranus and have discovered that they do not contain ice (as do the rings of Saturn) but are probably stony in composition. The picture was the final result of a complex procedure using reflected sunlight from the rings, in which data from numerous scans of the planet were transformed into a television-type picture.

The scientists who obtained the picture are Caltech scientist Keith Matthews, Professor of Physics Gerry Neugebauer, and planetary science graduate student Philip Nicholson. They performed the scans using the Hale Observatories' 200-inch telescope at Palomar Observatory.

The picture confirmed that the rings consist of complete bands of material, and that there doesn't appear to be any other material circling the planet. Taken when Uranus was about 1.6 billion miles from earth, the picture did not resolve the individual rings but showed them as a single wide band whose width is a measurement of brightness of reflected light. The actual rings are much narrower than they appear in the picture.

IA conferences

Alumni of the Institute are invited to attend Industrial Associates Conferences on the campus. Conferences and their dates include: **Technical Applications of Amorphous and Metastable Materials,** January 10-12; **Computer Conference: Very Large Scale Integration — Architecture, Design, Fabrication,** January 22-24; **Coal Combustion: Emissions and Control,** February 5-7; A Research Directors' Conference — **The Next Five Years: Predictions on Research Developments by Caltech Faculty,** February 21-23; **Catalysis: Fischer Tropsch Reactions,** March 5-7; **Current Problems in Biomedical Engineering,** March 22-23; **Options for Meeting Energy Needs of Large Scale Energy Consumers,** April 18-20 (tentatively scheduled); and **Western Water Issues,** May 17-18. Registration fees for these conferences are waived for Caltech alumni. For further information contact the Alumni Office.

Gell-Mann honored

Murray Gell-Mann, the Robert Andrews Millikan Professor of Theoretical Physics at Caltech, has been elected a foreign member of the Royal Society of London, Britain's top scientific body. Only four foreign members of the society are chosen each year. Gell-Mann was the recipient of the 1969 Nobel Prize in physics for his work on the theory of elementary particles.

Bengelsdorf award

Irving Bengelsdorf, director of science communication at Caltech, has been selected for an Energy Hall of Fame Award by the Energy Career Center Committee and the directors of Energy Fair, Inc. The award, in science and education, was presented for his leadership through more than 15 years of writing and public speaking about energy problems.

ALUMNI ACTIVITIES

February 9
Gourmet dinner, the Athenaeum. Caltech's own gourmet, J. Harold Wayland, professor of engineering science, will assist with the menu and wine selection.

March 2 and 16
California wine tasting programs, the Athenaeum. Details will be announced later.

March 9
Gnome Founders' Night, the Athenaeum.

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J. P. Clejan

Fond of Ferraris, he built his own

When a 16-year-old asks his parents for a new car, nobody's surprised. But if he wants to *build* the car himself, then he may be destined for Caltech. And if the end product of his efforts is a replica of the $26,000 Ferrari Dino 246GT, then he's Jean-Pierre (J. P.) Clejan of Hampton Bays, New York, a freshman at the Institute.

Clejan built his neon-blue Ferrari look-alike the summer before his senior year in high school, working in his garage with a screwdriver set, socket wrenches, an electric drill, and a crimping tool. He and his mother shared equally in the costs. "She liked the idea of my building it," he says. "She thought it would be a good learning experience."

Their joint investment of $6,400 included $4,400 for a Kelmark body and interior kit, $650 for a wrecked 1972 Volkswagen, and the rest for cast aluminum wheels and "tons of miscellaneous things" like carpeting, adhesives, and assembly tools.

In assembling his creation, Clejan stripped the Volkswagen down to the body shell and mounted the Ferrari fiberglass body on it, using the Volkswagen motor and transmission. Then he wired the car and assembled the doors, windows, dash, seats, and other interior upholstry. He devoted about four weeks to the project.

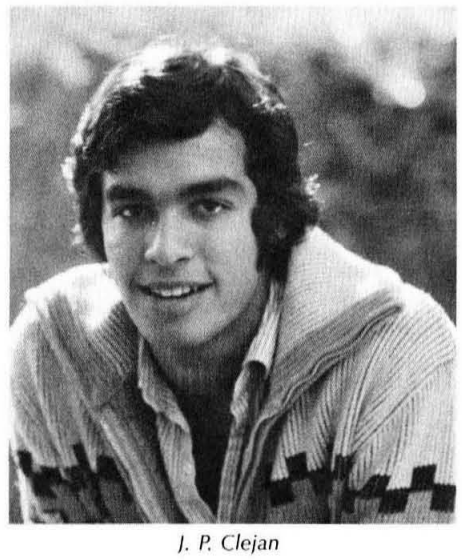
Clejan in his Ferrari look-alike.

The ultra-sleek vehicle that resulted gets 30 miles to the gallon, achieves a top speed of about 100 miles per hour, and accelerates from zero to 60 in 9.1 seconds, compared with 15 seconds for the typical family sedan. Clejan maintains the car himself, at a cost of approximately $25 a year. For the time being, it stays at home in New York.

The Caltech freshman says he chose the Ferrari replica kit from among several possibilities because "it was the best designed and the least kit looking. A lot of the cars that you make from kits look like something out of science fiction." But even though his auto closely resembles a real-world vehicle, it attracts almost as much attention as if it had just descended from outer space.

"I don't like to leave it unattended," he says, "because when I come back there's always a crowd around, putting fingerprints on it."

Clejan adds that owning the car has given him quick access to "most of the local car nuts. I'd met almost all of them a few weeks after I started driving it," he explains. "After all, there are less than 100 Kelmark Ferrari Dino replicas in the country."



J. P. Clejan

The car's visibility on the thoroughfares of New York has triggered several on-the-spot offers from would-be purchasers. "It appeals to people," he says, "because it's unusual without being strange."

Although the unique creation inspires a steady stream of questions, most of them fall into a standard pattern: "What is it?" "How much did it cost?" "Did you really build it?" and "Is it easy to pick up girls?" (The answer to the last question, Clejan admits, is yes.)

Clejan was only 16 when he set out to construct the sports car, but he was no novice in the world of mechanics. He began flying model airplanes and rockets soon after entering elementary school. At age 12 he worked as an apprentice in a motorcycle shop, and when he was 14 he opened a neighborhood bike repair business. "I was playing with engines long before I could drive," he says.

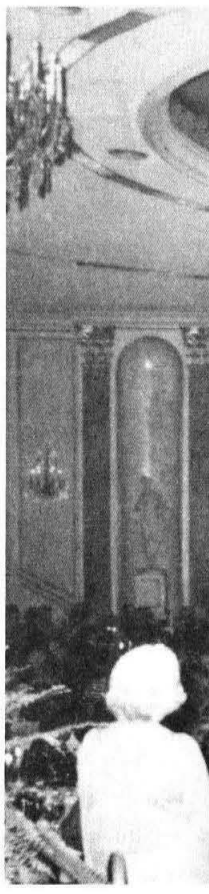
When Clejan isn't doing his Caltech homework or working with engines, he likes to sail. He started sailing competitively when he was nine and he's a member of the Caltech sailing team. Recently he took up wind surfing: riding a surfboard with a sail mounted on it.

Now that he has assembled his own automobile, he has his sights set on greater objectives. After completing a BS in mechanical engineering at Caltech, he wants to get an MBA at Harvard and then come back to Caltech for a graduate degree in engineering. After that he'd like to design transportation systems for large cities. A formidable challenge — but for a person who's already worked his way from model airplanes to Ferraris, it should be a cinch.

Lost—730 alumni

The Institute has no record of the addresses of these alumni. If you know the current locations of any of them, please relay the information to the Alumni Office.

