California Institute of Technology

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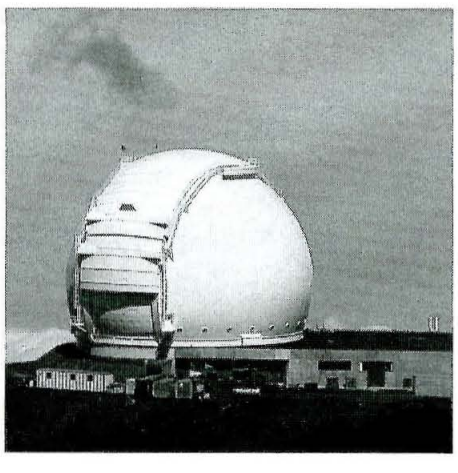
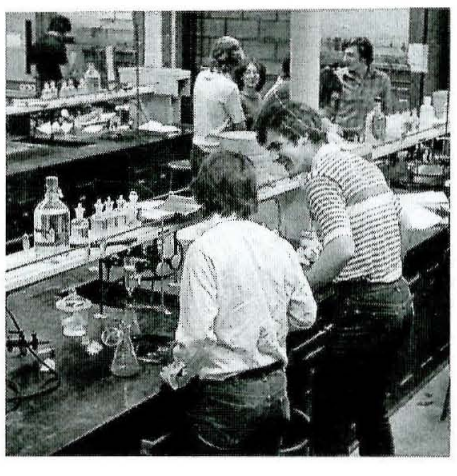
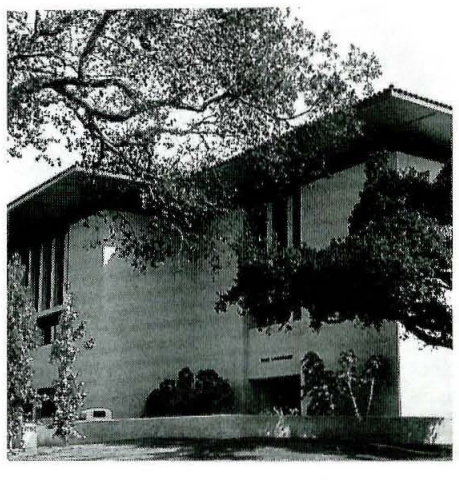
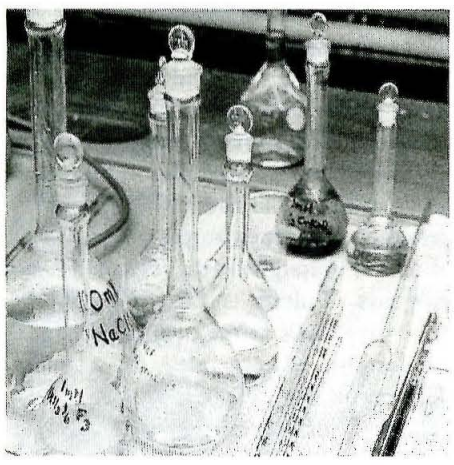
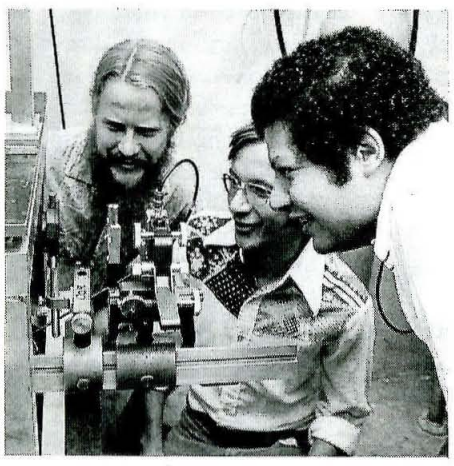
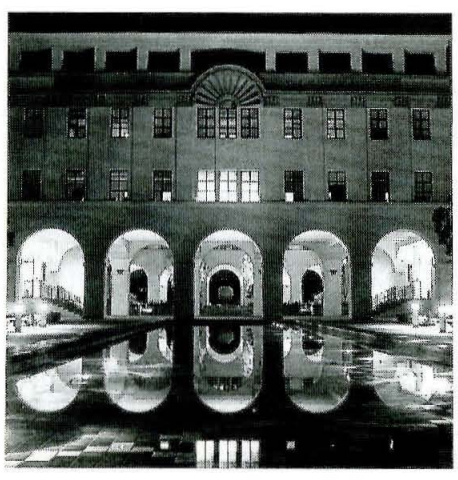












The Campaign for Caltech: A Second Century of Discovery

Caltech's 100th year marks the commencement of The Campaign for Caltech: A Second Century of Discovery. To be publicly announced on March 11, the campaign aims at increasing the Institute's endowment, and at raising funds for capital projects and new and current programs and operations over a three-year period. Trustee James Glanville (MS '46, ENG '48) heads the campaign, and Arnold Beckman (PhD '28) is honorary chairman.

"For a century the Institute has offered an outstanding return on investment in terms of educating leaders and of performing research that makes a difference," says President Thomas Everhart. Citing a long list of substantial contributions which have made Caltech "one of the world's most prestigious centers for research and education in science and engineering," Everhart adds that "our work is far from done. The price must be paid if Caltech is to remain preeminent."

"Caltech has always enjoyed generous support from alumni and other friends," says Everhart, "but private support will play an even more important role in the Institute's future. Government funding for research has not kept pace with the explosion of research being done in the United States, so competition for available funds is increasing, and the awards come with more strings attached."

Alumni gifts during the campaign will form a crucial portion of the goal. A Centennial Challenge presented by Hugh Colvin (BS '36) will match increases in donations and new gifts to the Annual Fund (see story on page 4), with the objective of raising alumni giving to a new high.

The campaign follows the conclusion of an in-depth aims-and-needs study completed by the faculty in 1989, which pinpointed areas of need and identified six broad categories of concentration: foundations of life and mind; informatics and complex systems; molecules, materials, and microdevices; earth and the environment; the universe; and human values and institutions.

Glanville chaired the trustee committee that reviewed the results of the study and recommended that the Institute launch the campaign. A working goal of $250 million, which would meet part of the identified needs, was set by Caltech's board in October 1989. This signaled the "quiet" phase of the campaign, in which trustees sought initial commitments toward the campaign goal from among themselves and other close friends of the Institute. The final goal will be announced March 11.

Included in the overall working goal is $85 million in endowment funds, of which the largest part would be devoted to supporting people—Caltech's exceptionally talented faculty, researchers, and students. Of this amount the Institute hopes to secure $20 million for endowed professorships and $10 million each for postdoctoral, graduate, and undergraduate fellowships. The remainder of the endowment goal is for unrestricted endowment and a venture fund to provide flexible funding for new projects. A total of $40 million is sought for capital projects. This includes $30 million for new buildings and $10 million for renovation of older buildings on campus.

A working goal of $125 million has been set for programs and current operations, most of that through unrestricted, restricted, and discretionary gifts to help defray the cost of running the Institute. Discretionary support is needed for start-up funds for new faculty, equipment for teaching and research, and matching funds for federal programs. And it is hoped that $10 million will be targeted for the new areas of study identified in the aims-and-needs study undertaken by the faculty.

The campaign will be announced at a Centennial dinner at the Regent Beverly Wilshire Hotel. Celebrating 100 years of achievement, the evening will also offer honored guests a preview of Caltech's second century. Walter Cronkite will be master of ceremonies, and Professors Harry Gray, Leroy Hood, Carver Mead, and Edward Stone will speak on their research and on trends for the future. Cochairs of the event are Keith Ann Kieschnick and Trustees William Kieschnick and Frank G. Wells. Also on the dinner committee are Kay Onderdonk, Nancy Petersen, Sheila Weisman, and Trustee Walter Weisman.

In its next issue, and biannually thereafter, *Caltech News* will feature a special insert to keep alumni and friends abreast of the progress of the campaign.

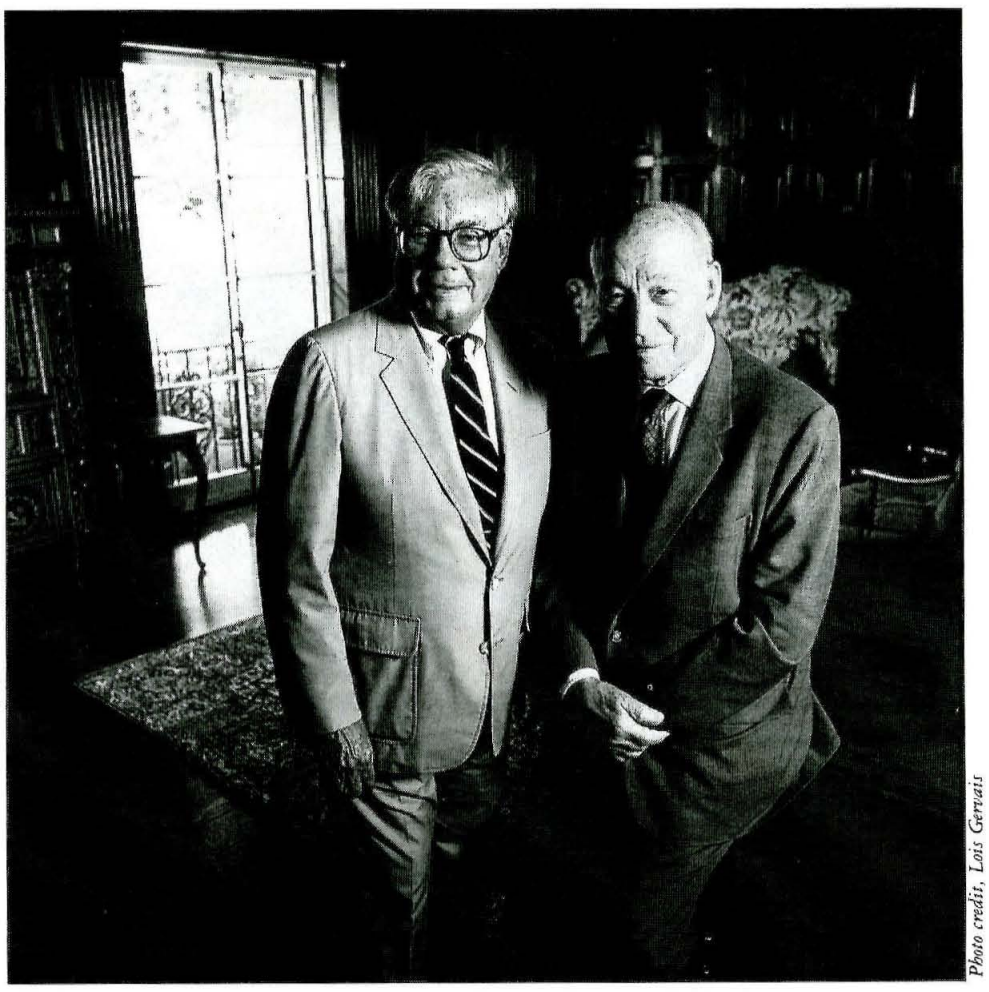


Photo credit, Lois Gervais

Chairman of the campaign James W. Glanville (MS '46, ENG '48) confers with Arnold O. Beckman (PhD '28), honorary chairman of the campaign.

