

CALTECH NEWS

April 1988

1986-87: Another record year for gifts to Caltech

Private gifts received by Caltech in the fiscal year 1986-87 were the highest ever recorded in the history of the Institute. A total of \$80,349,037 was contributed by trustees, alumni, Associates, other individuals, corporations, and foundations.

Included in the total were payments of \$30.74 million from the W. M. Keck Foundation for the W. M. Keck Observatory and \$3.40 million from the Estate of Liliore G. Rains.

The gift total also included a record \$4.80 million in life income trusts and annuities and \$4.67 million in unrestricted support, provided primarily by The Associates, the Alumni Fund, and the Industrial Associates.

Fund-raising activities focused on the challenge provided by Arnold and Mabel Beckman for the Beckman Institute. The terms of the first phase of the challenge required that Caltech raise \$10 million for the Beckman Institute. That first phase was successfully completed in October 1987, thereby qualifying for a payment of \$40 million from the Beckman Foundation. Activity is now directed toward the second phase of the challenge: to raise \$10 million from the trustees for Caltech's general endowment.

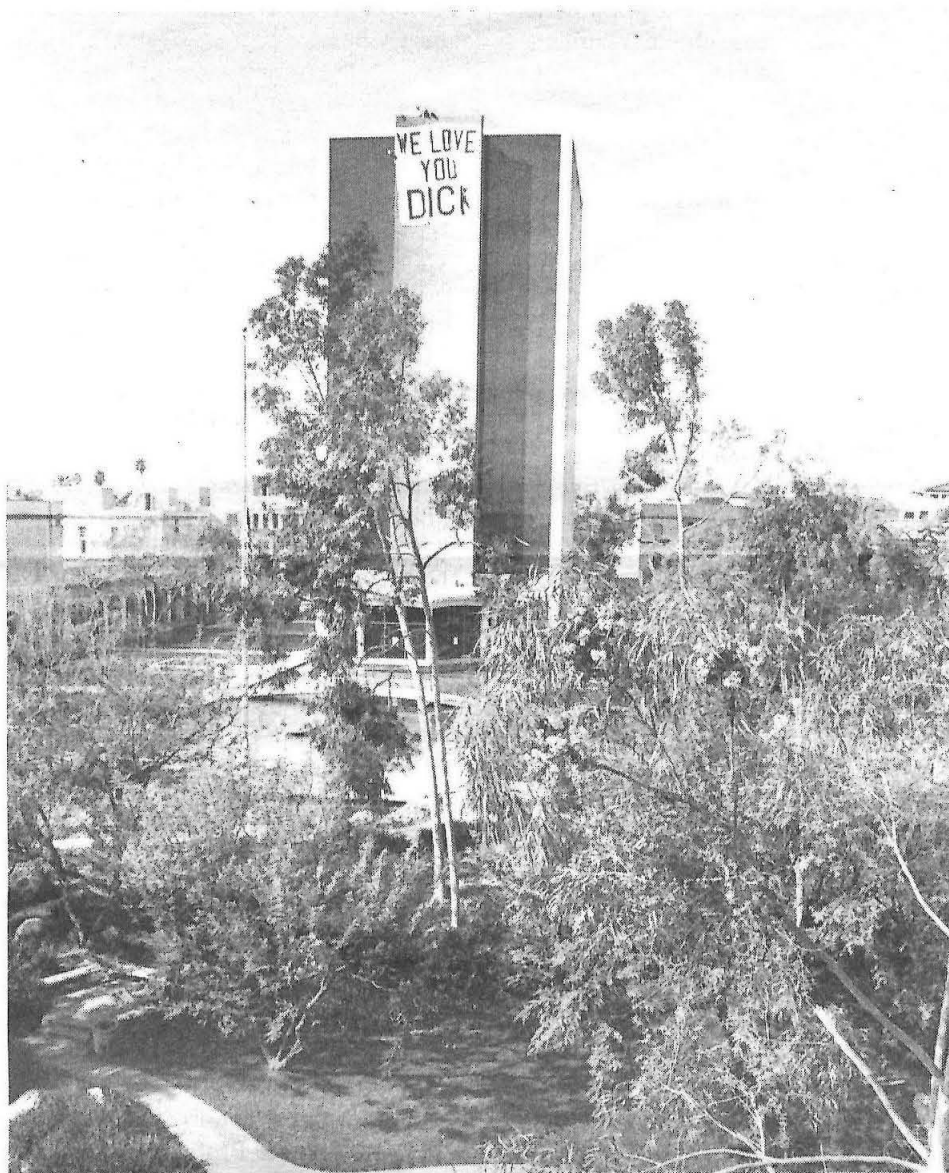
Other notable fund-raising activities included a \$750,000 challenge grant from the A. W. Mellon Foundation for an instructorship program in the humanities.

Pledges of \$1 million each from Du Pont, Shell Company Foundation, Eastman Kodak, and 3M make possible the implementation of the new Caltech Consortium in Chemistry and Chemical Engineering.

The Laboratory for Experimental Economics was funded by gifts and pledges totalling \$1.25 million from

Continued on page 2

Caltech students say goodbye



Students chose a banner, draped from Millikan Library, as their way to say goodbye to a special teacher and friend.

Colliding galaxies may be an evolving quasar

An ultraluminous pair of colliding galaxies, one billion light years from Earth, may be a quasar in the earliest stages of its evolution, report Caltech astronomers. In an article in the February 5, 1988, issue of *Science* magazine, the researchers report on infrared, optical, and radio-wave observations of an object called IRAS 14348-1447, a colliding galaxy system enshrouded by dust. Their studies seem to resolve a long-standing

controversy on what fuels quasars by indicating that the formation of a quasar source in a galaxy may be linked directly to the presence of huge quantities of molecular gas in the galaxy's central region.

The study was carried out by David B. Sanders, research fellow in physics, Nicholas Z. Scoville, professor of astronomy and director of the Owens Valley Radio Observatory, and B. Thomas Soifer, senior research

associate in physics. They used infrared data from the Infrared Astronomical Satellite (IRAS), which discovered IRAS 14348-1447 in the constellation Libra; optical data from the 200-inch Hale Telescope at Palomar Observatory; and radio-wave data from the 12-meter telescope on Kitt Peak near Tucson, Arizona, which is managed by the National Radio Astronomy Observatory.