Adodra, Surendra Nagindas 1967
Alexander, Joseph B. 1950
Aliferis, Eudoxia 1964
Allen, Robert N. 1916
Allen, Thomas E. 1949
Allison, Charles W. 1946
Allison, Donald K. 1930
Amster, Warren H. 1944
Andrew, James Bradford 1969
Andrews, Thomas J. 1949
Anspach, Kenneth Eldred 1943
Aranguren, Luis Y. Marchi 1971
Arbo, Paul E. 1952
Arcoulis, Elias G. 1952
Ari, Victor A. 1945
Arosemena, Ricardo M. 1951
Artaud, Alain Adrien 1968
Asher, Rolland S. 1947
Atencio, Adolfo J. 1947
Au, Yin-Ching 1948
Audet, Clement Charles 1962
Baekelandt, Victor 1959
Barriga, Francisco 1944
Barron, Robert T. 1966
Baumann, Laurence I. 1949
Baumgarten, Werner 1941
Bebe, Mehmet Fikret 1942
Behroon, Khosrow 1946
Bell, William E. 1944
Benjamin, Donald G. 1944
Berkant, Mehmet Nuri 1944
Bertram, Edward A. 1935
Birlik, Ertugrul 1944
Bissett, Charles Frank 1952
Blondy, Philippe J. M. 1967
Boissaye, Eric Rene 1972
Boss, David 1970
Bowen, Mark E. 1946
Bradford, Robert E. 1956
Brethes, Alain 1955
Briceno-Leguizamon, Nelson 1973
Brinkhaus, Harvey H. 1946
Brody, Julian 1950
Brown, James Montgomery 1943
Brown, John R. 1949
Bucy, Smith V. 1952
Bunce, Capt. James A. 1948
Burch, Joseph E. 1944
Burk, Thomas C. 1933
Burke, William G. 1944
Burnight, Thomas R. 1937
Byles, David G. 1958
Byun, Chai B. 1959
Campbell, Richard Bradford 1951
Carroll, Clark E. 1959
Cauley, Joseph Michael 1960
Cebeci, Ahmed 1944
Cerne, James Philip 1969
Chalier, Philippe R. 1965
Chang, Hung Yuan 1926
Chang, Tzeu-Ching 1964
Chao, Chung-Yao 1930
Cheema, Inder 1965
Chen, Ke-Yuan 1946
Cheng, Che-Min 1949
Cheng, Ju-Yung 1937
Christensen, Ronald Arlie 1959
Chu, Djen-Yuen 1936
Chu, Tao-Hung 1948
Chung, Ta-San 1947
Clark, Albert R. 1948
Clark, Morris R. 1941
Clarke, Fredric B. 1947
Clay, William Loring 1946
Clements, Robert E. 1947
Clementson, Gerhardt C. 1945
Coles, Alan Jeffrey 1970
Collins, Burgess F. 1948
Collins, Hugh H. 1947
Compton, Arthur Mandeville 1940
Conradt, Robert H. 1946
Cooper, Harold D. 1949
Couch, Harold Thompson 1966
Cox, Edwin P. 1922
Crosthwait, Ted Lawrence 1943
D'Arbaumont, Michel 1962
Dagnall, Brian D. 1947
Daleon, Benjamin A. 1943
Davidson, Harold W. 1949
Davies, John Bruce 1967
Davis, Roderic Charles 1937
Dawson, Thomas Emmett 1959
De Medeiros, Carlos A. 1944
De Witte, Leendert 1947
Delsemme, Jacques Andre 1973
Deo, Narsingh 1960
Dessinger, Jerry Lynn 1967
Dickinson, George W. 1966
Diercks, Allen Donald 1956
Dirickson, Luiz H. 1953
Dorlhac, Jean-Pierre 1962
Doyle, Richard Foster 1970
Drake, George Philip 1970
Dubois, Jean Claude 1962
Dupont, Michel Pierre 1967
Dyson, Jerome P. 1946
Easley, Samuel J. 1941
Easton, Anthony 1937
Eaton, Warren V. 1943
Edsforth, John F 1957
Edwards, Robert W. 1956
El-Hussaini, Jassim M. 1954
Emre, Orhan M. 1942
Engholm, Bernard Andrew 1952
Eris, Altan K. 1966
Esner, David R. 1946
Evans, M. Harrison 1935
Facon, Pierre J. 1963
Fagundes, Helio 1970
Farley, Alan Edward 1957
Fateh, Hassan F. 1946
Fitzgerald, Larry D. 1962
Fleuret, Jacques Pierre 1968
Fong, Conrad T. O. 1946
Forrester, Herbert A. 1950
Fossard, Andre J. 1959
Foster, Francis C. 1949
Foster, R. Bruce 1946
Freire, Luis Eduardo 1946
Gardner, John Louis 1958
Geitz, Robert C. 1941
Genachte, Paul F. 1935
Gentner, William E. 1940
Gibson, Arville C. 1940
Gibson, Charles E. 1945
Gill, George S. 1946
Gillam, Eric 1947
Giraudbit, Georges Pierre A. 1964
Girguis, Atef Isaac 1970
Given, Frank I. 1942
Go, Chong-Hu 1942
Goehring, E. J. 1944
Gold, E. Mark 1956
Goldstein, Mark Parne 1969
Goldwasser, Robert E. 1967
Goodell, Howard Clarke 1951
Goodman, Hyman D. 1938
Graham, Ralph B. 1971
Grange, Jean-Marie Francois 1964
Grant, Edmund 1930
Green, William J. 1940
Grey, Jerry 1952
Gridley, Horace V. 1924
Gross, Arthur G. 1938
Guebert, Wesley R. 1954
Guillemet, Michel Pierre 1959
Gutierrez, Arnulfo G. 1938
Halvorson, George G. 1946
Hamel, Armando 1959
Hansen, Raymond J. 1925
Hardy, Donald 1949
Harrington, Walter 1947
Harrison, Charles P. 1944
Harvey, Donald L. 1941
Hatch, G. Laurie 1967
Hauviller, Claude Gabriel 1972
Hayne, Benjamin S. 1946
Heiman, Jarvin R. 1949
Hemmingway, Richard E. 1959
Henry, Irvin G. 1954
Hill, David William 1956
Ho, Chung-Pen 1945
Hoge, Edison R. 1918
Holdridge, Douglas Bruce 1957
How, Kum Wah 1966
Hsu, Chang-Pen 1940
Hsu, Chi-Nan 1947
Hsu, Robert T. 1969
Huang, Ea-Qua 1947
Huang, Fun-Chang 1935
Huang, Y. H. 1926
Huber, William E. 1955
Hutchinson, James David 1970
Hylton, Frank G. 1949
Ikeda, Takehiko 1964
Imbert, Nicole Hartz 1970
Ingram, Wilbur Atwood 1946
Isaacs, Ernest Alan 1960
Jenkins, W. Hugh 1956
Jimenez, Herberto 1954
Joffres, Pierre Eugene 1960
Johnson, Gary Michael 1967
Johnson, William M. 1944
Jones, Paul F. 1937
Jones, Winthrop Gilman 1939
Kane, Richard Francis 1943
Kanus, Karl Herman 1964
Karubian, Ruhollah Y. 1940
Keenan, Robert K. 1963
Kelley, William 1930
Kelly, James Laflin 1956
Kendall, George Alden 1943
Killian, Roy Garfield 1945
Kitten, Roland 1961
Koch, A. Arthur 1933
Koch, Robert H. 1943
Koch, Walter Louis 1938
Kontaratos, Antonios N. 1956
Krasin, Fred E. 1949
Kraus, Alfred A. 1953