Jim Glanville zeroes in on The Campaign for Caltech: A Second Century of Discovery

James W. Glanville received a master of science degree in chemical engineering from Caltech in 1946 and a professional degree in chemical engineering in 1948. After nearly 10 years as a petroleum engineer for Humble Oil, he moved into investment banking. During his long and successful career he has earned a reputation as an open and direct man and a clear and independent thinker. He has served on the Caltech Board of Trustees since 1970 and now puts his talents to work as chairman of The Campaign for Caltech.

"Jim Glanville is a hard guy to say 'no' to."

That's the word from his longtime friend Jack Roberts, Institute Professor of Chemistry, Emeritus. "As an investment banker, Jim has worked with corporations all over the world," Roberts notes. "He is an engineer himself and knows how important advancements in science and engineering are to the world. He doesn't beat around the bush, but is direct and goes about achieving his objectives in a very reasonable, convincing fashion. I can't think of a better person to head this campaign."

The Campaign for Caltech: A Second Century of Discovery leaves its silent phase and goes public at a gala dinner at the Regent Beverly Wilshire Hotel March 11. The campaign objective: To raise sufficient endowment, capital gifts and operating funds by 1993 to assure Caltech's preeminent position in science and engineering education and research during the 1990s and into the next century.

Joining Glanville at the helm of the campaign is alumnus Arnold Beckman, chairman emeritus of the Caltech Board of Trustees, who will act as honorary chairman. "I am delighted and honored to serve with Dr. Beckman," Glanville says. "Arnold was chairman of the Board when I became a trustee in 1970. He is a dear friend, a marvelous gentleman and a great leader, who has contributed generously to the school financially, professionally, and personally. I couldn't be more pleased to have him on board."

Jim Glanville himself has been associated with Caltech since 1946, when he entered the Institute's first post-World War II master's class in chemical engineering.

Glanville received a superb education at Caltech, but he claims one of the most enduring lessons he learned was humility. The gravelly voiced Texan has a lot of empathy for incoming Caltech students, who, perhaps for the first time in their lives, must test their mettle against others of equal or greater talents.

Glanville grew up in an academic community. His father was chairman of the history department at Southern Methodist University, so he always assumed that graduate school was in his future. After earning a BS in chemical engineering from Rice University, he moved west.

"I came to Caltech because of its great reputation," he says, "and because the chemical engineering department was working on subjects in which I had a strong interest. But it was very tough that first year being surrounded by faculty, staff, and students of such incredibly high caliber."

Strong emphasis was placed on independent study and research, he recalls. "The exams were structured so you couldn't get by with simple memorization and regurgitation. There were no multiple-choice tests. You really had to think and not only know engineering principles, but also be able to apply them to some very challenging problems."

With the friendship and help of faculty and classmates, especially classmates who had done their undergraduate work at Caltech, he rose to the academic challenge and left the Institute two years later with lasting friendships, a well-respected engineering degree, and something else that has served him well in every aspect of his life—the ability to think and solve problems logically.

After graduating in 1948, Glanville returned home to Texas, where he joined Exxon, USA, then known as Humble Oil. He was advancing through the ranks as a petroleum engineer when in 1959, Lehman Brothers, the New York investment banking firm, hired him to help put together deals with oil and gas companies.

It soon became apparent that Glanville had the essential attributes of a good investment banker—a head for mathematics, the ability to listen, and an idea of what would work and what wouldn't.

The Sept. 25, 1978, issue of *Fortune* magazine carried an article just weeks after Glanville moved from Lehman Brothers to his present firm, Lazard Freres, New York. The article quoted the head of one of Wall Street's most successful firms, who said: "If we were to pick the person at Lehman whose integrity, ability, and intelligence we prize the most, and the man we enjoy working with the most, it is Jim Glanville."

One of the secrets to Glanville's success is his enormous enthusiasm for his work, an enthusiasm that is just as evident in his volunteer endeavors. He has been an active trustee at Caltech for more than 20 years and has served on the Investment Committee since 1971, chairing it from 1986 to the present. He also serves on the JPL Committee, the Nomination Committee and the Executive Committee. In addition to his contributions as a Caltech trustee, Glanville serves on the boards of JPL, Rice University, the Houston Museum of Fine Arts, and the Houston Museum of Natural History, as well as on several corporate boards.

"Our involvement with the Caltech Board of Trustees has been a remarkably happy experience, both for me and my wife, Nancy," he says. "We've had wonderful relationships with faculty and have traveled widely with Caltech groups. Nancy and I and three of our four sons have been down the Grand Canyon with Caltech geologists, and in the early 1970s, Nancy and I joined a group of trustees and faculty who visited the Soviet Union as guests of the Soviet Academy of Sciences. The relationships and the intellectual stimulation that come from our involvement are their own rewards."

So why take on the additional responsibility of a major fund-raising campaign after so many years of service?

"For Caltech to have the funds it needs to remain at the leading edge is extremely important to the advancement of science throughout the world," Glanville says. "Caltech is a crown jewel. When you look at the new knowledge the Institute has generated, the scientific instruments our people have developed, and the brilliant students and leaders we have educated, there can be no question that money given to Caltech is well spent in ways that return enormous benefits to society. And that makes it easy to ask for money. I am 100 percent behind the cause and, fortunately, at this point in my life, have time to devote to the Institute and this campaign."

"The success of the campaign," Glanville says, "will take the cooperation of every individual in the Caltech family—trustees, faculty, staff, students, alumni, and friends. I'm hoping for 100 percent participation," he adds. "We will be asking everyone to be as generous as possible within their own means, but we also want them to think about who they might talk to or what they might do to move us closer to our working goal."

Glanville is optimistic as the campaign moves into its public phase. "We have clear goals, strong commitment from the Board of Trustees, excellent leadership from the Caltech administration, and a cadre of loyal alumni and friends who would like nothing better than to see the bright students of today and tomorrow benefit from a Caltech education. The need for a place like Caltech has never been greater. It deserves our support."

Bulking Up the Athletic Center

More than 60 orange and white banners announcing Caltech's Centennial year now decorate the campus and nearby streets.

Ground is scheduled to be broken by November of this year for a new athletic center, thanks to a $4.7 million gift from the Carl F Braun Trust. The 42,000-square-foot facility, which is expected to be ready for use by the fall of 1992, will stretch west from the pool area to Wilson Avenue and north to the steam plant's cooling-tower buildings, and will incorporate the building now housing the women's locker room and the weight room. The outdoor basketball courts and the volleyball sandlot will be relocated, and the former Leakey Foundation building will be removed.

The new Braun Athletic Center will include two full-sized basketball courts, four racquetball courts, two squash courts, three locker rooms (men's, women's, and visiting team's), an equipment room for women's sports, a first-aid room, an aerobics room, a conference room, and an entry and lounge area. The second floor will house a weight room which, at some 4,600 square feet, will be larger than most houses. The athletic department's administrative offices will move to the new building's second floor, as will some of the coaches' offices.

Caltech students and athletic department staff have talked about expanding the gym for decades, and the matter was thoroughly aired at the 1986 Student–Faculty Conference. The idea gained momentum, and, in the fall of 1989, when Dan Bridges became athletic director, and Professor of Mathematics Gary Lorden and Jeanne Noda were appointed to head student affairs, the notion was given President Everhart's blessing and priority status. Bridges, Lorden, Noda, and Professor of Aeronautics Brad Sturtevant, chairman of the athletics facilities committee, set up a planning group that solicited suggestions campuswide and from other institutions. These ideas were distilled into a set of sketches, on which the architectural firm O. K. Earl based its design. In mid-November 1990, the Braun Trust, whose gifts to Caltech include the existing women's locker room and the weight room, agreed to fund the new project.

Students, administrators, faculty, and staff are elated by the news. According to recent estimates, Bridges says, 90 percent of the students, 40 percent of the faculty, and 30 percent of the staff use Caltech's athletic facilities on a regular basis, a high proportion compared with similar institutions.

Says Bridges, "The new facility will allow a tremendous expansion of our recreational and instructional offerings. We now offer 13 indoor instructional courses per term, but student interest is sufficient to fill about 25 classes, including several that we don't currently offer, such as judo, jazz and ballet dancing, squash, and racquetball. We'll also be able to expand the GSC basketball and volleyball leagues into year-round programs, instead of just one season each." But even with twice the number of classes in progress and with GSC games scheduled all year, open-court time will nearly triple. At present, the gym is only available about 14 hours per week for "open recreational play"—pickup basketball games, impromptu indoor volleyball, or just shooting some solitary hoops. The additional courts should permit 36 hours a week or more of open gym time.

The weight room will be the jewel of the new facility, says Bridges. Weight training has become increasingly popular with nonathletes as part of a general fitness program, as an exit poll at any health club will show. But the current weight room isn't big enough for the serious athletes on training regimens, let alone the lunch-break and after-hours workout crowds. Nor is the windowless, stuffy room especially inviting. The new weight room, which will occupy most of the second floor, will be a spacious, open room with a panoramic view of the mountains—smog permitting, of course—as well as to the east and south. The room will have a combination of free weights and machines, chosen with the needs of both the jock and the casual user in mind. Coach Wendell Jack, who is designing the room's layout, has consulted several nationally known strength and conditioning coaches, including USC's Robb Rogers. "I've learned quite a bit from them besides how many and what kind of machines to get," says Jack. "How to plan the traffic flow, for example, what floor coverings are best, even how many drinking fountains we'll need." Separated from the weight room by a glass wall, a broad balcony overlooking the gym will hold two rows of stationary bicycles and stair-climbing machines.

The Braun Athletic Center's exterior bears a remarkable—and hardly coincidental—resemblance to the Beckman Institute, Caltech's most recently completed building. Both structures were designed with the express intention of harmonizing with the arcaded stucco facades of the old campus.

The old campus's arcades provide a setting for social interactions—a place to hang out, to meet people, to relax for a bit before getting back to work. The new Athletic Center will do the same, according to Bridges. "The building was designed with the human factor in mind. It's a very open plan, with skylights and trees in the lobby, and two open stairwells leading upstairs to a balcony reception area outside the offices. From the balcony, you can look down into the gym, or over into the weight room, or out the windows at the mountains or the pools. I hope the Athletic Center becomes a center for the whole Caltech community—a place where people can socialize while waiting for a class or a court, or after a workout—where faculty, students, and staff can get to know one another better. Wearing sweats is a great equalizer."