Quasars are the brightest — and among the most baffling — objects in the universe. Quasars occupy volumes no larger than that of our solar system, yet they are at least one trillion times as bright as the sun, or about 100 times as bright as the entire Milky Way galaxy. How quasars sustain this luminosity is one of the major riddles of astronomy.

Quasars typically radiate most of their energy as visible and ultraviolet light. But in 1985, Caltech astronomers studying IRAS data reported the discovery of quasars that emit more than 90 percent and as much as 99 percent of their energy as infrared radiation. These objects apparently possess central energy sources enveloped in dust, which absorbs the visible light and reradiates it as heat.

In early 1987, Caltech astronomers reported that studies of these infrared quasars showed them all to be contained within pairs of colliding galaxies. IRAS 14348-1447 is one of these, and the present study reports on detailed observations of this single object. All the data from IRAS, an Earth-orbiting satellite that gathered a wealth of data from January to November 1983, are currently under study at Caltech's Infrared Processing and Analysis Center (IPAC).

The optical observations of IRAS 14348-1447 from the 200-inch Hale Telescope atop Palomar Mountain show that gas within the object is moving at up to 2,000 kilometers per second — almost 4.5 million miles per hour. These high velocities suggest the presence of a supermassive object, probably a black hole, into which the gas is falling. Although this black hole is smaller than our sun, it is probably 100 million to one billion times more massive.

Record gift year

Continued from page 1

the Lynde and Harry Bradley Foundation, the Sloan Foundation, General Motors, and Pacific Telesis. The Norris Foundation and Mr. and Mrs. Samuel Oschin provided gifts and pledges totalling \$2.2 million for two major initiatives in astronomy. Substantial support was also obtained for the new option in computation and neural systems.

"The results of this fiscal year continue to represent the committed involvement of volunteers and friends, and we believe that our potential for next year is a continuation of these positive results," said Theodore P. Hurwitz, vice president for Institute Relations. Hurwitz points out two areas of uncertainty, however, that could seriously hamper long-term fund raising.

"First," he said, "there is concern over the October 1987 stock market decline and what effect, if any, it will have on giving. Second, we continue to be concerned about effects of the 1986 Tax Reform Act. There was no decrease in giving this past year, but we know that many individuals took advantage of the higher marginal tax rates. We are concerned that a weak economy, coupled with the tax change, may begin to work against philanthropy."

Hurwitz added, "We remain confident that Caltech has tremendous potential for a continuing successful fund-raising program, and in spite of uncertainties beyond our control, we look forward to the coming year with optimism."

On the cover

Detlef Koschny, a senior from Germany, examines a film dryer that has been used for several decades to dry thousand of seismographs in Caltech's Kresge seismology facility. Now use of the equipment is being phased out with the advent of a new electronic system in Kresge that can record ground motions from one micron in amplitude to seven times that of the October 1 quake, and at periods of .1 second to those that are infinitely long. Information from the system can be automatically obtained by dialing its computer. The system is a joint project between several agencies and the new Incorporated Research Institutions for Seismology (IRIS).

Dervan named first Bren Professor

Caltech has established the Bren Professorship with a gift of \$1.5 million from the Bren Foundation of Los Angeles. President Thomas E. Everhart has announced that Peter Dervan, professor of chemistry, will be the first Bren Professor. A member of the Caltech faculty since 1973, Dervan has pioneered the development of chemical techniques that may one day make it possible to map the four billion chemical units that make up the entire blueprint of human heredity.

Dervan and his research group have played a leading role in formulating chemical methods that can analyze very precisely where and how anti-tumor, anti-viral, and antibiotic drugs and proteins bind to DNA, the basic material of genes. This research is expected to provide new insights into how these drugs function in fighting tumors, viruses, and bacteria, and may be applied to the development of more effective treatments for cancers and viral diseases.

Dervan received his BS degree in 1967 from Boston College and his PhD degree in 1973 from Yale. He joined Caltech as assistant professor of chemistry in 1973, after spending a year at Stanford as a National Institutes of Health Postdoctoral Fellow. He was named professor of chemistry in 1982.

In 1986 he was elected to the National Academy of Sciences and was named recipient of the Arthur C. Cope Scholar Award. He received the Nobel Laureate Signature Award for Graduate Education in Chemistry in 1985, the latter two awards from the American Chemical Society. He has also received the Guggenheim Fellowship (1983), a Camille and Henry Dreyfus Teacher-Scholar Grant (1978), and an Alfred P. Sloan Research Fellowship (1977).

The Bren Foundation was established by Donald L. Bren, chairman of the Irvine Company, based in Newport Beach, California. He has been a member of the Caltech Board of Trustees since October, 1983. Bren is a nationally recognized master builder and innovator within the related real estate disciplines of planning, design, construction. He is chairman of the Bren Company of Newport Beach and Bren Investment Properties of Los Angeles, and he founded the Mission Viejo Company which established the community of Mission Viejo in Orange County.

Plott chosen Harkness Professor

Caltech has announced the appointment of Charles Plott as the Edward S. Harkness Professor of Economics and Political Science. A member of the Caltech faculty since 1971, he was recently named the director of Caltech's new Laboratory of Experimental Economics and Political Science. Plott is the fourth Caltech faculty member and first economist to be named to the Harkness Chair since it was established in 1937.

A pioneer in the relatively new field of experimental political economy, Plott has led in the development of innovative techniques that have made it possible to examine the validity of various political and economic theories under controlled laboratory conditions. Studies that Plott and his colleagues have carried out over the past 15 years have had a direct impact on policy-making in the public and private sectors, in such areas as interstate commerce and transportation.

Plott received his BS in 1961 and his MS in 1964, both from Oklahoma State University, and his PhD in 1965 from the University of Virginia. After five years at Purdue University, he joined Caltech in 1971 as professor of economics. His honors include Guggenheim and Ford Foundation fellowships and election to the Econometric Society and the American Academy of Arts and Sciences, both of which named him a Fellow in 1985.

Plott is currently president of the Economic Science Association. He is a member of the Royal Economic Society and served as president of the Public Choice Society from 1976 to 1978.