Krauss, Max 1949
Kuo, I. Cheng 1941
Kwok, Chung-Mo 1964
Labanauskas, Paul J. 1944
Lacrouts, Jean P. 1958
Lafdjian, Jacob P. 1951
Lango, John W. 1959
Larsen, William A. 1933
Latson, Harvey H. 1948
Lau, Kam Hu 1929
Leeds, William L. 1943
Lejeune, Jacques Robert 1967
Lennox, Stuart G. 1953
Lentz, John Jacob 1938
Leo, Fiorello 1947
Leonard, Ronald Baldwin 1959
Leroux, Pierre J. 1949
Levin, Daniel 1942
Lewis, Frederick J. 1946
Lewis, Stanley M. 1911
Li, Chung Hsien 1950
Liang, Car Chia-Chang 1939
Linton, William Miles 1947
Liu, Yun Pu 1934
Lo, Shih-Chun 1951
Lotzkar, Harry 1937
Lovoff, Adolph 1940
Lowe, Frank C. 1938
Lowrey, Richard O. 1949
Lunday, Adrian C. 1952
Luo, Peilin 1952
MacDuffie, Duncan E. 1956
MacNeill, Robert John 1948
Majerovicz, Isaac Abraham 1970
Mampell, Klaus 1943
Manoukian, John 1947
Mantarakis, Petros Zanis 1970
Marshall, John Warren 1944
Martin, Francis Crawford 1928
Martinez, Victor H. 1942
Mason, Herman A. 1948
McBreen, Kenneth L. 1944
McElligott, Richard H. 1949
McNeal, Don 1935
Menis, Luigi 1940
Meyer, Robert R. 1964
Michal, Edwin B. 1933
Miller, James C. 1907
Moise, Norton L. 1959
Molloy, Charles Thomas 1967
Molloy, Michael K. 1947
Moorehead, Basil E. A. 1947
Morane, Didier 1959
Moyers, Frank N. 1930
Moysan, Jean Michel 1967
Muller, Jerry J. 1933
Neil, Harvey 1923
Nelson, Julius 1929
Nixon, Stanley Reed 1946
Norton, Frank E. 1906
Oakley, Spencer W. 1939
Oliver, Edward D. 1948
Olson, Raymond L. 1947
Onstad, Merrill E. 1944
Orr, John L. 1947
Ozkaragoz, Ethem 1944
Padgett, Joseph E. 1951
Palmiter, Hugh D. 1958
Parker, Dan M. 1949
Parnes, Basil R. 1952
Paulson, Robert W. 1950
Perrin, John Clyde 1967
Peterson, Frank F. 1927
Peterson, Norman L. 1940
Peterson, Roger L. 1965
Petrulas, Thomas G. 1949
Petty, Charles C. 1949
Pi, Te-Hsien 1944
Pines, Barry N. 1962
Pjerrou, Gerald M. 1958
Potter, Philip D. 1954
Prasad, K. V. Krishna 1946
Rau, William C. 1932
Reed, Dwain Joe 1961
Reimers, George I. 1941
Rhett, William 1938
Rice, Jonathan F. 1945
Rice, Winston H. 1933
Riddell, Richard B. 1944
Ridlehuber, Jim M. 1944
Ringness, William M. 1949
Rivas, Dagoberto 1935
Roberts, Fred D. 1943
Robinson, Frederick G. 1941
Robinson, True W. 1929
Robison, William C. 1952
Roe, George W. 1948
Roesch, William C. 1949
Rogers, Berdine H. 1954
Romney, Carl Frederick 1945
Rona, Yavuz 1969
Rosen, Moe William 1936
Roth, Stanley 1959
Rouvillois, Xavier Marc 1959
Rubin, Arthur Myron 1960
Salbach, Carl Koenig 1946
Samuelson, Lee W. 1963
Sappington, Merrill Homer 1947
Sayegh, Samir D. 1965
Scavennec, Michel A. 1967
Schaefer, Brian Morris 1968
Schmidt, Howard Richard 1950
Schneider, William Powers 1950
Scholz, Dan R. 1943
Scott, Francis F. 1954
Senhouse, Lionel S. 1964
Serafin, Robert E. 1966
Servet, Abdurahim 1937
Shannon, Leslie A. 1943
Shappell, Maple D. 1933
Shaw, Thomas N. 1937
Shepard, Elmer Ralph 1946
Shuler, Ellis W. 1937
Shults, Mayo G. 1944
Silgado, Enrique F. 1944
Sledge, Edward C. 1946
Slusher, John T. 1948
Smith, Harvey Franklin 1946
Smith, Lewis Lofsky 1961
Smith, Warren H. 1933
Snow, Neil W. 1935
Solelhac, Bernard C. 1965
Solomon, Salim 1949
Spence, William N. 1956
Spiegelman, Will G. 1963
Srinavasan, Prabandam 1956
Stadum, C. B. 1941
Standridge, Clyde Tilden 1941
Stanford, Harry W. 1944
Stein, Roberto L. 1944
Stenberg, Gunnar E. 1958
Stephens, Melvin M. 1965
Stuteville, Joseph Edward 1957
Summers, Allan J. 1951
Sunalp, Halit 1944
Sutton, Donald E. 1952
Swain, John S. 1948
Takahashi, Nobuyoshi 1953
Tanyildiz, R. S. 1944
Taylor, Garland S. 1944
Tezduyar, Tahsin 1972
Thompson, Russell A. 1947
Thompson, Wilfred Gregg 1925
Tileston, Peter Ayer 1943
Tracy, Willard H. 1924
Treyer, Andre Alois 1957
Trimble, William M. 1944
Tsao, Chi-Cheng 1938
Tung, Yu-Sin 1946
Turkbas, Necat 1945
Turteltaub, Matias J. 1965
Uhthoff, John C. 1957
Uyterhoeven, Willem 1929
Van Hise, Albert Eugene 1951
Van Riper, Dale H. 1936
Vanden Heuvel, George Renzo
Vicente, Ernesto 1943
Vidal, Philippe 1965
Voelker, William H. 1948
Waddington, Bruce Alan 1972
Waits, Harold P. 1964
Waller, Conrad J. 1925
Wan, Pao Kang 1947
Wang, Tsun-Kuei 1938
Wang, Tsung-Su 1940
Washburn, Courtland Lee 1943
Watkins, James Marshall 1940
Watson, James Wendell 1938
Weaver, Robert L. 1941
Weeks, Richard W. 1952
Wegener, Paul Theodore 1971
Welch, Donald E. 1955
Wellman, Alonzo H. 1947
Welte, Robert S. 1950
West, William T. 1931
White, Dudley 1930
White, Ray H. 1957
Whitehill, Norris D. 1950
Whitney, James Earl 1948
Widess, Paul R. 1960
Widess, Ruben 1931
Wiget, Clark H. 1937
Wight, D. Roger 1944
Wilkening, John W. 1949
Wilson, Howard E. 1952
Wilson, Warren Elvin 1939
Wimberly, Clifford McBride 1947
Winniford, Robert S. 1948
Winters, Edward B. 1947
Winters, Herbert H. 1954
Wiren, Jean Folke 1949
Wolf, Paul L. 1944
Woo, Sho-Chow 1931
Woodbury, William White 1938
Woods, Marion C. 1948
Wright, William Edwin 1969
Writt, John J. 1944
Wu, John Y. 1963
Yee, Thomas Wai 1974
Yik, George 1944
Ying, Lai-Chao 1947
Yoshioka, Carl K. 1931
Young, Larry L. 1936
Yui, En-Ying 1941
Zola, Colman 1941