FRIENDS

Weisman Postdoctoral Fellowship established in humanities

The Campaign for Caltech has received a $250,000 gift from Board of Trustees member Walter Weisman and his wife, Sheila Weisman, to support postdoctoral research in the Institute's humanities program. This gift augments a $250,000 contribution the Weismans made two years ago in response to Caltech's Mellon Challenge, and the combined $500,000 will be used to permanently endow a Weisman Fellowship for postdoctoral study in the humanities.

"The Weisman Postdoctoral Fellowship is a wonderful addition to Caltech's humanities program," said President Everhart. "The Weismans' generous support will make it possible to attract outstanding young scholars to the division and to broaden Caltech's scope of study in the humanities."

"Both Sheila and I greatly enjoy our involvement with Caltech and have been extraordinarily impressed by the commitment to excellence in all aspects of its academic life," said Weisman in making the gift.

Weisman, who was elected to Caltech's Board of Trustees in 1988, received his undergraduate and graduate degrees from Stanford University. He is a past chairman and CEO of American Medical International. Sheila Weisman received her undergraduate degree from UCLA and for the past ten years has been a docent at the Los Angeles County Museum of Art.

Weisman is a member of the Caltech Board's budget and capital expenditures committee, and he and Mrs. Weisman also serve on the committee planning next month's "A Second Century of Discovery" dinner.

In addition to his service on the Caltech board, Weisman is a trustee of the Los Angeles County Museum of Art, the Sundance Institute, and the Committee for Economic Development. Sheila Weisman is a trustee of the Los Angeles Children's Museum, the LA County High School of the Arts, the American Council for the Arts, and Community Counseling Services, and a past cochair of the LA Music Center Children's Festival.

Annual fund honors top workers

The Annual Fund this spring honored the volunteers who achieved top performance in several categories through December 31. Honored for achieving the highest donor participation rate for a Regional Chair outside California, for the third year in a row, was Raymond Cromley (BS '33), Region 11, with 79.7 percent. Honored for the highest rate achieved by a Regional Chair inside California was David Ritchie (BS '80), Region 1, 44 percent.

William M. Hardam (PhD '65), Area 525 (Delaware), and James McDonald (BS '67), Area 515 (Northeast VA), were recognized as the Area Chairs outside California achieving the highest donor participation rates, with 82.5 percent and 83.3 percent, respectively. Don Stewart (BS '47), Area 100 (Pomona/Claremont) was honored as the Area Chair inside California with the highest participation (72 percent).

Volunteers outside California honored for the participation rate they achieved among the alumni assigned to them were: John J. Deniston (BS '47), George A. Hufford (BS '46), Charles W. Baugh, Jr. (MS '47), Keats A. Pullen (BS '39), Jerrold Fried (BS '58), Victor Gilinsky (PhD '61), Lance M. Optican (BS '72), James I. Vette (PhD '58), Fremont E. Reichwein (BS '46), Kenneth E. Lohman (BS '29, MS '31), Harry A. Griffith (MS '55), Frank L. Bernstein (BS '80), Robert H. Korkegi (MS '50, PhD '54), Robert D. Christian (BS '55), David M. Mog (PhD '70), John R. Rempel (BS '44), James M. McDonald, Brian C. Belanger (BS '63), David J. Osias (BS '62), David L. Randall (MS '65, PhD '70), Robert L. Rosenfeld (PhD '62), Robert J. Huskey (PhD '68), Vatche Vorperian (PhD '84), Kenyon T. Bush (BS '36), S. Joseph Poon (BS '74, PhD '78), Terry N. Rahmeier (MS '65), Richard H. Brandwein (MS '85), Edward A. Schroeder IV (BS '70), Charles W. Pearson (BS '42), John W. Jones (BS '41), and Alfred B. Brown, Jr. (MS '47, PhD '50), all with 100 percent.

Volunteers inside California honored for their participation rate included: David M. Sherwood (BS '38, MS '39), Robert W. Taylor (BS '45), Richard C. Neville (BS '58, MS '59, PhD '71), Mike Stefanko (BS '70), and Bruce R. Walker (MS '56), all of whom also achieved 100 percent.

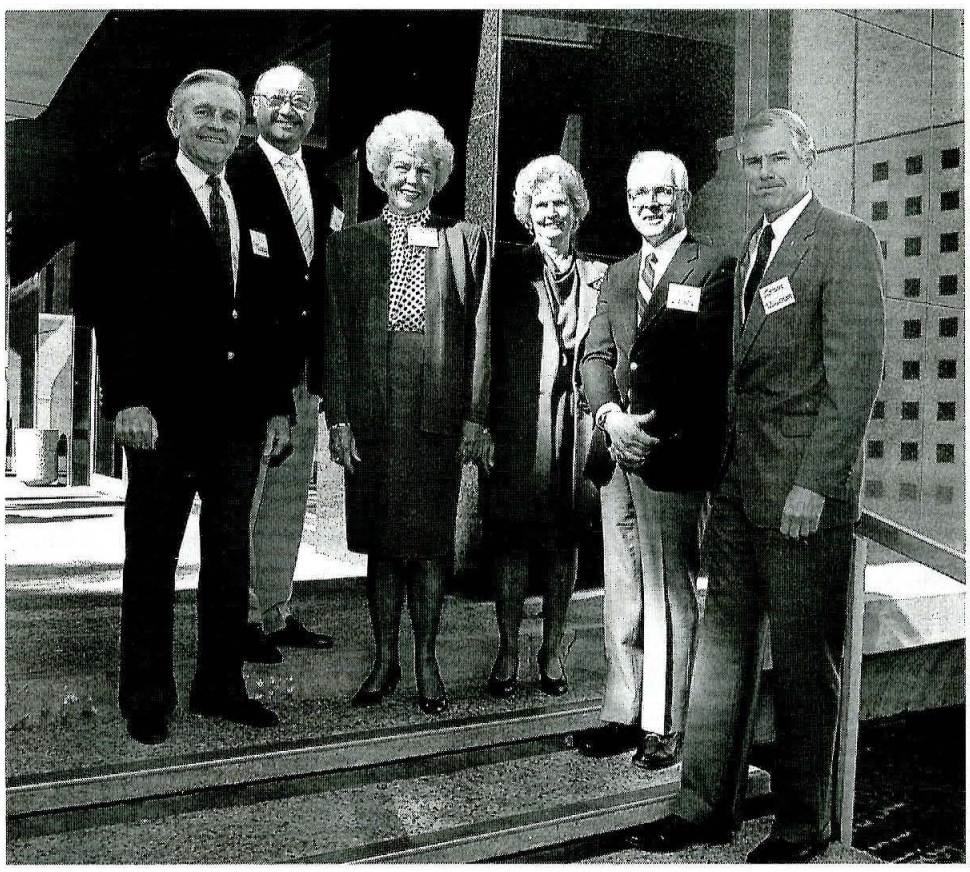
Honored as the Regional Chair outside California achieving the highest percentage of his dollar goal was Raymond Cromley (BS '33), Region 11, 97 percent. The Regional Chair inside California achieving the highest percentage of his dollar goal was David Ritchie (BS '80), Region 1, 146 percent.

James McDonald (BS '67) of Area 515 (Northeast VA) achieved the highest dollar goal percentage outside California, with 166.7 percent. Daniel Deutsch (BS '48, PhD '51), Area 045 (La Canada/Crescenta) achieved the highest dollar goal inside California, with 687.4 percent.

Area Chairmen receiving accolades for the highest ratios of volunteers to prospects were William Hardam (PhD '65), Area 525 (Delaware), with a ratio of 1:3.4, William Harkins (ENG '54) and Frank Ridolphi (BS '62, MS '63), Area 510 (Northwest VA), 1:3.7, Ronald W. Gatterdam (BS '61), Area 352 (Alaska), 1:3.5, and Ralph G. Baca (BS '80), Area 320 (Phoenix), at 1:3.9. The area chairman with the highest number of traditional nongivers who made contributions by December 31 was Brian Storrie (PhD '73), Area 520 (Southern/West VA).

In the Young Alumni campaign, the highest donor participation rate achieved by a House Chair was 16.3 percent by Mark Vagins (BS '87) of Ruddock. The highest by a Class Chair was 62.5 percent for Daniela Bonafede-Chhabra (BS '84), of Ricketts. The highest percentages of dollar goal attained for a House Chair and Class Chair were, in that order, 269.8 percent by John Sahr (BS '84), of Fleming, and 723.8 percent by Art Fortini (BS '83), of Blacker.

New members of the board of directors of The Associates include, from left, Boyd T. Marshall (BS '42, MS '43), John Wong, MD, Helen Lindhurst, Doris Pankow (incoming president), Carl V. Larson (BS '52), and Norman Williamson. Absent is William Carter. They will serve three-year terms.



Gifts by will

Trusts and bequests provide welcome support to Caltech's operating and endowed funds. Recent gifts received by the Institute include:

Ellsworth Lloyd Marsh:
Upon his death, $1,892,645 was distributed to Caltech from his living trust for the Division of Engineering and Applied Science. Marsh was an electrical engineer, whose attachment to Caltech was his great respect and admiration for the Institute.

Otto Sass:
A bequest of the residue of his estate in the amount of $533,454 has been distributed to Caltech to be used for its general purposes. Sass was a friend of the Institute.

William Ferdinand Eberz:
$199,312 was distributed to the Institute from Eberz's estate to be used for its general purposes. Eberz received his BS in civil engineering from Caltech in 1931 and his PhD in chemistry in 1934.

Frederick George Thearle:
The Institute has received for its general purposes the sum of $35,539 from Thearle's estate. He received his BS in mechanical engineering from Caltech in 1927.

For information about wording for bequests to the Institute, call the Office of Gift and Estate Planning (818) 356-2927.

Members of The President's Circle enjoy the ruins of Carthage, Tunis, on a trip led by Professor of Geology Kerry Sieh and director Nancy York, seated front row. Enjoying the sights and sporting CIT sweatshirts sent by President Everhart are, back row, Del Noland, Jean Smith, Bob Noland (BS '41), Patsy Wright, Gene Vincenti, Bill Wright (BS '51, PhD '55), Sharon Black, and George Smith (BS '44, MS '48, PhD '52).

Hugh Colvin issues Centennial challenge

It's often said that a contribution to one's alma mater yields double or triple the original value in terms of its lasting impact. Certainly, alumnus Hugh Colvin (BS '36) thinks so. He's issued this $3 million Centennial Challenge to his fellow alumni: Make a new gift to the Institute, or increase the amount of your usual gift, and he will match the increased portion of your contribution at a *two-to-one* ratio. And if you received your BS within the last nine years, your gift will be matched at a *three-to-one* ratio. The overall aim is to enhance alumni participation in The Campaign for Caltech, and to encourage contributions of unrestricted funds to the Institute. The Challenge will run through the end of 1993.