The Harkness Professorship was established at Caltech by the late Edward S. Harkness, a philanthropist who contributed almost \$100 million to the advancement of public, educational, and welfare organizations. The first Harkness Professor was historian William Bennett Munro, followed by J. E. Wallace Sterling, and Rodman Paul, who retired from Caltech's faculty as Harkness Professor, Emeritus, in 1981.

Eleanor Searle first Caltech woman appointed to named professorship

Professor of History Eleanor Searle has been appointed the Edie and Lew Wasserman Professor of History by the Caltech Board of Trustees, becoming the first woman faculty member at the Institute to receive a named professorship.

Searle, who is also a senior research associate at the Huntington Library, joined the Division of the Humanities and Social Sciences at Caltech in 1979. She had been a member of the faculty at UCLA for the previous 10 years.

A scholar of medieval history, she was the first woman to study at the Pontifical Institute of Mediaeval Studies in Toronto, where she received her LMA degree (Licentia Mediaevorum Studiorum) magna cum laude in 1961 and her DMS (Doctor Mediaevorum Studiorum) in 1972. Her BA, magna cum laude, is from Radcliffe College, Harvard University, 1948. She was Visiting Fellow at Cambridge University and Fellow at Australian National University's Research School of Social Sciences.

Searle is a Fellow of the Medieval Academy of America, and served as its president in 1985-86. She is also a Fellow of the Royal Historical Society and of the Society of Antiquaries of London, and is honorary vice president of the Battle and District Historical Society. She is the author of three books on medieval subjects, and her fourth book, *Predatory Kinship and the Creation of Norman Power 840-1066*, will be published by the University of California Press in 1988.

The Edie and Lew Wasserman Professorship which Searle holds was established in 1983—a gift from Mr. and Mrs. Lew R. Wasserman of Beverly Hills. Wasserman, who is chairman of the board and chief executive officer of MCA, Inc., is also a life member of the Caltech Board of Trustees, having served on the board since 1971. The Wassermans are life members of The Associates.

SURF celebrates a 10-year anniversary

The SURF (Summer Undergraduate Research Fellowships) program kicked off its tenth anniversary year with a dinner and program featuring Ray D. Owen, Professor of Biology, Emeritus. In addition to celebrating the transition into SURF's second decade, the annual event launched the 1988 fund-raising drive to increase the number of SURF endowments and to provide operating funds.

Attending the dinner were President and Mrs. Thomas E. Everhart; individual, foundation, and corporate donors; and other friends of SURF, including faculty, students, and staff.

SURF-88 was dedicated to Ray Owen for his long-standing interest and involvement in undergraduate education. In his keynote speech, "The Complete Solution," Professor Owen described past attempts to label a plateau of scientific understanding as the final one—for example, certain discoveries in immunology in the 1960s and in molecular biology in the 1970s. He said, "The only way to give students scientific experience is to get them into research. SURF does that in unique but vital ways. SURF isn't a giveaway, but an earned prize." In conclusion, he stated, "Scientists build cathedrals and castles. Only time will reveal whether your ugly little stone will be the cornerstone for a new castle."

Hugh Colvin (BS '36), chairman of the SURF Board and president of The Caltech Associates, recounted the SURF tradition at Caltech, beginning with a single student who worked with Arthur Amos Noyes, and continuing to the modern program. He noted that "with SURF, everyone wins—the students, faculty, Caltech, and even humanity."

David Bruning, who has held three SURF fellowships, described his research on the neocortex of the rat and the impact SURF has had on his life. He said that the three most important things SURF has taught him have been how to interact with people, to take responsibility for doing his own project, and to persevere until his project is completed.

Fred Shair, professor of chemical engineering, and founder of SURF in 1979, said, "SURF has been one of the most satisfying experiences of my career. SURF works because of the faculty — the most important

Continued on page 4

President Everhart welcomes new Associates



Hugh F. Colvin, president of The Associates, welcomes new member Manny (Mrs. Max) Delbruck, at left. Right: Robert W. Johnson, a new member of The Associates, with Mary (Mrs. J. Stanley) Johnson, Doris (Mrs. Thomas E.) Everhart, president Thomas E. Everhart, and J. Stanley Johnson.

President Thomas E. Everhart spoke of Richard P. Feynman's contributions to Caltech — and of The Associates, and their contributions to the Institute — when he addressed guests at the annual new-member dinner in the Athenaeum on the day after Feynman's death from cancer.

"His passing is a real loss for Caltech," said Everhart. "But in a larger sense, those of us who knew him feel greatly enriched, because without him on campus since 1950, Caltech would have been a different place."

"As people go through life, they can make a difference. Richard Feynman was a person who did make a difference — a profound difference. My message to you, The Associates, this evening is that you are also people who can make a difference — and you have done so by joining this group."

Everhart noted that, during the great Depression, contributions from The Associates (whose membership then included some 100 members) provided one-fourth of the Institute's budget. "You have grown as Caltech has grown in its leadership role," he continued, as he pointed out that membership in the organization today includes 1,143 persons who provide Caltech with highly important discretionary funds for flexible operation.

Everhart praised Caltech's modern founders, Robert A. Millikan, Arthur Amos Noyes, and George Ellery Hale, for having the "right concept" when they created the modern Caltech. "They started something that

the state, the nation, and the world can be very proud of," he said, "and this is why I was willing to talk with the Faculty Search Committee members when they came to me seeking more insight into what a university president does."

Everhart said one thing that has impressed him during his months at the Institute is the depth of knowledge of the faculty, and also their innate humility, "at least when surrounded by one another."

"The world is full of people who try to impress more than they should, based on what they actually do know. Our faculty members don't do this, and this same quality impressed me in Feynman. He had the ability to question the assumptions on which people based their conclusions, and in doing so he forced them to be more honest with themselves."

Everhart offered The Associates three quotes — the first from Einstein, who said: "The right to search for truth also implies that one must not conceal any part of what one has recognized to be true."

"About a week ago, I read Feynman's commencement address from several years ago, and if I had to summarize it in one sentence, I would use this sentence by Einstein. Feynman tried to tell the truth at all times as he saw it."

Everhart's second quote came from John Dewey, who said: "Every advancement in science has issued from a new audacity of imagination."

"When Feynman became dissatisfied with existing theories, he totally reinvented quantum electrodynamics, and in doing so he pro-

vided a whole new way of looking at things," Everhart pointed out.