Mr. and Mrs. Thomas L. Brennan with their guest, Mrs. Charles S. Arledge (left), are pictured at left. Right: William C. Rockefeller is greeted by Mrs. George D. Jagels and President Marvin L. Goldberger.

Mr. and Mrs. John R. Fee with Mr. and Mrs. John C. Wilfong.

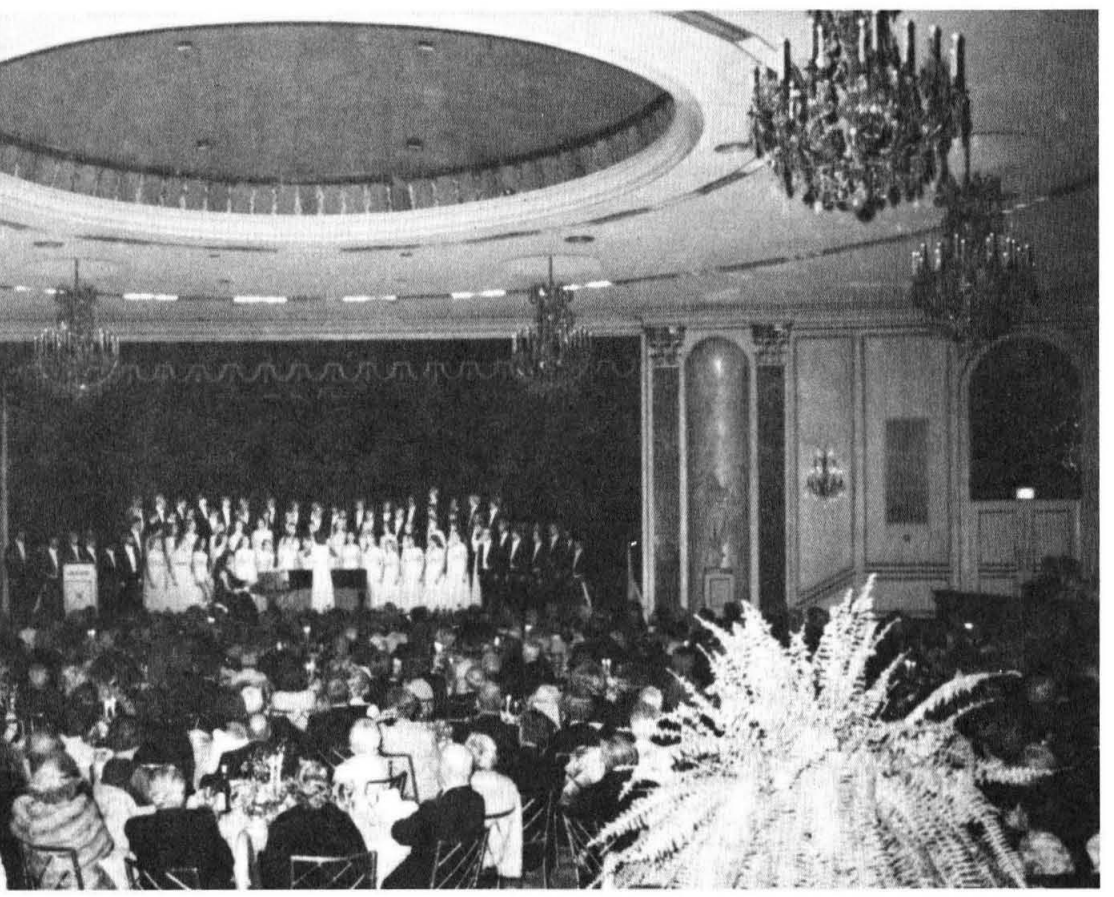
The Associates lauded at

More than 600 members of The Associates, their guests and members of the Caltech faculty and the Board of Trustees, gathered at the Beverly Wilshire Hotel in November for The Associates' annual dinner. For many, the evening provided the first opportunity to meet and talk with Caltech President and Mrs. Marvin L. Goldberger. Goldberger, the keynote speaker, stressed the ways that Caltech depends on The Associates. (See story on page 1).

Mr. and Mrs. Richard L. Smyth with the Goldbergers.

Mr. and Mrs. W. Morton Jacobs are welcomed by Dr. Goldberger and Jagels.

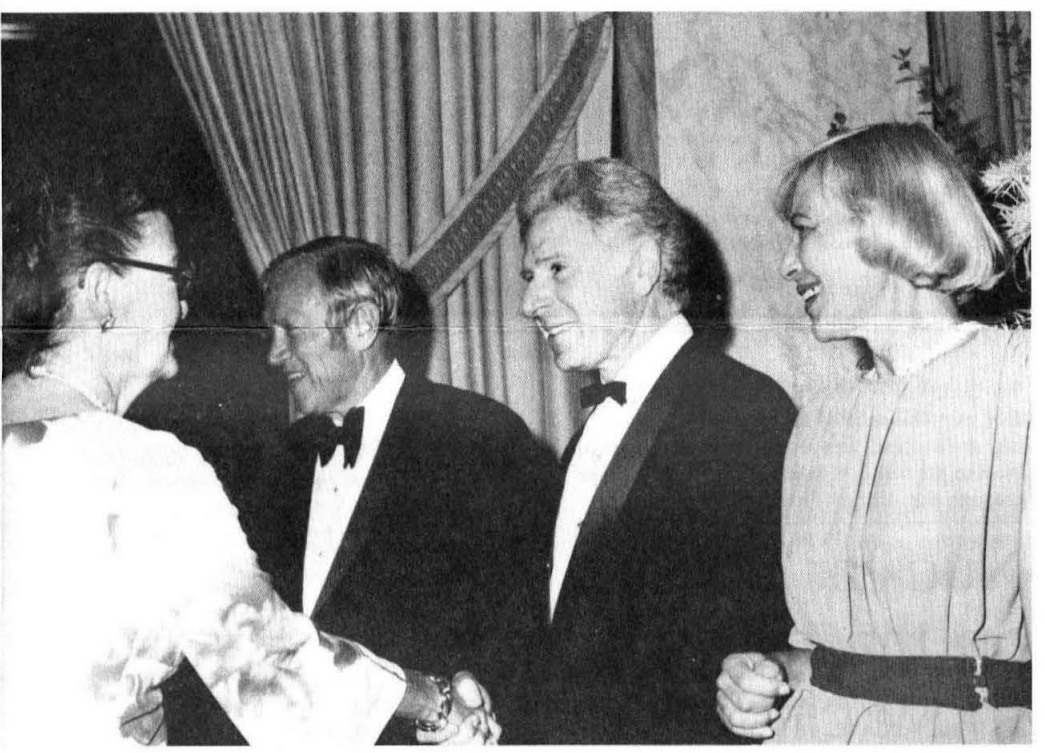
Dr. and Mrs. Henry L. Lee, Jr.; their guests, Mr. and Mrs. Charles W. Crysler, and Mrs. Don Hayden Rose.



The Caltech Glee Club performs for The Associates.

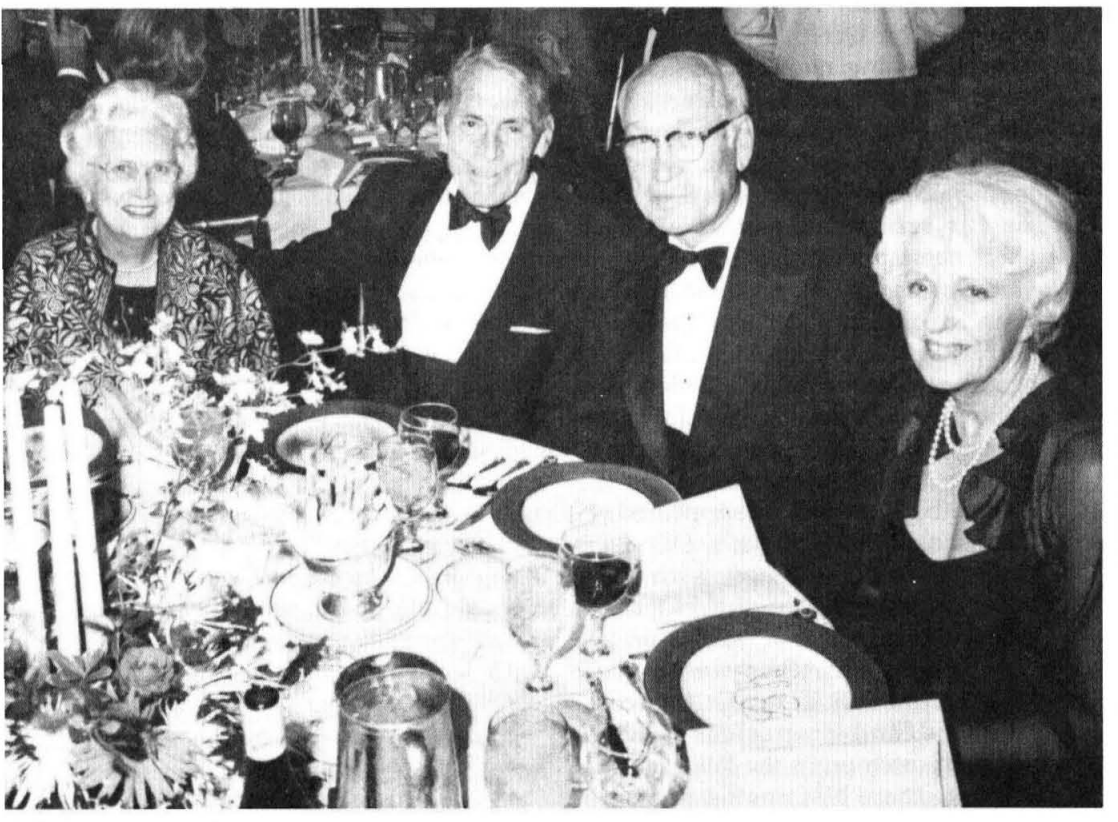
annual dinner

Mr. and Mrs. Fred J. Broderick with Dr. Goldberger.