Colvin, who served as president of The Caltech Associates in 1988–1989, has made a number of gifts to the Institute. Among others, in 1988 he provided seed money of $50,000 to establish five SURF (Summer Undergraduate Research Fellowship) endowments named for distinguished members of the faculty. A member of SURF's board of directors since 1984, Colvin previously served on the board of directors of the Alumni Association and was editor of *Engineering & Science* magazine in the 1940s. Last year he received Caltech's Distinguished Alumnus Award.

Faculty, alumni, staff, reap honors and awards

Don Anderson, McMillan Professor of Geophysics and director of the seismo lab from 1967 to 1989, has been selected the 1991 recipient of the Bowie Medal, the highest honor of the American Geophysical Union, in recognition of his "accomplishments over a distinguished career in geophysics." The medal will be presented to him at the AGU meeting in Baltimore this May.

Seymour Benzer, Boswell Professor of Neuroscience, has been awarded the 1991 Wolf Prize by the Israel-based Wolf Foundation in recognition of his fundamental research into the genetic bases of behavior and neurophysiology. The $100,000 prize, one of the most prestigious—and lucrative—awards in international science, was presented to Benzer for "having generated a new field of molecular neurogenetics by his pioneering research on the dissection of the nervous system and the behavior of gene mutations." Benzer will receive the award at a ceremony in Jerusalem this spring. The Wolf Foundation was established in 1975 by the late Dr. Ricardo Wolf to "promote science and art for the benefit of mankind."

Caltech's *Audio Visual Services*, headed by Guy Colville, has received an Honorable Mention in the educational institutions category of the 1990 Visual Communicators Department of the Year Competition. The national contest is sponsored by the Association of Visual Communicators to judge the quality of visual materials prepared by various corporate and educational institutions. AV's Jesse Santillan accepted the honor—a plaque and citation—on behalf of the department at an award ceremony last November.

Mark Konishi, Bing Professor of Behavioral Biology, has been awarded Japan's 1990 International Award for Biology, established in memory of the late emperor of Japan because of his special interest in biology. Konishi received the award from the present emperor, Akihito, at a ceremony in Tokyo last November.

Shrinivas Kulkarni, associate professor of astronomy, has received the 1991 Helen B. Warner Prize for Astronomy from the American Astronomical Society (AAS) in recognition of his work on millisecond pulsars and on developments in the theory of optical and radio interferometry. The prize, a certificate and $1500, is presented annually for a "significant contribution to astronomy" by an astronomer under the age of 36.

Ken Libbrecht, associate professor of astrophysics, has been awarded the 1991 Newton Lacy Pierce Prize in Astronomy—a certificate and $1500—presented each year by the AAS for "an outstanding achievement in astronomy" by an astronomer under age 36. The honor went to Libbrecht for his research on helioseismology—"observations of the sun [that] have provided essential new insights into its internal properties."

Rudy Marcus, Noyes Professor of Chemistry, has been selected to receive the 1990 William Lloyd Evans Award from Ohio State University. He is the second Caltech faculty member to receive this honor; the first was Linus Pauling.

Allan Sandage, staff astronomer with the Observatories of the Carnegie Institution of Washington, and a longtime Caltech collaborator, has been awarded the 1991 Crafoord Prize in Astronomy, presented by the Royal Swedish Academy of Sciences, in recognition of his fundamental contributions to "extragalactic astronomy, including observational cosmology." The Crafoord prizes were established in 1982 by the Royal Swedish Academy to honor outstanding scientific contributions in fields not recognized by the Nobel Prizes—mathematics, astronomy, the geosciences, and the biosciences—on a rotating basis. Sandage, who will receive the $260,000 prize at a ceremony in Stockholm this September, earned his Caltech PhD in 1953 and carried out much of his research at Caltech's Palomar and Carnegie's Mt. Wilson observatories, jointly operated by the two institutions until 1981.

Wallace L. W. Sargent, Bowen Professor of Astronomy, has received the 1991 Dannie Heineman Prize for Astrophysics—a certificate and $10,000—in recognition of his pioneering research into the properties and composition of galaxies and the intergalactic medium. The prize is presented annually by the AAS and the American Institute of Physics to "recognize outstanding work in the field of astrophysics."

Mel Simon, Biaggini Professor of Biological Sciences, has received the Selman A. Wakesman Award in Microbiology, administered by the National Academy of Sciences.

A mathematical match

By Laura Marcus

Two prominent mathematicians arrived at Caltech together in 1957. Jack (John) Todd came as a full professor; Olga Taussky Todd came as a research associate. In 1971, she became the first woman to achieve the rank of full professor at Caltech. Now, both are officially emeriti, and both continue to work on various aspects of mathematics.

The Todds first met in London—predictably at a math seminar—and were married a few months later on the September day that Britain's Prime Minister Neville Chamberlain returned from Munich with his "peace in our time" pact. Instead of taking a honeymoon, the Todds decided to help dig trenches in suburban London—just in case the peace did not hold.

At the time, Olga was teaching at Westfield, an undergraduate women's college within the University of London, located in the suburb of Hampstead. Jack was teaching at King's College in London. After World War II broke out, they both entered wartime government service. Olga joined an aerodynamics research group in the Ministry of Aircraft Production, while Jack did mathematical analyses for the Admiralty.

Living in England through the war years, the Todds had to move 18 times. On air-raid nights they tried to sleep on a mattress under a table. They quickly learned never to sit up in that bed, and, because of the table legs, to turn over very cautiously.

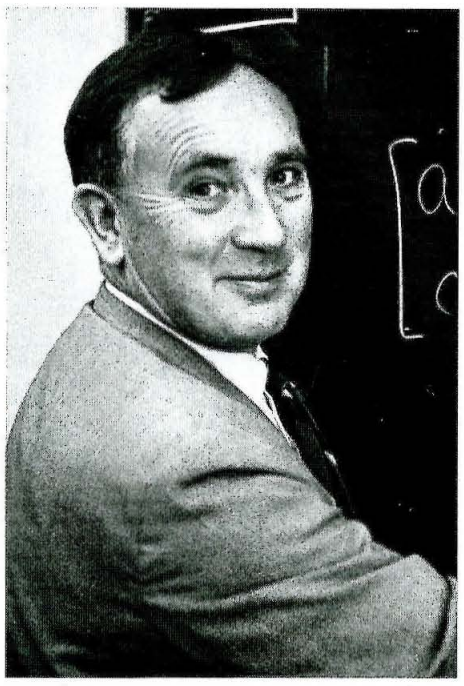
Two years after the war ended, they came to America to work at the National Bureau of Standards' field station, the Institute for Numerical Analysis, at UCLA. The purpose of the Institute was to develop uses of large-scale computers which were then under construction.

During their one-year stay in California, Olga wrote half a dozen theoretical papers and lectured at several universities. Her topics often combined her original specialty, number theory, and matrix theory, which was also becoming vital in computer applications.

Although the Todds returned to England at the end of the year, it was only for a short time. Jack was invited back to the National Bureau of Standards' headquarters in Washington, D.C., to head the Computation Lab, and then became the Chief of the Numerical Analysis Section. Olga served as a staff consultant. During their ten years at the Bureau, they became recognized experts in the new field of high-speed computer programming and analysis.

In 1956, a letter came from Caltech, inviting them to explore the possibility

Jack Todd when he first came to Caltech.



of joining the staff—Jack as professor of mathematics, and Olga—according to the letter—"in a research position of equal academic rank, called here [at Caltech] a Research Associate appointment."

"We were very proud to be invited to Caltech," Olga said recently. "Since this was largely a men's school, I did not expect to be appointed to the faculty. But I had left a tenured position at the National Bureau of Standards, and I did want tenure in my new position. Six years later, in 1963, Caltech gave me tenure. I was happiest, though, when (in 1971) my appointment was changed from research associate to full professor."

In addition to being the first woman named to full professor, Olga was the first woman to teach at Caltech under a formal appointment. "Both of us enjoy teaching, and while I was not required to teach [as a research associate], I did," Olga says. "During my years here, I taught every year until I had to retire.

"I do hate that word, retire. I don't believe in retiring—I believe in working. Of my 14 PhD students, two were women—one is now on the faculty of Swarthmore, and the other is at Cal State, Northridge."

Olga Taussky, the second of three daughters, was born August 30, 1906, in a town that was then part of the Austro-Hungarian empire. (It is now in Czechoslovakia.) Her mother, she says, was a good homemaker who required her girls to help with the housework. "I don't mind washing dishes, but I have never liked housework," she maintains.

"My father was an industrial chemist, and after my older sister graduated from the University of Vienna, she also became a chemist. I began with a major in chemistry, but changed to mathematics."

Olga decided to specialize in number theory, and in 1930 she received her PhD from the University of Vienna. A lecture she gave at a meeting shortly after graduation helped her land a prestigious assignment at the University of Göttingen—the opportunity to coedit the volume on number theory of the collected papers of the celebrated mathematician David Hilbert.

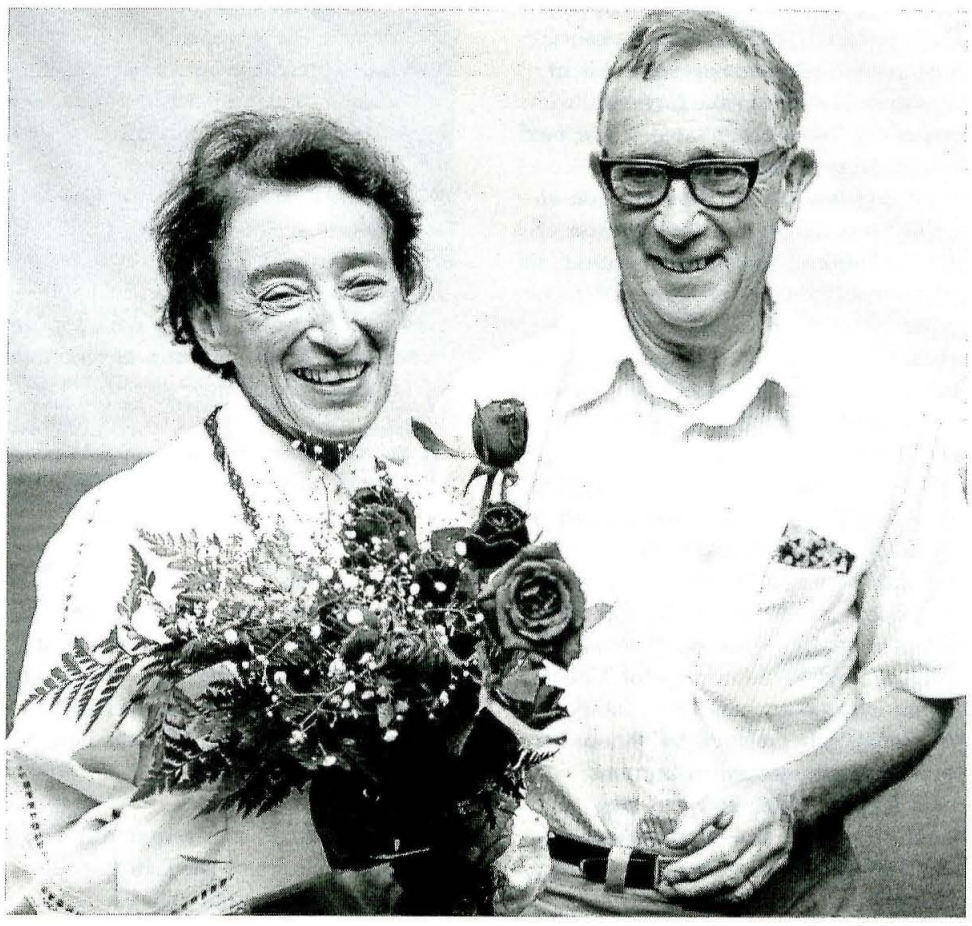
In 1934, after completing the Göttingen project, Olga Taussky was offered a three-year fellowship by Cambridge University's Girton College—the first college for women in England, founded in 1869. Since she had already accepted a one-year appointment at Pennsylvania's Bryn Mawr college, Girton allowed her to use some of the stipend for the year at Depression-stricken Bryn Mawr before continuing at Girton.