"I asked him when I first met him, 'Weren't you ever tempted to leave?' He said, 'Yes, once. I had been here for a few years and another university offered me a chair and a fabulous salary. But the next day I came to work and, on my way to the office, a colleague stopped and told me about a new discovery in biology. Then another colleague stopped and told me about a new discovery in astronomy. By the time I got to my office, I had learned about two important scientific discoveries, and that was before I sat down to work. I couldn't leave a place like this.'

"In a very real sense, Feynman epitomized the spirit here," said Everhart, as he offered his third quote, this one from Thomas Carlyle. He termed these words "a fitting testimony to Feynman and also to Caltech — a place that let him blossom in the way he wanted."

"The great law of culture, Carlyle said, 'is that each become all that he or she was created capable of being; expand, if possible, to his or her full growth; and show himself or herself at length in their own shape and stature, be those what they may.'"

At the dinner, The Associates welcomed 56 new members. Hugh F. Colvin (BS '36), president of The Associates, presided. He greeted the guests, stressing their contributions to the Institute.

Guests admire the Domesday Book



A modern replica of the Domesday Book — an archive considered England's most important treasure — was the focus of a reception for members of the Caltech community. Richard L. Hayman, who gave the facsimile, was the guest of honor. Above left: President Thomas E. Everhart, Eleanor Searle, and the late John Benton admire the two-volume publication, which is kept in Caltech's rare book room. Above right: Richard Hayman talks about the gift.

John Benton, renowned medieval scholar, dies unexpectedly in Pasadena

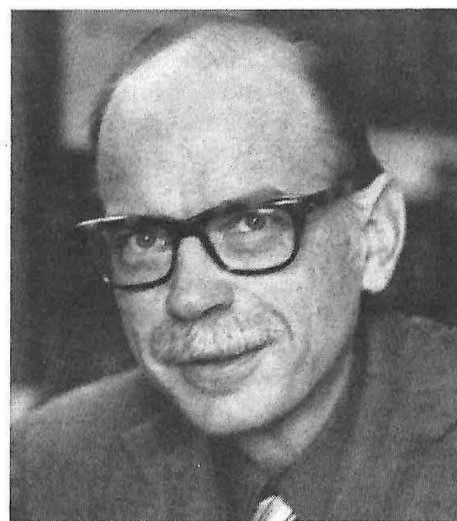
John F. Benton, 56, who recently had been named the Doris and Henry Dreyfuss Professor of History at Caltech, died unexpectedly February 25 in conjunction with a fall at his home in Pasadena. He was born July 15, 1931, in Philadelphia, Pennsylvania.

In announcing Benton's appointment to the professorship, Caltech President Thomas E. Everhart had said, "In John Benton we have one of the world's leading scholars in medieval history, and also a man whose breadth of interests makes him a humanist in the finest sense."

A much-honored medieval scholar, Benton in 1985 received a five-year MacArthur Prize Fellowship. This gave him a yearly stipend of slightly more than \$50,000 a year, tax free. The award allowed him to travel frequently to Europe to pursue his research. He had also held Guggenheim and Fulbright Fellowships.

Some of his most recent work included searching the archives of France for, and then editing, some 750 charters issued between 1151 and 1197 by Counts Henry I and Henry II of Champagne, and Marie of Champagne. He had been involved in studies of the correspondence between the famous 12th-century lovers, Heloise and Abelard, and argued that Abelard wrote all of the letters himself.

Benton made headlines for his work with image-processing techniques developed for space exploration



at JPL, using them to read ancient, medieval, and modern manuscripts in which the writing had been erased or damaged, or had faded.

He was a member of the American Historical Association, the Mediaeval Academy of America, and the Medieval Association of the Pacific, and he had served as president of the International Courtly Literature Society.

Benton received his BA degree from Haverford College and his MA and PhD degrees from Princeton University. After holding faculty positions at Reed College and the

University of Pennsylvania, he joined the Caltech faculty as assistant professor of history in 1965. He became professor in 1970.

He is survived by his wife, Elspeth; four daughters, Laura, Helen, Jo, and Anna; and a sister.

SURF celebrates an anniversary

Continued from page 3

resource — and because of the students — the most important product."

Ed Koo, 1987 SURFer, presented a photograph of one of the early SURF experiments to Betty Nickerson, former SURF Board chairman. He expressed appreciation on behalf of the 769 students who have held SURF fellowships over the past nine years, for her personal support for the program.

SURF began in 1979 to enhance the academic program and to provide opportunities for undergraduates to become involved in research with the coaching of faculty members. In the intervening years, SURF's venue has expanded to include JPL and occasionally other universities. Some students have SURFed abroad. Last summer, 148 students participated in the program.

Continued on page 9

Directory phone phase to begin

Beginning May 10, the Harris Publishing Company will conduct telephone follow-up calls to alumni who are NOT members of the Alumni Association, for the purpose of verifying information in the forthcoming alumni directory. At the same time, the telephone representatives will invite alumni to order their personal copies of the volume.

If you are a member of the Alumni Association, no telephone follow-up call will be made to you. The information that goes into the directory will be determined by what you return in your questionnaire.

The directory is tentatively scheduled for release in September-October 1988.

The telephone call follows two questionnaire mailings sent to all alumni with verified addresses. If you have not received a questionnaire, please let us know immediately by calling the alumni office, (818) 356-6592.

Vol. 22, No. 2

April 1988

Issued six times a year (Feb., April, June, Aug., Oct., and Dec.) and published by the California Institute of Technology and the Alumni Association, 1201 East California Blvd., Pasadena, California 91125. Second class postage paid at Pasadena, California. Postmaster: Please send address changes to *Caltech News*, 1-71, California Institute of Technology, Pasadena, CA 91125. (818) 356-4692

David Harper: *President, Alumni Association*
Theodore P. Hurwitz: *Vice President, Institute Relations*
Robert L. O'Rourke: *Director of Public Relations*
Jane Dietrich: *Director of Periodicals*
Winifred J. Veronda: *Executive Editor*
Barbara Wirick: *Production Artist*
Michael Farquhar, Julie Hakewill, Susan Hoffmann: *Copy Editors*
Julie Hakewill, Susan Hoffmann: *Personals/Obituaries*
Robert Paz: *Photographer*
Phyllis Brewster, Heidi Aspaturian: *Contributors*

USPS 085-640

Meet Caltech's oldest undergraduate

By Winifred Veronda

People sometimes laughed when Herb Burrows told them he was saving money to go to college and get a degree in science or engineering. After all, he had never attended college, and he earned his living by running a catering operation out of a truck in Gardena. They assumed he was having delusions of grandeur.