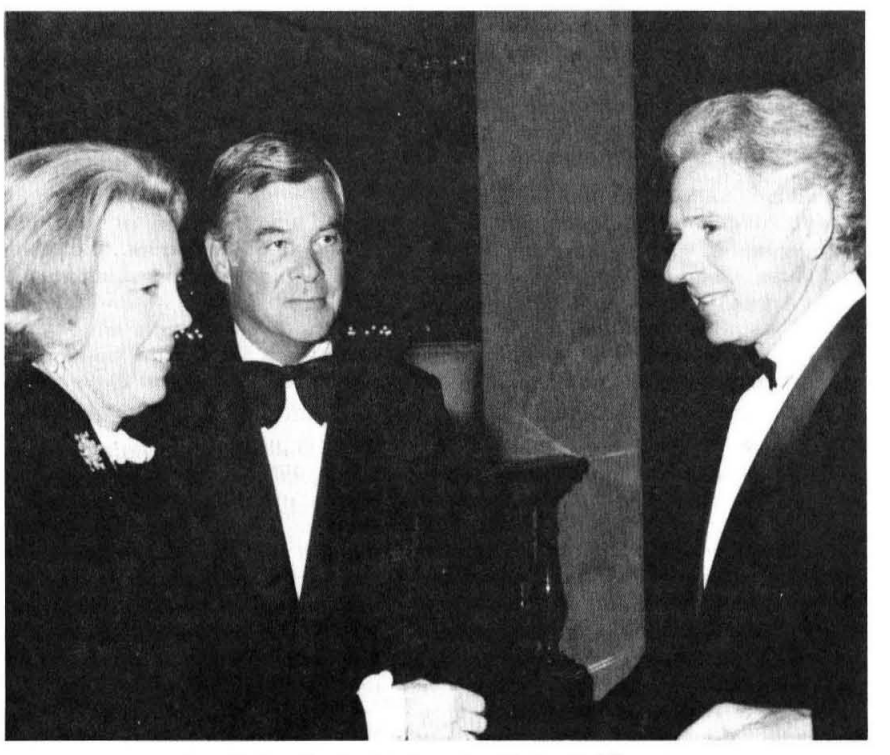


Mrs. Richard L. Hayman is greeted by George D. Jagels and Dr. and Mrs. Goldberger. Jagels is president of The Associates.

Mr. and Mrs. Spiros G. Ponty talk with a member of the Caltech Glee Club. The Pontys were guests of the Institute at the dinner.



Mrs. Arnold O. Beckman, Lowell Stanley, Dr. Beckman and Mrs. Stanley. The Stanleys were guests of the Beckmans for the evening.



Mr. and Mrs. Charles W. Gates II with Dr. Goldberger.

PERSONALS

1924
FRANK PINE, Ex, is the recipient of the 20th Annual Fernando Award. Nominated by the Greater Van Nuys Area Chamber of Commerce for outstanding service in working to improve transportation in the San Fernando Valley, Pine has served as vice chairman of the chamber's Valleywide Streets, Highways, and Transportation Committee since its inception. A resident of North Hollywood, California, he has also been active in many other civic groups.

1935
ALAN BEERBOWER was named an honorary member of the American Society for Testing and Materials. Beerbower, a research engineer for the UC San Diego Energy Center, was cited for his "long and dedicated service in establishing standards for the aerospace industry, and his ability to inspire those working with him to unprecedented levels of productivity while maintaining the highest quality of language and precision." He is currently responsible for work on energy conservation, focusing on reduced friction and improved efficiency in rotary equipment.

1936
SIMON RAMO, PhD, has received the Delmer S. Fahrney Medal for outstanding leadership of major scientific and technological projects of national and international importance. The award was given in Philadelphia by the Franklin Institute on its annual Medal Day, on November 8. Ramo is a Caltech Trustee and a director of TRW in Redondo Beach, California, and the chairman of TRW's Science and Technology Committee.

1938
DANIEL A. OKUS, MS, is the 1978 recipient of the Water Pollution Control Federation's Gordon Maskew Fair medal which honors those serving the water pollution control field in the area of engineering education. He is the Kenan Professor of Environmental Engineering at the University of North Carolina, Chapel Hill.

EMANUEL WINDSOR, MS '48, PhD '51, has retired from Olive View Medical Center in Van Nuys, California, where he was a clinical chemist.

STANLEY T. WOLFBERG was named a Fellow of the American Institute of Industrial Engineers at the AIIE's Annual Conference in Toronto. He is a consultant to industry, commerce, government, and non-profit institutions.

1944
RASIT ALPAN writes from Istanbul after seeing his name in "Help Us Find These Lost Alumni" in last December's *Caltech News*, with an update about himself and his friend, ASIM ÜNAYRAL, BS '44. Alpan and Ünayral, both from Turkey, went together to the University of Michigan for their masters degrees after graduating from Caltech and then they returned home and married sisters. In 1958 both families came back to the United States and settled in Springfield, Illinois, where the men worked for 11 years as civil engineers. They all moved back to Turkey in 1969, where Alpan is now the head office director in Istanbul of Anadolu Cam Sanayü, a glass factory. Ünayral died of a heart attack two years ago. "It is nice to know that we are still remembered," Alpan concludes in his letter.

NEVILLE S. LONG, MS '48, has moved to Houston, Texas, where he is the project manager for Bechtel, Incorporated, for the design phase of a major seawater injection project for Aramco in Saudi Arabia. He writes that he and his wife, Anne, will be moving to Saudi Arabia in another 18 months for the construction phase of the project.

1954
EDWARD J. GAUSS of the computer science faculty of the University of Alaska has been joined by JOHN WILKINSON, BS '61, PhD '65. Gauss writes that he is using computer simulation to approach some of the problems of bush aviation. He is also the proprietor of the Fat Moose Flight School and does consulting in data systems. In August he served as a relief pilot in the Alaskan bush for Resource Associates of Alaska, an international prospecting firm. Gauss says he would like to hear from anyone who has modeled Supercub-sized airplanes, especially in the region around stall. His address is 228 Slater Drive, Island Homes, Fairbanks, Alaska 99701.

1958
HAROLD K. FORSEN, MS '59, writes, "As of April 1, 1978, I have been named to the board of directors of Exxon Nuclear Company. I had been vice president since 1975 in charge of our laser isotope separation program." He lives in Bellevue, Washington.

WILLIAM L. KO, MS '59, PhD '63, writes that he is doing research work on aero-thermo structural problems of hypersonic flight vehicles (such as space shuttles) at the NASA Dryden Flight Research Center, Edwards, California. Meanwhile he continues to pursue a successful second career as a painter of watercolors. While living in San Antonio, Texas, he presented two one-man shows, and one of his works hangs in the permanent collection of the L.B.J. Library in Austin. Ko describes a process he developed that enables a painter of watercolors to express his emotional ideas more freely than by conventional methods. He writes:

"As an engineer I did some research on the physical properties of watercolor papers under different atmospheric conditions. I found that the physical properties of the papers (filamentary materials) depend very strongly on the moisture diffusion in them and I developed an equation that describes the one-dimensional moisture diffusion process in the papers. After I fully understood this process, I applied the knowledge to my painting. By artificially controlling the rate of water molecules' diffusion it was possible to express freely my emotional ideas in the paintings. Such expression (in watercolors) previously had been considered impossible."

1959
WALTER HADDAD, MS, has been elected first vice president of Bateman Eichler Hill Richards in Los Angeles. He has also been chosen to serve on the Board of Directors of Energy Incorporated, Idaho Falls, Idaho.

CLAYTON S. SMITH, MS, has been appointed chief of the Bio/Chemical Conversion Branch at the Solar Energy Research Institute (SERI) in Golden, Colorado.

1961
ALBERT W. "BUZZ" MERRILL, MS '62, writes that he has married Mary Hammill, "who is a wonderful lady and I love her completely. She is an actress and has two teenagers. We've bought a house in Beverly Glen, California, with lots of trees and space."

GEORGE W. SIMON, MS, PhD '63, has been named by NASA to serve as a payload specialist during the second Spacelab mission, scheduled for 1981. As one of four payload specialists, Simon will serve either aboard the orbiting space laboratory to operate scientific investigations or he will operate ground-based experiment equipment. Simon lives in Alamogordo, New Mexico, with his wife and three children. He is chief of the solar research branch at the Air Force Geophysics Laboratory with permanent duty location at the Sacramento Peak Observatory, Sunspot, New Mexico.