"It was difficult," Olga says. "My English was not very good. But I gave seminars, worked on my research, and had an opportunity to visit Princeton a number of times, where much work was being done." Her two ensuing years at Girton were spent on intensive research, as well as on improving her English and, finally, in finding a job.

"I did not think of getting married, though I must say I did have some offers. Then along came this crazy Irishman from Belfast."

A delightful portrait of Olga hangs in the Todds' living room. It was painted in 1939 when Olga was 33 and the artist was 82. "At the time, I thought she was incredibly old, and now look who's here!" Olga exclaims.

The Todds at a symposium honoring Olga in 1976.



This soft-spoken lady who today looks so fragile, works in her large, corner office on the campus, still pursuing her primary interest—number theory. A poem Olga once wrote for *Against Infinity: An Anthology of Contemporary Mathematical Poetry*, began with these lines:

"Number theory seems greater
than what comes later
in the strict athletics
of mathematics . . . ."

That piquant sense of humor is evident in her conversation as well as in her poetry. She likes to remember when she and Caltech biologist Max Delbrück used to vie with each other in their poetic efforts. She is pleased that one of her poems was translated from the original German into English, Bulgarian, and Japanese.

Olga Taussky Todd's saga spans several eras. For example, when, as she

Portrait of the Todds, by Sylvia Posner, 1986. Acrylic on canvas, 36" × 30".

Olga and Jack Todd

puts it, "women's lib" started in earnest, she began receiving a number of invitations to visit college campuses to give endowed lectures and to talk with students. "The women said they had always had well-known male mathematicians come to speak, and they wanted to hear a woman."

Her work had long been well known in the literature of her fields, of course. She has written more than 200 scientific papers, and has been included in a number of journal articles and books written about famous mathematicians. Two recent examples are *Women of Mathematics* (published in 1987) and *Mathematical People* (1985). The latter includes an autobiographical essay she wrote for the Caltech Archives' oral history project. A symposium held in her honor at Caltech in 1976 brought mathematicians from across the country, with a resulting volume of *Linear Algebra and Its Applications* dedicated to her. In addition to being a founding editor of that journal, she is an editor of the *Journal of Number Theory*, also *Linear and Multilinear Algebra*, and *Advances in Mathematics*.

In 1964, the *Los Angeles Times* named Olga Taussky Todd "Woman of the Year." From 1964 to 1972, she served on the Los Angeles Mayor's Committee on Space, and USC awarded her an honorary doctorate in 1988, which she greatly prizes, as she does the Golden Doctorate that her alma mater, the University of Vienna, awarded her in 1980 in recognition of her achievements in research and in teaching. Other tributes include the Golden Cross of Honor First Class of the Austrian Republic, and a corresponding membership in the Austrian Academy of Sciences, as well as election to the Bavarian Academy of Sciences in 1985. In 1986-87 she served as a vice president of the American Mathematical Society, following six years on its council.

In their almost 52 years of marriage, Olga and Jack Todd have attended many scientific meetings together, have had many mathematical discourses together, and have steadfastly supported each other in the pursuit of their careers. "My life and my career would have been so different if my Irishman had not come along," Olga says with a contented smile.

Jack Todd was born in Carnacally, Ireland, in 1911, the oldest of five children, whose parents were elementary school teachers. At the age of 11, he received a scholarship for secondary school, then attended Queen's University in Belfast for a BS degree, followed by two years of graduate work at Cambridge University. He returned to Queen's in 1933 to teach for four years before joining the faculty of King's College, University of London, and his subsequent acquaintance with Olga Taussky.

Jack earned the money for Olga's engagement ring teaching spherical trigonometry and aerial navigation to men from Siam and Turkey who were sent to the RAF for training before World War II. Scientists from the U.S., Britain, and other countries also gathered in England to work together to provide statistical analyses useful in military planning. Organizing an aspect of that joint effort in the Admiralty was one of Jack Todd's main concerns in those days.

It took even more fortitude and ingenuity for an official mission that Jack and several other mathematicians (plus cosmologist Fred Hoyle) were sent on soon after the war ended. Their assignment was to find out what had been done in mathematics in Germany during the war. Traveling through the country, they had as one of their targets the new Mathematical Research Institute at Oberwolfach in the Black Forest. Upon arriving there, they found it necessary to protect the Institute from French Moroccan troops until the local military government was operational. Their experiences and the success of the mission are recorded in a lively account Jack has written. The work done by the German mathematicians was also published, subsequently, in an official seven-volume report.

Jack Todd has contributed many journal articles in his field of numerical mathematics. A 1955 article, "Motivation for Working in Numerical Analysis" was particularly influential and was translated into German and Russian.

A founding editor of *Numerische Mathematik*, and an editor of *Aequationes Mathematicae*, as well as of the *Journal of Approximation Theory*, Jack has edited and/or written books on numerical mathematics and books of tables. He and Olga each wrote chapters for the notable *Handbook of Physics*.

How Joseph McCarthy and Epsom Salts Affected Numerical Analysis is the informal title of a book Jack Todd and Professor Magnus Hestenes, of UCLA, are now completing. "It is a history of the National Bureau of Standards' Institute for Numerical Analysis at UCLA during the years from 1947 to 1954," Jack states.

As a section chief at the Bureau during the McCarthy years, Jack was called before investigative committees in Washington to testify to the loyalty of people in his section. "It was a chilling experience," he remembers. "This ordeal occurred shortly before I became an American citizen. Our book deals with that period of political history. Caltech was a welcome change from that climate."

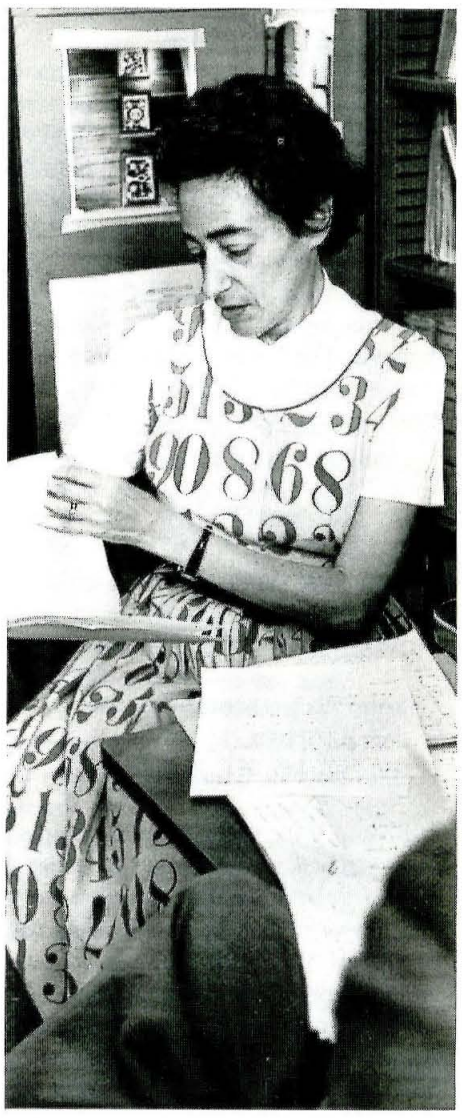
When the Todds came to Caltech, H. F. Bohnenblust was chairman of the mathematics department, and Robert Bacher was chairman of the division. "'Boni' and our other colleagues have always given us enthusiastic encouragement to develop our ideas," Jack says. "We have enjoyed our years at Caltech. The challenge of teaching modern numerical mathematics to bright undergraduates, graduate students, and postdocs at the Institute has been nothing short of fun."

In the classroom, at the cricket field, the tennis court, or the swimming pool, the Todds are at home on campus. As they express it, "Without question, our roots are at Caltech."

Their contributions to Caltech will be perpetuated by three charitable trusts that they have established with the Institute. The proceeds of these trusts will be used, the Todds say, "to consolidate, stimulate, and advance the study of mathematics."

Reprinted from On Campus

Olga in her number dress, circa 1960.



ALUMNI

New alumni board members nominated

Two committees have met during January and submitted nominations for officers of the Alumni Association board of directors, and for five board members and one chapter representative. The terms of office for directors and officers will begin at the close of the annual meeting in June 1991.

Nominations for officers were made by committee members Tway Andrews, Mike Boughton, Gary Stupian, Vic Veysey, and Rhonda MacDonald on January 16, in accordance with section 5.01 of the bylaws. The nominees are:

Officers
President: Gary W. Stupian (BS '61)
Vice president: Le Val Lund, Jr. (BS '47)
Treasurer: William M. Whitney (BS '51)
Secretary: Peter V. Mason (BS '51, MS '52, PhD '62)

The nomination proposal committee, composed of Mike Boughton, John Fee, Ray Morris, Carel Otte, Gary Stupian, Bill Whitney, and Rhonda MacDonald, in accordance with section 5.01 of the bylaws, met on January 16 to propose nominees for members of the board of directors. The following have been asked to serve three-year terms beginning in 1991:

Directors
Trudy L. Bergen (BS '74)
Robert C. Burket (BS '65)
Glen R. Cass (PhD '78)
Jeanine M. Gainey (BS '86)
David B. Ritchie (BS '80)

Chapter Representative 1991–92
Walter A. Specht, Jr. (BS '57, MS '61, PhD '65)

Section 5.01 of the bylaws provides that members of the Alumni Association may make additional nominations for directors or officers by a petition signed by at least 50 regular members in good standing, providing the petition is received by the secretary no later than April 15. In accordance with section 5.02 of the bylaws, if no additional nominations are received by April 15, the secretary casts the unanimous vote of all regular members of the association for the elections of the candidates nominated by the board. Otherwise, a letter ballot is required.