But they stopped laughing quite a while ago. Last fall Burrows, now 43, enrolled at Caltech as a transfer student from Los Angeles Valley Community College after graduating from that institution with a 3.9 grade point average. He is believed to hold the record as the Institute's oldest undergraduate. Burrows finished his first Caltech quarter with a 3.4 average, and feels a little chagrined that it wasn't higher, although he's especially proud of an A in Physics 2.

"Being here feels like being on vacation because I love what I'm doing. It's what I've wanted to do all my life, and I'm having fun," says the gregarious, sandy-haired student, who often wears Caltech T-shirts and who looks more like a professional athlete than a Caltech junior. "For 12 years I worked 90 hours a week, from 6 a.m. to 10 p.m. During those years, I took three vacations and five holidays. That was work."

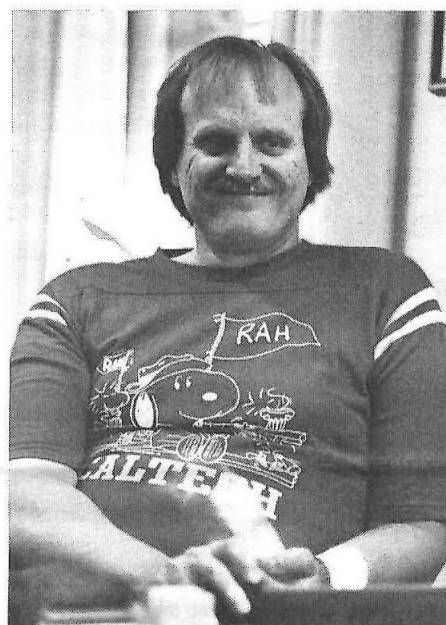
For personal reasons, Burrows couldn't go to college after he finished high school, but he was determined that one day he would. Working those 90-hour weeks, he gradually accumulated the money to pay for a university education. He dreamed of going to Caltech because "it's the best-known school in its field," and because he felt that its small size would offer important opportunities to become well acquainted with a lot of faculty members and students and to gain professional insights not so readily available at a big institution.

Burrows was fortunate in encountering some able teachers at LA Valley Community College—among them Gareth Edwards (BS '67), who was his physics instructor and "the best teacher I've ever had." His mathematics courses also were rigorous and well taught, and they prepared him ably for his transfer exams.

Most of his teachers encouraged him in his ambitions to go to Caltech, although one discouraged him, saying he would find it filled with brilliant young whiz kids with whom he would feel incompatible. Burrows didn't let this counsel deter him, although he says he doubted seri-

ously that he would qualify for Caltech admission. Taking no chances, he applied to—and was accepted by—eight other schools, among them UC Berkeley, UCLA, and UC Irvine. When he learned he had been admitted to Caltech, he cried.

Burrows says he really didn't think much about the age factor until registration, even though Edwards had warned him that he had probably set a record as the oldest student ever admitted to the Institute. "When I went in to register it really hit me,"



Herb Burrows, age 43

he acknowledges, "because everyone else in the room looked 16." He later learned that the registration staff had returned his files to the admissions office with a note that there was a mistake—obviously the age on his records must be a typo.

"During registration and rotation I became acutely aware that I was much older than the other students," he says. "Everyone I met would talk about it. A few seemed offended that someone my age had gotten in. They assumed that because I was older, I wouldn't be able to do the work. I was really afraid that all the attention paid to my age was going to be a problem, and that I wouldn't be treated as an individual. But this tapered off and I have a number of friends now. Socially, everything is going along fine."

Although he lives off campus, Burrows joined Dabney House during rotation. "I'm glad Dabney took me," he says. "I fit in well with the people there."

"The house system is a good one," he adds. "It's a quick way to make contacts."

Burrows admits he has not yet had time to explore extracurricular activi-

ties, noting that "the first quarter came at me pretty fast. I like to study with people, and I had trouble finding anyone. But there are several people that I study with now, some in Dabney, one from the annex, a friend who lives off campus. I was up last night until 2:30, studying for an engineering exam." The transfer student says he studies about 40 hours a week, not including the time he spends in classes. He found the competition "harder than I expected," and adds that the first two or three weeks "I felt that everyone here was brighter than me." Happily, this feeling faded as he became acclimated.

One of his biggest surprises at Caltech was the quality of the teaching. "I knew the teachers would be brilliant, and doing excellent research," he says, "but I was surprised that they're also such fine teachers. Marshall Cohen and Frank Mullin, for example—they're excellent!" He is also filled with praise for a teaching assistant, John Lindner. "He is a terrific teacher and he spends a tremendous amount of time with the students," says Burrows. "Without him, I wouldn't have gotten an A in physics." All in all, he says, "the faculty members have treated me very well. They're really superior people."

Burrows likes the honor system and has found it "particularly beneficial. I take tests badly in classrooms, and taking them at home is more relaxing for me. And the system gives the teachers more time to cover the course material because they don't have to use class time for tests."

If Burrows could follow his heart, he would get a degree in physics, because he finds the material such a delight. "But I can't major in physics for practical reasons," he says. "I'd be facing intense job competition from a lot of brilliant people."

So he plans to earn a BS degree in electrical engineering, and he would like to go on to graduate school and eventually to a career in teaching. But he may opt for a job in industry. "I've done a lot of tutoring and I know I'm a good teacher," he remarks. "But I don't have as many years of earning power ahead of me as the average student does, and I have to think of that when I make my choices."

Caltech has been filled with various surprises for its oldest undergraduate, but the biggest surprise of all is a very basic one. "Just being here," he says fondly, "surprises me the most!"

Cash gifts strengthen Fund effort

A casual glance at comparison figures for the 1986-87 Alumni Fund year, and for this year, hardly do justice to the significant role that cash gifts have played in the strength of the 1987-88 Fund. Stock gifts were greatly reduced this fall as a result of the stock market dive, but gifts to the Fund, at \$1,345,427 on February 20, remain fairly consistent with the \$1,398,932 raised during the same period in 1987.