1962
EDWARD T. CLINE, JR., PhD '66, has been promoted to associate professor in mathematics, at Clark University, Worcester, Massachusetts. His research, supported by National Science Foundation funds, is in finite and algebraic groups.

1967
PETER N. CROSS writes, "I continue to be involved in the design and implementation of rural health delivery systems in Afghanistan. Our objective is to put a trained health provider within reach of the majority of Afghan villagers by 1990. About 20 percent have access now."

GARY G. IHAS, who married Joann Posey on July 24, 1977, is now an assistant professor of physics at the University of Florida and received an Alfred P. Sloan Foundation Fellowship this year. He says he supervised the construction of a refrigerator at Ohio State University which set a world's record — 0.0004 K. He has since heard unofficially that this record has been broken by a friend and classmate, DOUG OSHEROFF, of Bell Labs.

1968
ROBERT M. MATTHEYSES, MS '69, has joined the General Electric Research and Development Center as an information scientist. He lives in Schenectady, New York, with his wife, Lynn, and their daughter, Alexa.

1969
GREGG F. WRIGHT and his wife, Christine, have joined the faculty of the Department of Pediatrics at the University of Texas Medical Branch in Galveston.

1970
NARENDRA K. GUPTA, MS, has received the Donald P. Eckman Award from the American Automatic Control Council for his outstanding contributions to automatic control. He is a senior scientist in the Aeronautical and Marine Division of Systems Control, Inc., a research and development firm in Palo Alto, California. His major research interests are the development of new techniques for model structure determination, information matrix analysis, input design, and adaptive control. He and Mrs. Gupta live in Menlo Park.

CHRISTOPHER REED received his PhD in applied math from Cornell in January 1978 and has now joined the faculty of the Rochester Institute of Technology as an assistant professor in the mathematics department.

1973
CHARLES W. ALMQUIST married Debbie Collins on October 4 in Norris, Tennessee. Almquist is with the staff of the Tennessee Valley Authority.

EPIFANIO ANZALDO is a resident in obstetrics and gynecology at Harbor General Hospital, Torrance, California. His wife, Liane, has recently set up private law practice in the Gardena area.

1976
MICHAEL J. CRAIG, after working for a year and a half at Caltech as a research engineer in soil mechanics, has joined the Union Oil Company of California at its research center in Brea. As part of its Reservoir, Ocean, and Optic Group, he will be working on offshore oil structures.

GOLDENBERG MEMORIAL

1956
The family of H. MARK GOLDENBERG, who died September 15 in an accident while working on his car, has established a memorial fund in his name. Contributions may be made through the Alumni Fund office.

Nuclear physics on the talk show circuit

If John Davidson, senior research fellow in physics, ever anticipated national recognition, he probably didn't imagine it would be by way of Johnny Carson's "Tonight" show. But night owls who tuned into the program on October 12 saw Davidson discussing nuclear physics with Carson like any show business pro.

Davidson's unexpected entry into the talk show circuit came about because popular singer John Davidson had to cancel an appearance after it had been publicized. So as not to have a disappointed public on their hands, program managers got busy with the phone book — to make good on their promise to deliver a "John Davidson" to their TV audience.

They found five namesakes in the phone book and all five appeared on the show. But Caltech's Davidson handled his interview with such easy assurance that the entertainment world may not have seen the last of him. His tenor voice is well known to many in the Caltech community, and if nuclear physics doesn't catch on in the late night TV circuit, then his singing may still give the other Davidson a run for his money.

Alumni Chapter Officers

CHICAGO CHAPTER
President — Howard E. Jessen '46, 225 Ridge Ave., Winnetka, Ill. 60093

DENVER CHAPTER
Officers — David B. MacKenzie '50, P.O. Box 269, Littleton, Colo. 80160
Paul W. Fullerton, Jr. '48, 3233 S. Columbine St., Denver, Colo. 80210

DETROIT CHAPTER
Chairman — Daniel G. Reichel '73, 1805 Village Green Lane #C1, Ann Arbor, MI 48015

NEW MEXICO CHAPTER
President — Jonathan F. Callender BS '66, University of New Mexico, Albuquerque, N.M. 87131

NEW YORK CHAPTER
President — Delbert C. McCune '56, Boyce Thompson Institute, 1086 North Broadway, Yonkers, N.Y. 10701
Vice President — Willis A. Bussard '44, 102 Autumn Hill Rd., Princeton, N.J. 08540
Secretary — Harry J. Moore '48, IBM Corporation, Old Orchard Rd., Armonk, N.Y. 10504

SACRAMENTO CHAPTER
President — Melvin E. Holland '60, 4141 Stowe Way, Sacramento, Calif. 95825
Vice President — Norman B. Hume '26, 2730 Morley Way, Sacramento, Calif. 95825
Secretary — William D. Pyle '49, 3920 Dunster Way, Sacramento, Calif. 95825

Meetings: Mansion Inn, 700 16th St. Luncheon second Friday of each month at noon. Visiting alumni cordially invited—no reservations.

SAN DIEGO CHAPTER
President — Delano A. Brouillette '55, 6671 Cibola St., San Diego, Calif. 92120
Vice President — David B. Wilford '48, 10066 Sunset Ave., La Mesa, Calif. 92041

SAN FRANCISCO CHAPTER
President — Thomas A. Tisch '61, 14735 Aloha Ave., Saratoga, Calif. 95070
Vice President — Hubert E. Dubb '56, One Lyndhurst Ct., Belmont, Calif. 94002
Secretary — Ben G. Burke '61, 919 Carl Rd., Lafayette, Calif. 94549

Meetings: Engineers' Club, 16th Floor, Hong Kong Bank Bldg., San Francisco. Informal luncheons every first Thursday at 11:45 a.m. Contact Chip Smith, 415/781-4211, ext. 2507 or 2221.

San Francisco Peninsula luncheons: Ming's Restaurant, Palo Alto. Luncheons third Thursday of every month at 12 noon. Call Hugh Dubb, 415/421-2674, for information or reservations.

WASHINGTON, D.C. CHAPTER
President — John T. Cookson '66, 7508 Masters Dr., Potomac, Md. 20854
Secretary/Treasurer — Michael B. Wilson '71, 3119 Homewood Parkway, Kensington, Md. 20795

FRENCH CHAPTER
President — P. Claude Mahieux '56
Vice President — Michael B. Wilson '71
Secretary-Treasurer — Madeline A. Shea '77

Meetings: For information contact Caltech Alumni de France, France-Amerique, 9 ave. Franklin Roosevelt, 75008, Paris, France.

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 91125

Please send me: (Check one)
☐ An application for placement assistance.
☐ A form indicating a desire to keep watch for opportunities although I am not contemplating a change.

Name .....
Degree(s) ..... Year(s) .....
Address .....

No local hops for him

Ken Gold commutes to the Middle East

by Winifred Veronda

Anyone who has made seven ocean crossings before his eighth birthday is likely to acquire an international viewpoint and a taste for travel. So it isn't surprising that S. Kendall Gold, BS '42, gravitated to work that focuses his efforts on an island state in the Persian Gulf and his attentions on a problem as global as the energy crisis.

Gold is manager of planning and economics for the Caltex Petroleum Corporation and he is also the regional director for the company's producing and refining activities on Bahrain, an island 30 miles off the east coast of Saudi Arabia. Bahrain is the site of a major "swing" refinery which supplies Caltex's international markets. During his 36-year career in the oil industry he lived in England for seven years and — while based in New York City — he often made trips to Europe, South Africa, the Orient, the Philippines, and the Middle East.

This periodic globe-trotting may have had its origins in his childhood in Shanghai, China, where his father managed a taxi company, the largest in that city in the pre-World War II era. Gold, who was born in China, made seven 21-day crossings by passenger liner to the United States before the family permanently returned to this country to settle in Hollywood.

After living for a few years in the Los Angeles suburbs, Gold was off to study at Shattuck School in Faribault, Minnesota. There he won honors in science, and with college approaching, he decided to become an engineer.