Anecdotes sought for Centennial timeline

Caltech undergraduates are looking for a few good stories to embroider an anecdotal timeline that is being put together by an undergraduate committee as part of the Institute's Centennial celebration. The timeline, which will trace the Caltech undergraduate experience of the last 20 years, will be unveiled amid speeches and rejoicing (that is, a student party) later this spring. If you are interested in sharing funny, serious, or enlightening anecdotes, vignettes, and recollections about house life, campus traditions, the admission of women, sports, academics, or any other topics, or if you might be interested in speaking to current undergrads on campus about your experiences here, please contact Larry Cheng at 1-55 Caltech, Pasadena, CA, 91126, for more information.

Frank Press, president of the National Academy of Sciences, will be the keynote speaker at Centennial Seminar Day, on Saturday, May 18. He will be speaking on "Global Warming: What To Do About It." Press, a faculty member from 1955 to 1965, was a professor of geophysics and the director of the Seismo Lab.

From the alumni president

By E. Micheal Boughton

On January 1, when Caltech officially kicked off its Centennial celebration with an entry in the Tournament of Roses Parade, your Alumni Association was represented. I had the tremendous honor of accompanying our float, "For Every Action . . . A Reaction," which took a humorous look at Newton's theory of relativity. Dressed as one of nine Caltech beavers, I found it truly remarkable to experience the parade from the "other side." Reactions from the crowd were exhilarating, particularly from the children who seemed fascinated by our antics as we marched down Colorado Boulevard. Some children would run up to shake hands, while others were more tentative. One youngster shouted, "There's a man in there, dad!" when he got close enough to see my eyes.

The goodwill of the crowd was evident along the entire parade route. "Hurray for Caltech" greeted us throughout the parade, and with particular enthusiasm as we passed the Caltech bleacher section.

Although an official prize was not to be ours, the Caltech float was a great crowd-pleaser. Many parade-goers prepared their own rating signs, holding them up as we passed. I am happy to say that we received all "9s" and "10s."

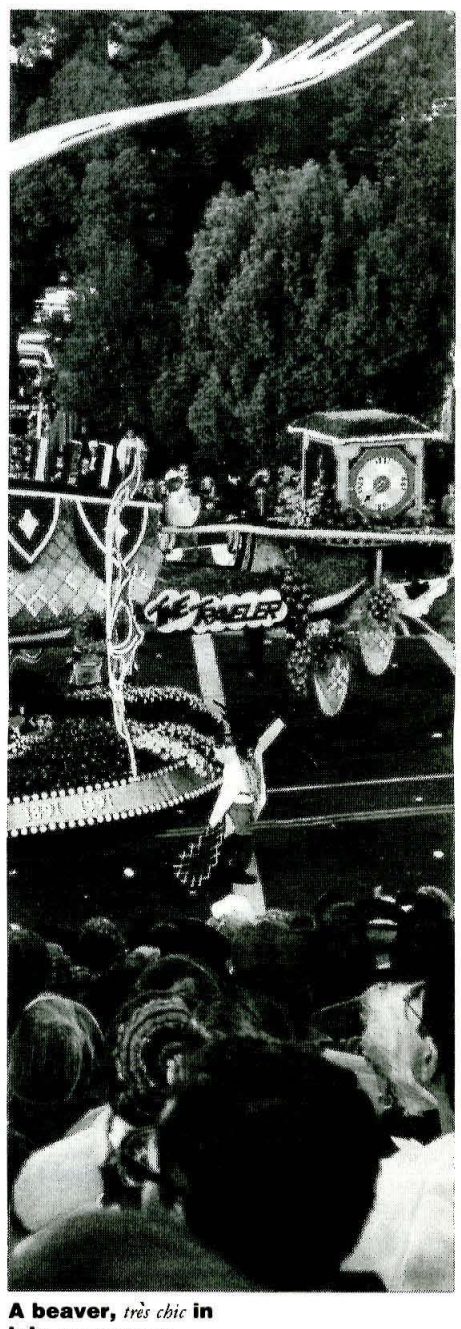
At one point a viewer's sign announced the halfway point. We turned the corner only to find that we had actually reached the end of the parade. With so much adrenalin flowing, I believe I could have easily walked it again!

Of course the parade was the culmination of many people working extremely hard. Much credit should go to the alumni, students, faculty, staff, and their families whose labors produced the Caltech parade entry. I was extremely impressed with their dedication and the effectiveness of their efforts. Our float was completed on time, with no panic to finish. All those who did the work and participated in the parade had a great time.

With such a Centennial kickoff, I couldn't be more proud. A year of diverse activities lie ahead, with many opportunities for alumni to become involved—and I hope you will do just that. *Caltech News* will keep you up-to-date on Centennial programs planned for the coming months.

I remind you to watch your mail for information on two of the year's special events; Centennial Seminar Day and All-Classes Reunion on May 18. That weekend will offer an opportunity not only to see classmates, but to renew acquaintances from other classes as well.

If you have questions regarding future alumni events, please contact us by mail or phone: Caltech Alumni Association, Mail Code 1-97, Pasadena, CA 91125, 818/356-6592.



A beaver, *très chic* in leis, scampers down the street next to Caltech's Rose Parade float, "For Every Action . . . A Reaction." Yes, it's alumni president Mike Boughton.

Alumni Activities

March 1, *Caltech Musical "Working,"* Ramo Auditorium, followed by dessert at the Alumni House.

March 6, *Orange County Chapter Event:* speaker, President Thomas E. Everhart.

March 9, *San Francisco Chapter Event:* the shake table at the Richmond Field Station, UC Berkeley, used to test a structure's resistance to earthquakes. For information call Alan Breakstone, (415) 926-3181 (day), or (408) 738-5934 (evening).

March 26, *Chicago Chapter Event:* speaker, Michael R. Hoffmann, professor of environmental chemistry.

April 6–7, *Camping trip to Joshua Tree National Monument:* led by Robert P. Sharp, Sharp Professor of Geology, Emeritus.

May 16, *Class of '41—50th Reunion Dinner,* the Athenaeum.

May 17, *Half Century Club Reception and Luncheon,* the Athenaeum.

May 17, *Class of '51—40th Reunion Dinner,* the Athenaeum.

May 17, *Alumni-Student Barbecue,* seating by House, Dabney Garden.

May 17, *Student House Receptions for Alumni.*

May 18, *Centennial Seminar Day,* various venues on campus.

May 18, *All-Classes Reunion Dinner,* seating by class, The Ritz-Carlton Huntington Hotel.

May 31, *Boston Chapter Event:* speaker, Kerry E. Sieh, professor of geology.

June 7–9, *White-water Rafting,* on the South Fork of the American River.

June 20, *Alumni Association Annual Meeting and Honorary Alumni Dinner,* the Athenaeum.

June 23–30, *Yellowstone Travel/Study Program,* led by Robert P. Sharp, Sharp Professor of Geology, Emeritus, and Leon T. Silver, Keck Foundation Professor for Resource Geology.

July 11, *Solar Eclipse Viewing,* Big Bear Solar Observatory.

September 27–30, *Owens Valley and Yosemite Travel/Study Program:* led by Le Val Lund (BS '47), civil engineer of water resources and earthquake engineering, and Suzanne Granger, associate curator, Los Angeles Arboreta and Botanic Gardens.

October 19–25, *Hawaii Travel/Study Program:* led by Robert P. Sharp, Sharp Professor of Geology, Emeritus.

For information, unless otherwise indicated, please contact: Arlana Bostrom, (818) 356-8363, chapter events; Patsy Gougeon, (818) 356-8366, reunions and Seminar Day; or Helen Shafran, (818) 356-8364, trips and local social programs.

The kinetic sculpture, Water Forms 1991, commissioned by Caltech in honor of its centennial was dedicated in Millikan Pond in the presence of many Caltech friends on January 25.

At the San Francisco Chapter meeting geographer Ned Munger and Peter Tong (MS '81, PhD '85) study a map of South Africa.

Professor Tom Apostol, Warren (BS '50) and Eloise Whiting, and Kay Lynn and Allen (PhD '84) Robinson chat after Apostol's talk to the New Mexico Chapter on "Project MATHEMATICS!"

Chapters busy as beavers

Nine of the Association's twelve chapters have had meetings and lectures in recent months:

Tri-State Chapter—Alumnus Andrew Odlyzko (BS, MS '71) spoke to the chapter on December 4, 1990, on "Factoring Integers for Fun and Publicity." Odlyzko, head of communications and computer systems at AT&T, gained some notoriety in 1985 when he solved a famous number theory problem—the Mertens Conjecture—and hence the title of his talk.

Boston Chapter—High-tech sleuthing was the topic of a talk presented by Glen R. Cass, professor of environmental and mechanical engineering. Cass, on sabbatical at MIT from his Caltech post, discussed his research on the types and movements of airborne pollutants that damage collections in museums.

Portland Chapter—Seismologist Clarence R. Allen described his field work in Tibet to members of the chapter. Allen, who carried out field studies with Chinese scientists in areas previously closed to foreigners, believes that the work has applications in earthquake-hazard assessments of the San Andreas.

Seattle Chapter—More than 50 alumni and their guests, from every decade from the 30s through the 80s, enthusiastically received Clarence Allen's talk on Tibet entitled, "Chasing Earthquakes and Faults in Tibet." In addition to seismology, Allen, professor of geology and geophysics, emeritus, offered descriptions of the unique culture, history, and architecture of Tibet.

New Mexico Chapter—"Mr. Pythagoras Goes to Hollywood" was the title of a talk presented by Tom Apostol, professor of mathematics and director of *Project MATHEMATICS!* Apostol explained how visualization, moving images, and special effects are combined to produce computer-animated lessons on basic subjects in mathematics. He quizzed alumni on some of these subjects and awarded videotapes to the winners.

Phoenix Chapter—Joseph L. Kirschvink (BS, MS '75), associate professor of geobiology, returned to his hometown and gave a talk to the chapter entitled "Geomagnetic Sensitivity in Animals." Kirschvink has found that many birds, mammals, fish, bacteria, and other organisms have small deposits of magnetic material in their bodies which may be the key to the ability of some species to migrate over long distances.

San Diego Chapter—Chip Smith (BS '70), an editor for *Legends* and *More Legends of Caltech,* gave a slide presentation to the chapter on pranks at Caltech. More than 50 people attended.