While the 1988 campaign has not yet produced the dollar goal hoped for, \$360,789 in new and in increased portions of renewal gifts are eligible for the challenge match offered by an anonymous alumnus donor.

"There is still time to take advantage of this outstanding opportunity to increase the magnitude of alumni gifts," G. Stan Holditch (BS '48), Alumni Fund chairman, reminded graduates. "Eligibility for the match will remain in effect through June 30." Gifts may be sent to the Alumni Fund, Caltech, Pasadena, California, 91125.

New Fund effort focuses on young alumni

Leslie Ann Paxton-Rousseau (BS '79) has been chosen as chairman of a new group of Alumni Fund volunteers who will solicit those alumni who have graduated within the last 10 years.

Paxton-Rousseau explained that young alumni are being solicited as a separate group because of their unique circumstances. Many are still in school while others are just beginning their careers, and their ability to give is usually more limited than that of older alumni.

"The recruitment effort will be tailored to their interests," Paxton-Rousseau explained. She added, "We hope the young alumni will bring their excitement and enthusiasm to the Fund, and will begin to think of themselves as contributors to it."

G. Stan Holditch (BS '48), Alumni Fund chairman, expressed his satisfaction that younger alumni will become more involved in the Fund, and he said that he hopes their enthusiasm will be contagious.

Richard Feynman: The Caltech community recalls a unique and joyous friend

Nobel Laureate Richard Phillips Feynman died at the UCLA Medical Center on February 15 after a long struggle with cancer. One of this century's most original thinkers, he was considered by many to be the leading theoretical physicist in the world today. Feynman was the Richard Chace Tolman Professor of Theoretical Physics at Caltech, where he had been on the faculty since 1950.

A somber mood gripped the campus as faculty, students, and staff recalled their encounters with a man whose spirit was uniquely identified with that of the Institute.

Students draped a sign, "We love you, Dick," from Millikan Library following his death, and *The California Tech* devoted most of its February 19 issue to tributes to the individual they characterized as "the man, the teacher, the scientist, the friend, the artist, the actor, the bongo-drummer." "A numbness swept over campus Tuesday when it was learned that Richard Feynman had passed away the previous night," wrote Randy Kamien in the *Tech*. "There was a feeling of the loss of a treasure — a treasure beyond value."

"Richard Feynman's joy of living, of teaching, and especially of learning and understanding inhabits everything I know about him," wrote Astrid Golomb in the *Tech*. "I am very grateful . . . to have been his student. Not a Caltech student, but a student of the way he engaged life, challenging it, and exalting in each glimpse of understanding. . . . He embraced each curious adventure and we loved him for taking us along."

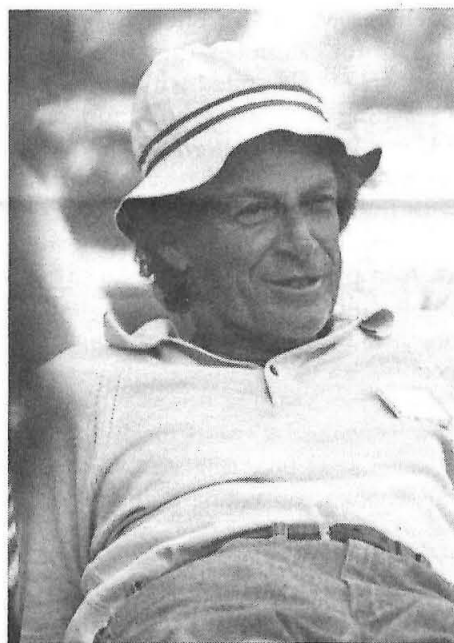
Feynman was born in Far Rockaway, New York, in 1918. His father, a clothing salesman, had a profound influence on his life. Determined that young Richard would be a scientist, he made a continuing effort to help him in that direction, starting by teaching him elementary mathematics when he was still in his high chair, and using a toy wagon and a ball to explain inertia to him.

After graduating from Far Rockaway High School, Feynman attended MIT, where he graduated with a BS in 1939. From there he went to Princeton and received his PhD in 1942. After wartime work at the Los Alamos Scientific Laboratory — where he divided his time between trying to solve the secrets of the atom and of cracking safes — Feynman became professor of theoretical physics at Cornell. It was there that he did the work that led to his receiving

the Nobel Prize in Physics in 1965, which he shared with Shinichiro Tomonaga of Tokyo and Julian Schwinger of Harvard. They had worked independently on problems in the existing theory of quantum electrodynamics.

Throughout his career he was noted not only for his contributions to an understanding of the laws of physics, but also for his ability to bring his subject alive to non-physicists and to physics students. In 1982, for example, he received an ASCIT award for teaching excellence.

Keenly interested in students, he showed up in full academic regalia for commencement whenever it was physically possible for him to do so, and one year he gave the commencement address. He taught his Physics 230 class on quantum chromo-



dynamics until a few days before his death, saying "I want to go out teaching."

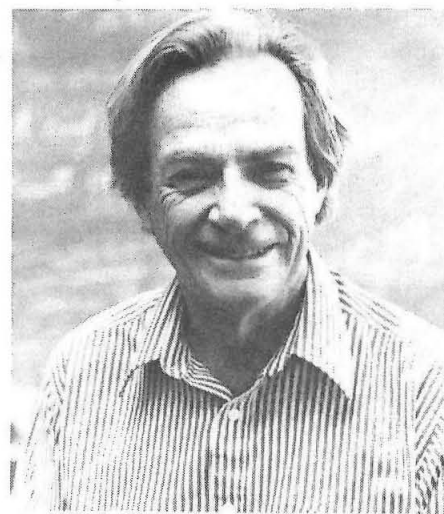
Feynman attended Freshman Camp several times and made appearances in several campus musicals, once in *South Pacific*, dressed as a native chieftain and playing Tueti drums. He regularly gave a lecture to the freshman physics class, challenging members to reach to the limits of their ability.

The faculty members were equally appreciative of his lectures. Whenever it was known that he was going to speak on any topic, the largest lecture hall available was made ready for an overflow crowd.