"My father had studied engineering and he subtly guided me in that direction," he said. "Besides, the country was in the grip of the depression and it seemed important to have a job that would provide a meal ticket. And since I was going to be an engineer I wanted to enroll in the best institution that would admit me. Even then, Caltech was the best technical university around."

Gold entered Caltech in 1937 and, with World War II on the horizon in 1940, he enrolled in the V-7, or Naval Line Officer Training Program, on the campus. When he was forced to leave the program because of an arm injury, he took a year off from school, helping Joyce Shoes to create a production line manufacturing operation, and then joining C F Braun & Co as a cost accountant and later estimator, at $.75 an hour.

"Taking off that year to work was a tremendous experience for me," Gold said. "I matured a lot and I gained more appreciation for the kind of work our courses were preparing us to do. When I returned to school my grades went up, even though I didn't study nearly as hard."

As a Caltech student, Gold loved to sample. "I dabbled in almost everything," he says, "— Press Club, Ski Club, *Big T,* Musicale, interhouse sports, swimming, and water polo. I believed a person ought to be well rounded. I still do."

A Fleming House resident, Gold also dabbled in politics, and he earned a reputation as an enthusiastic campaigner. Running for student body rally chairman, Gold teamed with another candidate to buzz the campus in a small plane, their names painted, one on each side, in poster paint. As his pilot companion circled the campus at a low altitude calculated to plummet FAA officials into a state of hysteria, Gold blared campaign messages over a megaphone to the assemblage below. Back at the airport in Monrovia, he scrubbed the names off the plane — until he heard that a reporter was on the way to take a picture. Then he hastily restored his name, omitting that of his colleague. He won the election; his colleague lost.

S. Kendall Gold

Overseas Assignments

Graduating from Caltech in 1942, Gold accepted a job with Standard Oil Company of California as project engineering assistant, and a year later he went to work with the Caltex Group Companies. There he served in several capacities in refinery engineering, with assignments in New York City and with projects overseas.

In 1948, Gold, who was based in New York City, was assigned to expedite an engineering project conducted for Caltex by Bechtel Engineering Company in San Francisco. There he met Philis Ludlam, a Bechtel employee who had gone to work for the company hoping to renew a romance with an old boyfriend. Instead she found a new romance with Gold, and they were married in 1948.

In 1954 the Golds went to England where he was assigned to organize an engineering department for the firm in that country. The assignment lasted seven years and Gold returned to the United States in 1961 as assistant chief engineer and later as the chief engineer in the company's central engineering department. In 1970 he became manager of planning and economics, and in 1977 regional director for activities on Bahrain, an independent island state in the Persian Gulf.

In this role he flies to Bahrain two or three times a year; in 1977 he and Mrs. Gold spent two months on the island where he filled in for the company president who was home on leave. Since he first visited Bahrain in 1943 he has seen it grow from a sleepy British protectorate with thatched houses and subsistence agriculture to a thriving country with luxury hotels, superhighways, and modern homes with electric power and air conditioning. He also has watched the world's oil supply shift from a matter for complacency to a crisis of global proportions.

Gold remembers an earlier "oil crisis" — an interval during his college years when experts predicted that the world would run out of this valued commodity sometime in the 1940s. "Those dire predictions proved groundless because we found more oil — in Saudi Arabia and elsewhere," he says. "And as an industry, we hope we can continue to find new deposits to replace the known reserves. But we can't keep pulling rabbits out of hats forever. We're moving into an era when the oil crisis will force us to make major adjustments. It would appear that in 20 years or so, unless there are some enormous finds, we'll be in serious trouble.

"The industry can turn to alternatives based primarily on coal or oil shales," Gold says, "but making gasoline from these materials will be tremendously expensive."

Gold, who has worked with Arab oil executives for more than 30 years, believes many are responsible and competent individuals, but he stresses that the quality of leadership in the Middle East varies considerably. "It's important to remember that the Arabs aren't all peas in a pod, any more than people in western countries are," he says. "The Saudis have demonstrated quite a degree of statesmanship, as has the government in Bahrain. The Shah of Iran can be unpredictable, although his policies have been quite successful in attracting money for development in Iran. Leaders in Iraq, on the other hand, can be difficult to deal with."

As he discusses Middle East leadership, Gold emphasizes the political aspects of the oil shortage as well as those related to supply.

"For example," he says, "the Saudis have announced that they're going to insist that we produce more heavy crude and less light crude. This is going to be tough for refineries because they're mostly geared to processing light crude.

"Of course," Gold notes, "the Shah and the others often comment piously that they're being cruel only to be kind when they raise prices and stiffen restrictions on oil because they have to make us face the fact that oil is a limited resource. And when we see how difficult it has been for Congress and the administration to work out a realistic energy bill, it's easy to believe they have a point."

Active for many years in the New York Alumni Chapter, Gold served as president in 1954-55 and again from 1969 to 1971. In 1976-77 he was Alumni Fund area chairman for Manhattan.

While traveling for Caltex, Gold has continued to sample activities as he did as a student. He's skiied in Europe and Japan and he always takes his tennis racket on his trips to the Middle East. At home in Greenwich, Connecticut, he's active in Christ Episcopal Church, and is one of its wardens and a member of its investment committee.

It was through his work on the Investment Committee that Gold began to ponder the complexities of mutual funds investment. His interest led him to develop an investment system—the Eskay Method.

The Eskay Method

"Like a lot of people, I've dabbled in the market — and generally with indifferent success," he says. "On the Christ Church Investment Committee I observed the way an investment banking concern handled the church's investments, and I looked for a way to adapt those principles to the needs of the common man." Gold has published a book outlining his method through a corporation that he established several years ago to market a stock market game that he had devised. The book is entitled, *Invest Without Anxiety—The Eskay Method.*

As he looks back on his days as a Caltech student, Gold is grateful that, while sampling extracurricular activities at Caltech, he also sampled courses in the humanities. "My Caltech education gave me a solid engineering background and the capacity to think logically — and it gave me a grounding in the humanities that, in many intangible ways, has also been very important," he says. "I'm grateful that Caltech emphasized the humanities as well as technical subjects."

As he reflects on a career that began with an assignment as an engineering assistant and has led to top level management work, Gold says he has enjoyed his management responsibilities the most. "If I had it to do over I might have taken an MBA on top of my engineering degree," he says, "because my shift into management has been very satisfying. I like to look at an integrated business operation and see what makes it tick. The challenge of analyzing systems and procedures, of working with attorneys, accountants, and technical people — all this is very satisfying to me."

Throw in other challenges as formidable as those posed by the energy crisis—and interests as diverse as those of the oil industry—and you have a career to satisfy the most demanding and enthusiastic Techer.

EQL staff plaudits

Brent D. Taylor, a member of the EQL professional staff, and Vito A. Vanoni, Caltech professor of hydraulics, emeritus, are recipients of the J. C. Stevens Award given by the American Society of Civil Engineers. The award, which recognizes Taylor and Vanoni's discussion of a paper, "Applicability of Unit Stream Power Equation," was presented at the ASCE annual convention.

Taylor is project manager of EQL's Sediment Management Project which attempts to define regional sediment processes of erosion, transport, and deposition. Vanoni, who retired from teaching at Caltech in 1974, is a consultant on river and sediment problems. He is doing research on sedimentation that concerns the relationship between hydraulic parameters and the bed roughness and sediment transport rate of streams.