San Francisco Chapter—At a gathering in Palo Alto, members heard Professor of Geography, Emeritus, Ned Munger speak on "The New South Africa: Prospects and Problems." Munger, a member of the Caltech faculty for 30 years, has made more than 70 trips to Africa.

Colorado Chapter—Barclay Kamb, Rawn Professor of Geology and Geophysics, gave a lecture entitled "Disintegration Mechanism for the Antarctic Ice Sheet," on how the greenhouse effect is affecting sea level worldwide.

PERSONALS

1927
ALAN E. CAPON, retired general manager of the city of Burbank's Public Service Department, was recently honored at a luncheon. In addition to his service to the city, he has held leadership positions with the National Red Cross, the Kiwanis Club of Burbank, the Advanced Gift Division of the United Way, the Burbank YMCA, and the Burbank Symphony Association, and since his retirement has served on the Public Service Advisory Board. He also served as the Public Service Department's interim general manager in 1987 and 1988.

1941
PAUL S. FARRINGTON, MS '47, ENG '48, PhD '50, of Los Angeles, retired as professor of chemistry in June 1989, after 39 years at UCLA. He served for 20 years as associate dean for student academic affairs in the College of Letters and Science, and he continues to teach during the summer session.

1942
CARL H. SAVIT, MS '43, wrote in October 1990 that he and his wife, Sandra, were living in Utrecht, where he was a visiting professor at Utrecht National University's Institute for Earth Sciences, teaching reflection seismology. He expected to return home to Houston, Texas, by the end of the year.

1943
ED FLAVELL, of Santa Cruz, California, has been reelected to the Santa Cruz Port District Board of Commissioners for a four-year term.

LEON KATZ, PhD, of Saskatoon, Saskatchewan, Canada, in 1989 received the High Tech Entrepreneur Award for Outstanding Contributions to the High Tech Community, Saskatchewan, and, in 1990, an honorary doctor of science degree from the University of Saskatchewan.

1945
RICHARD ("DICK") A. B. KNUDSEN, MS, of Glendale, California, reports that he finds his life "more exciting" now that he has retired. He is teaching an adult nonreader to read, of which he says, "Boy, I think I learned as much as she did! . . . We are used to teaching our own children with a lot of 'no-no's'—you find that instead it is much better to say 'that's great, but . . .'" He has taken up skiing and windsurfing, among other sports, but found it "pretty lonely" doing it by himself. Accordingly, he helped start an "over the hill gang," of which he is now the secretary/treasurer. The group currently has 138 members, who ski, bicycle and mountain bicycle, and windsurf; Knudsen teaches the latter sport. He has also started gardening. "Of course, in true Caltech spirit, I have a shelf of books on the subject at least 6' long," and, he adds, "I have learned so much about gardening, nature and where our food comes from that I had no idea about before." His latest project is the Sicomorro Foresters, a group that is attempting to reforest the canyon in which he lives, using native trees. "The main satisfaction for me," he writes, "is that at my age I can continue to learn about things like computers and gardening and nature. Even more fun is to be able to participate in sports and even learn new ones at an age when so many say 'I'm too old.'"

1946
EBERHARDT RECHTIN, PhD '50, professor of engineering at the University of Southern California, has won the 1991 Goddard Astronautics Award, which will be presented by the American Institute of Aeronautics and Astronautics at its annual meeting May 2; the award is for "sustained excellence in conception, systems architecture, engineering, and management of space, launch and associated ground systems for scientific and national security programs." His numerous other honors include the IEEE's Alexander Graham Bell Award and NASA's Medal for Exceptional Scientific Achievement.

1951
JOSEPH M. DENNEY, MS '52, PhD '55, has been named a Technical Fellow by TRW's Space & Defense Sector, in "a new program designed to foster, recognize and reward technical innovation and achievement." Denney was recognized "for a wide range of work in solid-state physics, radiation effects and signal processing."

CLARENCE R. GATES, PhD, associate director of Caltech's Jet Propulsion Laboratory and a JPL employee for 40 years, retired on January 1. Over his career, he played leadership roles in the design of the prototype for Ranger—JPL's first lunar explorer—and the development of the 1962 Mariner spacecraft, which voyaged to Venus. He also worked in the areas of reliability, communications research, spacecraft design, and computing.

1952
DALE C. KRAUSE, of Paris, France, writes, "I have retired from UNESCO (31 December 1989) as Principal Director (D-2 rank) of the Division of Marine Sciences, after 16 years of service."

RICHARD S. WINKLER, MS, retired from Earl & Wright Consulting Engineers, San Francisco, in 1984, then worked as a teaching assistant and research assistant for the Ocean Engineering Department of the University of Hawaii. In September 1990 he retired to Placerville, California, and writes that he looks forward to hiking and skiing this winter. Last fall, he adds, he visited nearly every major lake in the Desolation Wilderness, which is about one hour from his home.

1953
ALLAN SANDAGE, PhD, staff astronomer with The Observatories of the Carnegie Institution of Washington, has been awarded the 1991 Crafoord Prize in Astronomy. The Royal Swedish Academy of Sciences is presenting the prize in recognition of his contributions to "extragalactic astronomy, including observational cosmology."

1959
JOHN W. WESNER, MS, will serve for 18 months as chair of the Design Engineering Division of the American Society of Mechanical Engineers. His tenure began in January. During his 26-year career, Wesner has been involved in the design of nuclear-reactor internals and of a variety of telecommunications and computer equipment.

1964
GEORGE T. PRESTON, of Palo Alto, California, has been named vice president of the generation and storage division of the Electric Power Research Institute (EPRI). The appointment, made at EPRI's December board meeting, became effective January 1. Preston joined EPRI in 1978 as a program manager, after managing a number of research projects for Occidental Research Corporation. He is the author of many publications and holds a patent in the field of urban refuse resource recovery.

1966
A. DOUGLAS HOLFORD, a Houston, Texas, lawyer, writes, "I represent the plaintiffs in Mrs. Samuel E. Allgood, et al. vs. R. J. Reynolds Tobacco Company, et al., which I filed on January 4, 1991."

1969
CHRIS DEDE, of Burke, Virginia, writes, "I have joined the faculty at George Mason University, with a joint appointment in education and in information technology. I am Director of the Center for Interactive Educational Technology and on the core faculty of the university's Institute for Public Policy."

1970
RONALD J. POGORZELSKI, PhD, writes, "After 12½ years with TRW in Redondo Beach, CA, I have accepted a new position as Director of the Engineering Research Group at the General Research Corporation in Santa Barbara. Having finally succeeded in selling our former residence in Palos Verdes and acquiring another in Santa Barbara, the family (wife, daughter, son, and myself) is rapidly becoming acclimated to its new surroundings and zip code (not to mention phone number, bank account numbers, doctors, dentists, schools, stores, water rationing, property taxes, etc.). Moving is a royal hassle!"

1972
DUNCAN AGNEW, a geophysicist at UC San Diego, made appearances in the news media late last year, according to Yorkman Lowe (EX '72). Agnew was interviewed by both the *San Francisco Chronicle* and San Francisco's KGO-TV, regarding Iben Browning's forecast of an impending earthquake. The *Chronicle* quoted Agnew as saying that "throwing darts at a calendar" would be as useful for predicting earthquakes as Browning's projections.

NEIL RISCH, associate professor of public health and of human genetics at the Yale University School of Medicine, has collaborated in research supporting the use of DNA fingerprinting as evidence in court, to link suspects to crimes; the work was reported in the September 21, 1990, issue of *Science*. According to a Yale press release, "Some scientists have challenged the theoretical underpinnings of the methods used to calculate how likely it would be that two unrelated people would have identical genes at sites often used for DNA fingerprinting. Because of the tendency of people in certain geographic areas and ethnic groups to marry each other, critics argue that many people are more alike in these DNA fingerprint sites than would occur if people mated at random." The Yale researchers, however, have demonstrated mathematically that the alleged problem is due to the use by critics of "imprecise methods of interpreting the length of DNA fragments." "Dr. Risch," the release concludes, "acknowledges that people probably don't mate at random, but the gene frequency among the intermarrying subgroups [doesn't] differ from other groups enough to affect the validity of the technique."

1973
HENRY C. YUEN, PhD, has been named a Technical Fellow by TRW's Space & Defense Sector, in "a new program designed to foster, recognize and reward technical innovation and achievement." Yuen is known "for his internationally recognized work in ocean waves and his contributions in TRW to non-acoustic anti-submarine warfare programs."

1974
JACK GELTOSKY, PhD, writes, "I noted in the December '90 edition of *Caltech News* that I was one of those listed as missing in action. I'm here in sunny La Jolla serving as Director of Research at the Robert Wood Foundation Pharmaceutical Research Institute. After I left Caltech in '74, I worked 6 years in Richard Lerner's lab at Scripps Clinic. From there I joined industry, working at Dupont for 4 years and Johnson and Johnson for the last 7. I have truly enjoyed the scientific and managerial challenges that the pharmaceutical industry presents. It's a lot of fun to take interesting biologicals from the lab into the clinic. Sounds simple; it's not! I'm always in a recruiting mode: any molecular biologists/biochemists looking for a job?

"I live in La Costa with my wife, Barbara, and two sons, Anthony (10) and Evan (8). Am I the only one still worrying about the long-term effects of Prufrock House?"

JEFF HARROW, according to a recently received postcard, "this year got divorced, finished his residency in internal medicine, and was deployed to Saudi Arabia with the 144th Evacuation Hospital. He is located somewhere near Riyadh and would happily receive mail, food, or official speaking invitations."

JOHN MEADOR and his wife, Collene, "are pleased to announce the birth of their first child, Grace Diana, born December 7, 1990. John is the Director of Research and Advanced Development at Medtronic, Inc., a Minneapolis-based medical-device manufacturer."

1977
HON CHUNG LAU, of Houston, Texas, "has returned from his assignment as an exchange scientist in Shell's lab in Holland. He is now a staff research engineer at Shell's Houston lab, doing research on well-completion techniques."

1978
JOSE I. CABEZON, of Denver, Colorado, has earned his PhD from the University of Wisconsin at Madison; he is currently teaching at Iliff School of Theology, Denver University.

1980
GREGORY A. BLAISDELL, MS '82, "has completed his doctorate in Mechanical Engineering at Stanford University and is now an Assistant Professor in the School of Aeronautics and Astronautics at Purdue University. His wife, Theresa R. Blaisdell (nee Birdseye, BS '84) has left her position as a Senior Process Engineer with Intel Corporation to pursue a second career as a full-time mom-at-home to Laura Jonelle, who was born January 31, 1990."

CARRIE CUMMINGS has been appointed senior environmental officer by Delta Container Corporation. Her responsibilities include updating landfill environmental standards, setting policy for waste reception, and overseeing the design of disposal units.