A concrete expression of the respect and admiration the Caltech community held for him occurred a few years ago when the rumor reached campus shortly after Feynman underwent major surgery that he needed massive transfusions and that blood was in short supply. The

blood banks were overwhelmed by Caltech students and faculty offering to contribute.

In 1973, British audiences saw Feynman in a Yorkshire Television interview called *Take the World from Another Point of View*. The title was



a summation of Feynman's outlook.

In 1985, he became known, through a book he wrote, to millions who had never heard of his theoretical breakthroughs. *Surely You're Joking, Mr. Feynman*, was a series of anecdotes and stories originally told to a friend, mathematics teacher Ralph Leighton, and recorded during their bongo-drumming sessions. Both the hardback and paperback editions made the national bestseller lists.

His most recent book, also published in 1985, was *QED: The Strange Theory of Light and Matter*. In it, Feynman undertook to explain quantum electrodynamics to the general reader, without using a single equation. His earlier textbook, *The Feynman Lectures on Physics*, a three-volume set of texts co-authored with Robert B. Leighton and Matthew Sands, revolutionized the teaching of

physics in colleges and universities around the world.

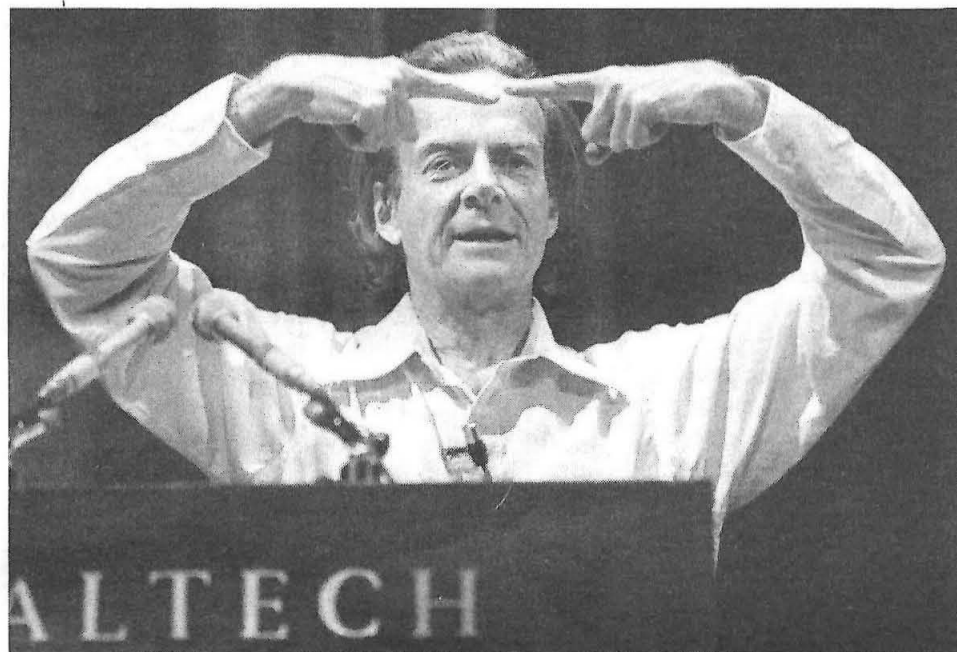
After the Space Shuttle disaster, when the President's Commission on the Space Shuttle Challenger accident was created, Feynman was asked to serve on the panel. Despite an avowed distaste for bureaucracy, he agreed. He quickly established a place for himself on the commission as an independent thinker and a driving creative force. Once, while a NASA expert was testifying, Feynman demonstrated what happens to a synthetic rubber O-ring at cold temperatures by dipping it into a glass of ice water. It came as no surprise when he issued his own explanatory addendum to the commission report.

As an avocation to express the wonder he felt toward the beauty of the universe, he took up painting. His works had been exhibited at the Athenaeum and at Bullocks Pasadena.

In addition to the Nobel Prize, Feynman had been awarded the Albert Einstein Award from Princeton, the Einstein Award of the Albert Einstein College of Medicine, the E. O. Lawrence Award of the Atomic Energy Commission, the Oersted Medal for Teaching, and the Niels Bohr International Gold Medal.

Wrote Randy Kamien in a tribute to Feynman, "I did not know Professor Feynman as well as I would have liked to [but] I tried to take in as much of his wisdom as possible. In class, he would tell us not to be intimidated by the theories, and the 'great men' who invented them. He often told us that, 'what one fool can do, another fool can do better!' This is one fool who will heed those words."

Feynman is survived by his wife, Gweneth Howarth Feynman, formerly of Rippowden, Halifax, England, now of Altadena; a son, Carl Richard, a daughter, Michelle Catherine; and a sister, Joan.



Serenading freeway commuters:

That's the tip of Loh's campaign to keep life exciting

By Winifred Veronda

Sandra Tsing Loh (BS '83) has made a resolution about her life: She never intends to be bored. Based on her experiences thus far, that's a resolution she'll be keeping.

A talented composer and pianist who earned her Caltech degree in physics, she broke new ground when she serenaded rush-hour commuters on a downtown stretch of the Harbor Freeway for an hour and a half over Labor Day weekend. Attired in a white silk suit and seated at a nine-foot white Steinway grand piano, she performed atop a parking garage roof that abuts the freeway, the downtown skyline providing a dramatic backdrop.

Utilizing six speakers and 9,600 watts, she made sure her work was not without impact. It carried for five blocks in all directions, reaching some 200,000 members of her captive audience who were caught in gridlock.

The music she performed consisted of original compositions (the only type of music she plays these days), and the performance was entitled "Spontaneous Demographics." She describes her music as "neo-romantic," and as influenced in rhythm by contemporary jazz, and by such composers as Prokofiev, Poulenc, and Satie.

Loh saw lots of smiles and some hand waves as she played, and one motorist pulled off and stopped to listen.

The Caltech alumnus, who had no previous experience in working with the media, was surprised at the sensation her concert created. She mailed out a press release to newspapers and was profiled in the *Wall Street Journal*. Thus discovered, she became a hot news item, sought after by the *Los Angeles Times*, the Associated Press, *People* magazine, and many others. She even rated a mention in Johnny Carson's monologue.