13-5 record

Cross country successes

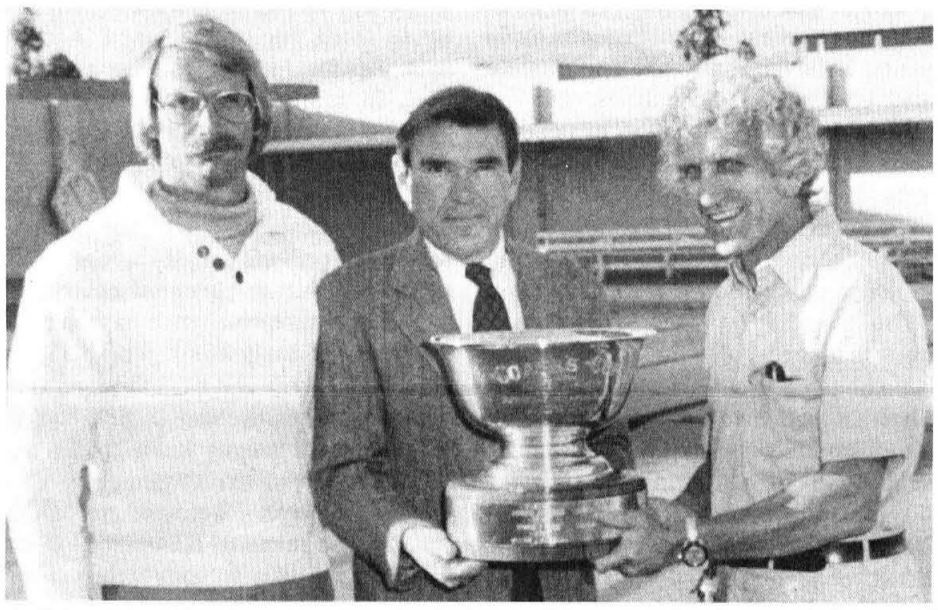
Led by senior captain Robert Bourret, Caltech enjoyed its most successful cross country season in many years. Consistently the squad's number one runner, Bourret earned the Paul Barthel Memorial Award as the outstanding team member.

Giving consistent support to Bourret were sophomores Glen George, Rich Holmes, and Eric Korevaar, and junior Bill Gould. Their efforts, combined with those of Bourret, enabled the team to post a 13-5 record. In SCIAC action the team compiled a 4-2 record in dual meets, placed fourth in the championship race, and ended in third place in overall conference performance.

In the championship race on Caltech's tough and hilly 4.56-mile course, Bourret earned all-conference honors by taking 9th place, followed by Gould, 16th; George, 18th; Holmes, 26th; and Korevaar, 30th. Because Tech was competing against defending NCAA District III champion Occidental College as well as a tough Pomona College squad, the performance of the Beavers in this event was remarkable.

The men's team completed the 1978 season by competing in the NAIA District III championship race on the 5-mile course at La Mirada Park, placing 7th out of 11 participants. In this event Bourret, who was Caltech's top runner, finished 19th out of 72. Although he will graduate in the spring, the other team members will be back next year. "If the runners work as hard next summer as they did this year, then our 1979 season could be even better," according to Coach Leroy Neal.

A noteworthy aspect of the 1978 season was the fielding of Caltech's first varsity women's team, led by freshmen Camilla Van Voorhees and Susan Gardner, and junior Laura Wesson. "If the women continue their level of progress, they'll offer strong competition next year for other women's teams in the conference," says Coach Neal.



A gift from Reginald G. Spear, center, the Coaches' Cup will be engraved each year with the name of the outstanding Caltech water polo player. The designee also will receive a silver tray. With Spear are Water Polo Coach Ed Spencer, left, and Caltech Director of Physical Education and Athletics Warren G. Emery, right. Spear, a San Marino businessman, has long been a supporter of the Caltech athletic program.

Soccer sequence

The Caltech soccer team finished fifth in the conference this year with three wins and nine losses. So many players turned out (35) that Tech was able to play a junior varsity game against Pomona.

Caltech will be losing five of its starters through graduation next spring — Stan Chen, Erik Sirri, Cliff Beall, Mansour Sabeti, and Pete Kezios — but will retain these players, all of whom made important contributions: John McNally, who was voted first team all-conference forward; team captain Bryan Dunkeld, who was voted second team all-conference at centerback; Andy Gellman, a sophomore who took over and improved consistently after starting goalkeeper Mike Walsh was injured; sophomores Erik Gunderson and Larry Friedrich; and freshmen Jimmy Kuo and Lance Dixon.

Water polo promise

The Caltech water polo team entered the final round of conference play with a young and highly improved team — the starters consisting of four freshmen, one junior, and two seniors. Ten out of 18 players this year are freshmen, "the first time in many years that we've had so many frosh with swimming or water polo experience," according to Coach Ed Spencer.

The season opened with a 16-12 loss to Rio Hondo Junior College followed by an excellent contest with perennial powerhouse Occidental College in which Oxy emerged victorious, 12-8. The remainder of conference games were equally as close, except for a 9-8 victory over the University of Redlands.

The alumni handed the Techers their bitterest defeat, blasting the inexperienced varsity 12-4. The game was tied 4-4 early in the third quarter; then the alumni pulled away. The absence of one starter and the ejection of a second seriously impaired the varsity performance.

The water polo program this season was hurt when nine games against more equal competition were cancelled. These teams had been forced to drop water polo because of lack of funding. Next season holds great promise, according to Spencer, because the 1978 team has great potential and should mature into a strong, competitive contingent in 1979.

For the first time in 20 years, Caltech finished its football season with as many victories as losses. The wins were celebrated in the traditional way—with bonfires on the streets of Pasadena. This one, after Tech's first victory over the La Canada Ducks, was lighted in front of Bob's Big Boy restaurant on North Lake Avenue and promptly doused by firemen who had been waiting in the wings. After the Beavers' third victory, over Tijuana Tech, students thoughtfully kindled a blaze in front of the Pasadena Star-News offices, thereby assuring themselves of suitable press coverage. "Yes, Virginia, there really is a Tijuana Tech," pronounced the paper's headline the next day.

Season lively for local firemen

Beavers win three games

Caltech football has been alive and well this season. The demise of football last year apparently stimulated interest this fall because 38 players joined the team — the largest turnout in the recent history of the sport at the Institute. In celebration of the return of football to the campus, Caltech won three of its six games, defeating the La Canada Ducks 33–14, winning its second contest against La Verne College, 14–6, and trouncing Tijuana Tech 14–6.

Due to the large number of new and inexperienced players, Coach Tom Gutman and his staff worked hard during the pre-season practice period to develop basic skills. The coaches anticipated that the season would start slowly and end on a winning note, and their expectations were correct. Tech won its last three contests after losing the first three (to the Valley Freelancers and to Redlands, and in its first contest with La Verne).

According to Gutman, the team has been well balanced in ability, members have improved their skills rapidly, and enthusiasm has been at what he terms "an all-time high." He notes that "most of the players will be returning next year, and this means that the outlook for next season is bright."

Teaching Techers not to think

Tom Gutman, Caltech's football coach, has a novel approach to instructing his squad. He advises his players, "Stop thinking. Just do it!"

Trying to teach Caltech students not to think is almost as difficult as squaring the circle, but even if the mathematicians can't accomplish the impossible, Gutman is making a pretty good stab at it — with the 38 undergraduates who showed up this fall for the season's first practice. It was the largest turnout for football in the past 13 years, and it delighted Gutman, especially since the schedule was canceled last season because there weren't enough players to make up a team.

What's the point of Gutman's turn-off-your-brains approach? Well, 80 percent of the football players at Caltech never played in a varsity game in high school, and 50 percent never played the game at all. That's a real disadvantage. "When your experience and ability are so much less than your opponents'," Gutman says, "thinking becomes a negative factor."

Long time athletes develop attitudes of confidence and commitment that become almost instinctive rather than thought-out, according to Gutman. He should know; he played football for Beverly Hills High, UCLA, and in the Rose Bowl in 1961. "In football, a lot of the action is just reaction without thinking about it first," he says. "If you're about to tackle someone twice your size — and you think about it — you probably won't do it."

The "quit-thinking" approach is not the only novel aspect of coaching that Gutman has developed in the 12 years he has been at the Institute. On a campus where recruiting for athletes is unheard of, where players are kidded about their IQ's being higher than their weight (this year's average is 140 pounds), and where one of the challenges is to find opponents in the same class, a coach has to be pretty innovative. Gutman and his assistants are masters of the art.

Capability is obviously not a prerequisite for joining the football program. Everyone is welcome, no matter how unskilled. Of course, the three coaches try to teach the skills, but they first spend a lot of time identifying the temperament, personality, and attitudes of each player and then try to tailor their approach (teaching) to individual needs.

Ed. note: As Caltech News *was in production, Gutman, who has been Caltech's head football coach for 10 years, resigned to take a position in property management. The Institute's wrestling coach, he also taught classes in volleyball, self-defense, and weight training. "Caltech has been an experience that has given me great insight into the concept of teaching," he said. "You're challenged to be creative, inventive, and patient."*