1981
KWANG-I YU, PhD, has been named a Technical Fellow by TRW's Space & Defense Sector, in "a new program designed to foster, recognize and reward technical innovation and achievement." Yu "is the inventor of the Fast Data Finder system, a world-class text search system, and . . . served as the founder and first manager of the TRW Coyote Works, a center for multidisciplinary innovation."

1982
HOLLY EISSLER GIVEN, MS, PhD '86, and her husband, Jeffrey Given, PhD '84, write that their first baby, Caroline, was born in September 1990. "Holly is a research geophysicist at Scripps Institution of Oceanography, and Jeff works in the geophysics division of Science Applications International Corporation."

1984
JOHN SCHAECK, of San Francisco, California, has received his MS in pharmaceutical chemistry from UCSF and is working as a research assistant at Arris Pharmaceutical Corporation, in South San Francisco.

1985
THOMAS F. FRIC, MS, PhD '90, of Albany, New York, has joined the GE Research and Development Center as an aeronautical engineer.

DAVID KOILPILLAI, MS, PhD '91, of Troy, New York, has joined the GE Research and Development Center as an electrical engineer.

1986
HITOSHI YAMAMOTO, PhD, of Cambridge, Massachusetts, is an assistant professor at Harvard; he is spending part of his time at the Cornell electron–positron collider.

OBITUARIES

1923
ROY W. CARLSON, EX, on October 4, 1990. He was a member of The Associates. He is survived by daughters Suzan Ichinaga and Sally Brasseur.

1925
HAROLD J. MARTIN, EX, on September 6, 1990. A member of the Half Century Club, Martin was also a retired lieutenant colonel, U.S. Army; a retired city manager of Ontario, California; and a registered civil engineer and registered electrical engineer. He is survived by daughter Cynthia Martin Howard.

1926
JOHN L. FAHS, of Pasadena, on October 26, 1990. A member of The Associates, he had retired from Dupont in 1969, after spending his entire career with that company. He is survived by his wife, Alice.

1932
WILLIAM M. BLEAKNEY, PhD, on July 2, 1990. He retired from Hughes Aircraft in 1970 as a chief scientist and worked as a consultant for that company for seven more years. He held patents in areas including missile guidance, signal processing, and synthetic-aperture radar. A lover of the High Sierra, he continued backpacking into his 70s. His wife, Mildred, died in 1985, and he is survived by his son, Thomas, and his brother Walker, both of whom are also physicists.

1935
FREDERICK PEHOUSHEK, of Ventura, California, on February 6, 1990. After working briefly for Los Angeles Light and Power, Pehoushek was hired by Schlumberger, an oil-well surveying company. During World War II he served in the U.S. Navy as radar officer on the U.S.S *Shangri-La*, rising to the rank of lieutenant commander. In 1950 he moved to Schlumberger's research and development section in Houston, Texas, where he remained until his retirement in 1978. His wife, Katherine, died in 1987, and he is survived by two daughters—Carol Ann White and Lorraine—and a sister, Helen.

1947
FRANKLIN O. MYERS, on July 15, 1990. He is survived by his wife, Doris, and by his daughter, Karen.

1948
DAVID S. STOLLER, MS, on October 9, 1990. He is survived by his wife.

1953
TERRY N. THOMAS, MS '56, of Carmel, California, on June 26, 1990. He is survived by his wife, Kay, and daughter, Carol.

1957
WALTER F. WEISS, on October 13, 1990. He is survived by his wife.

1967
PETER L. KRAUSE, of Lakewood, California, on September 12, 1990. As a computer and electronics engineer, he was responsible for a number of equipment designs and developments, including magnetic-drum and cassette data recorders for computers, and a voice-operated typewriter; he obtained several patents during his career. He was a member of Phi Beta Kappa and the Institute of Electrical and Electronics Engineers. His brother Dale writes, "Peter Lawrence had a deep intellectual curiosity. Inter alia, he carried out extensive intellectual investigations into quantum theory. He liked camping in the Sierra Nevada." He is survived by his mother, Susie; his brothers, Dale and Ronald; and his uncles and aunts, Arnold and Vera Unruh, Maria and Tom Park, Ann Gillig, and Minnie Krause.

Carl Anderson, 1905-1991

Nobel laureate Carl David Anderson, Board of Trustees Professor of Physics, Emeritus, died on January 11 in San Marino, California, after a short illness. He was 85 years old. Discoverer of the positron, the first particle of antimatter

shown to exist, Anderson was awarded the Nobel Prize in physics in 1936 when he was only 31 years old. He is survived by two sons—Marshall, a mathematician and computer analyst, and David, an engineer—and two grandchildren. His wife, Lorraine, died in 1984.

Anderson was born of Swedish immigrant parents in New York City on September 3, 1905, and in 1912 the family moved to Los Angeles. He graduated from Los Angeles Polytechnic High School in 1923, and enrolled at Caltech, intending to become an electrical engineer. During the third term of his sophomore year, however, Anderson took Professor Ira Bowen's class in modern physics, a course he found so inspiring that he changed his major to physics.

He received his BS in 1927 and stayed on as a graduate student to conduct cloud-chamber cosmic-ray research with Robert Millikan. In 1934—four years after earning his PhD—he detected in his cloud-chamber photographs the tracks of what appeared to be a positively charged electron. Eventually named the positron, this particle was the first confirmation of the concept of antimatter developed by the British physicist Paul Dirac.

Anderson served as a Caltech research fellow from 1930 to 1933, when he was promoted to assistant professor. By the time he received the Nobel Prize in 1936, he and his first graduate student, Seth Neddermeyer (now deceased, formerly professor of physics at the University of Washington), had identified two more of the fundamental particles of matter, which have variously been called the positive and negative mesons, the mu-mesons, or the muons. These studies also made use of cosmic rays, which are far more abundant at higher altitudes. Part of the work was done at the top of Pikes Peak in Colorado. Later, Anderson conducted research in Panama, in the White Mountains of California, and in a B-29 airplane that operated at altitudes up to 40,000 feet.

Anderson was awarded the Nobel Prize in 1936, but he had to borrow $500 from Millikan to pay for his ticket to Stockholm. That year the physics prize was shared by Anderson and Viktor F. Hess, the discoverer of cosmic rays. Anderson received $20,000. The following year he was promoted to associate professor. He became a full professor in 1939.

The outbreak of World War II changed the direction of Anderson's work, as academic research took a back seat to war-related efforts. Anderson turned down the offer to head up the atomic-bomb project—the job eventually went to J. Robert Oppenheimer—and instead elected to work on the solid-propellant-rocket project headed by Caltech physicist Charles Lauritsen. Specifically, his work dealt with how to fire these rockets from aircraft, and this effort was successful enough that he was flown to Europe in 1944 to supervise the installation of the first aircraft rockets on Allied planes.

In 1946 Anderson married Lorraine Bergman. At Caltech he resumed his studies of cosmic radiation. His research group included Robert Leighton and Eugene "Bud" Cowan, both now Caltech professors of physics, emeritus. It also included Donald Glaser, now a professor at the University of California, Berkeley, who won the 1950 Nobel Prize in physics for the invention of the bubble chamber, another device for detecting subatomic particles.

In the course of his research, Anderson and his group took literally tens of thousands of pictures, each of which they methodically examined in the hope of seeing interesting particle tracks. Although this was quite tedious, it paid off with evidence for many new fundamental particles that came to be known as "strange particles."

By the late 1950s, Anderson's kind of cosmic-ray work was beginning to be supplanted by research done on huge high-energy accelerators. He became chairman of Caltech's Division of Physics, Mathematics and Astronomy in 1962, a position he held until 1970. He retired in 1976 and was named Board of Trustees Professor of Physics, Emeritus.

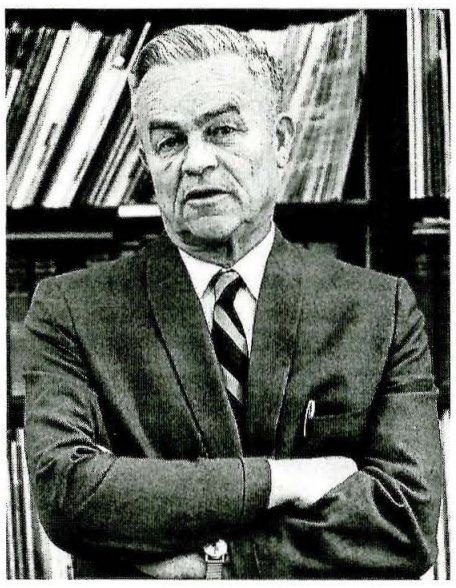
In addition to the Nobel Prize, Anderson received many other honors and awards. He received three honorary doctorates—from Colgate University, Temple University, and Gustavus Adolphus College—and he received the Gold Medal of the American Institute of the City of New York, the Presidential Certificate of Merit, the Elliott Cresson Medal of the Franklin Institute, and the John Erikson Medal of the American Society of Swedish Engineers.

In 1979 Anderson recorded an oral history for the Caltech archives. Asked if he felt that society should spend huge sums on scientific projects, Anderson replied, "If you ask how many millions or billions of dollars a fundamental particle is worth, the answer is that I don't know. Doing science is a matter of faith. You just have to explore the physical world. Curiosity is a part of human nature, and there will always be science for the sake of science—for the sake of pure understanding."

For those who wish to contribute, a memorial fund has been set up for Dr. Anderson by his family. Checks should be made out to the Carl Anderson Memorial Fund and sent to Caltech, c/o Charlene Chindlund, 105-40, Pasadena, CA 91125.

Economist Horace N. Gilbert dies

Horace N. Gilbert, professor of business economics, emeritus, died on Sunday, December 16. He was 89. Professor Gilbert came to Caltech in 1929—lured away from Harvard by Robert Millikan—and stayed at the Institute until his retirement in 1969. His



research on the ways countries industrialize led Professor Gilbert to travel the world. He went to the USSR in 1931 to study the first five-year plan and returned six more times.

Of Caltech students Gilbert said at his retirement party, "I couldn't have had a finer group of students at any other school in the country, including Harvard Business School." At Caltech he served as chairman of the faculty committee on foreign students for 16 years, and as a member of the patent committee, the committee on relations with industry, and was first chairman of the Athenaeum house committee. A director emeritus of The Associates, he served on the board and was a long-time member of the President's Circle.

Gilbert received his AB from the University of Washington in 1923, his MBA from Harvard University in 1926, and an honorary DBA in 1971 from the South Dakota School of Mines and Technology. He was a coauthor of *Introduction to Business,* and wrote many articles in the *Harvard Business Review.*

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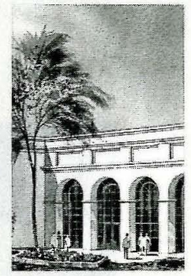

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