"The media loved it, particularly the ones back East," says Loh, who has been described as an ebullient, slightly hyper talker. "They loved it because they like stories about people in Los Angeles doing bizarre things."

An articulate and enthusiastic proponent of her ideas, Loh originally sought permission to perform on a median strip between lanes, but authorities denied her permission.

She settled for the parking garage rooftop. She went ahead in spite of warnings that she would undoubtedly face lawsuits stemming from accidents, but only one small fender bender occurred during the concert, and it seemed unrelated to her performance.

What idea can one conceive for a project to follow such an innovation as a freeway concert? For Loh, the challenge was not difficult. When she was interviewed in January, she was planning to premiere a four-minute composition outside the Hollywood-Roosevelt Hotel in early spring. As a climax, friends would drop 1,000 \$1 bills from an upstairs window into the crowd below, when Loh reached a musical climax of crashing chords.

"This is a stunt—throwing money out of a window—that would only make sense in Hollywood," she says. "It can be viewed as a satire on the kind of self-promotion that goes on in the entertainment industry. It perpetrates — yet at the same time comments on — the mythic idea that performers in Los Angeles will do anything to further their careers."

Loh figures she can save \$1,000 a year and treat herself to a unique performance annually. "They're a lot of fun, especially in the 1980s when Yuppies and materialism are in," she says. "They go against the trend."

A veteran of the avant-garde, Loh did not begin her musical experiments with the freeway concert. She had previously composed "Music for the Bonus Car Wash," a five-minute tape for drivers to play as they move through the rollers, brushes, and suds. "When you go past the soap cycle you start your tape," she explains. "Playing it makes the car wash like a Disneyland ride."

She also created a suite for moped and piano in which she says she sought to capture the "stop-and-go anguish" of driving in Los Angeles. "There's a sad part in the middle where you hear the clutch grinding," she explains. While she was programming computers at Hughes Aircraft, she wrote "Forward Looking Infrared," which she describes as a "funk-rap piece comprising technological terms." She later performed it at the Hollywood Palace with band members garbed in radiation suits.

She has published two short stories and written a play that was presented at the Zephyr Theater in West Hollywood. A screenplay she

wrote is making its rounds of potential producers. Entitled "Terror in Silicon Valley," it is about Yuppies and mass murder, and Loh terms it "a bit



Sandra Tsing Loh: She never intends to be bored.

of political satire." MusiCum Laude, a music production company, has produced her first album.

But Loh maintains that she wasn't always serious about a career as a performing artist, although she has been encouraged to move in that direction. "As a young person, I never took my music very seriously," she says. "I grew up with the feeling that, if you don't become a scientist you'll starve in the street."

A graduate student in English at USC, she teaches a course in creative writing and specializes in studies of turn-of-the-century American literature. In her studies she often examines the treatment of science in literature, and she is interested in literature from the era when technological change was transforming the face of the United States. She likes being part of an academic community, and she enjoys teaching—so long as there are many chances to let her imagination roam and create.

Avoiding boredom has never been a problem for Loh. The youngest child of Caltech alumnus Eugene Loh (MS '53, PhD '54), she lived for several years in Egypt and Brazil as a young person, dodged bullets in Belfast, and braved snow-blindness on Peruvian mountains.

She was living with her family in Malibu when it was time for college, and she applied to only one school—Caltech, where her brother, Eugene Loh, Jr. (BS '80), was a senior

in Page House. "I never thought of going anywhere else," she says. She was given early admission, and she moved into Page House too, settling into her particle physics studies.

Loh had started playing the piano when she was six, and composing when she was 10—"short, bad compositions. They weren't Mozart." At Caltech she continued her piano studies, taking classes with Elma Schonbach and performing about one concert a year in Dabney Lounge. She won a Don Shepard award for the encouragement of extracurricular-activity participation, and used the money to put together a concert which also featured members of a campus modern-dance group, and a string quartet assembled from among her musician friends who were members of the staff and student body. She also played on the volleyball team for four years, programmed the Y's noon concerts, and appeared in a student musical and play.

As an undergraduate, Loh took one or two English courses a term ("I have good memories of almost every English professor at Caltech from whom I took a course"). When she was a senior applying to graduate school, she decided particle physics was not to be her career, and she applied to English programs instead.

Would she do it over the same way, coming to Caltech and majoring in physics? Yes, says Loh. "I like to know a lot about different fields, and it's more interesting if you have a background in physics, as well as know a lot about English."

Besides, she finds that having a physics degree at Caltech has been very helpful in her musical performances. "If you play a piano on the freeway, people make certain judgments about you," she explains. "Then they learn about the degree, and they take another look. You're not necessarily more sane because you have a Caltech degree, but people make that assessment."

Besides, having a scientific attitude was important in dealing with the simple but challenging engineering and logistical problems that she had to work out when making plans to put her piano and sound equipment atop a parking structure—and she says there will be many other occasions when she will find it of practical value.

At this juncture, Loh is not sure what direction her career will take—whether she will become an English professor or a performing artist, or become involved in other forms of creative expression. But one thing seems certain: she'll keep with that resolution never to be bored.

From the president

A column of alumni news
by Alumni Association President David Harper

This month I'm pleased to welcome two new members to the Alumni Association Board of Directors — James Crabtree (BS '65) and



David Harper

Anthony Skjellum (BS '84, MS '85). James Crabtree lives in Long Beach and works as a MTS for Beckman Instruments in Fullerton. A life member of the Alumni Association, he is looking forward to serving on the Board.

Anthony Skjellum is pursuing his PhD degree in chemical engineering at Caltech, after receiving his BS degree in physics and his MS degree in chemical engineering. He served as the GSC chairman representative on the Board in 1986-87, and currently works with the Publications Committee. A resident of San Marino, he is a life member of the Alumni Association. Anthony and James are filling two vacancies on the Board with terms that expire in 1990.

Meanwhile, chapter activities have been under way across the country. In Boston, more than 170 alumni and their guests attended dinner and a reception where they heard Caltech President Thomas E. Everhart discuss the Institute and its future. The president of the Boston Chapter, Walter Specht (BS '57, MS '61, PhD '65) has been working with local alumni to plan future chapter events. The meeting with President Everhart was a great kickoff event for the Boston chapter and we look forward to more successful alumni gatherings there.

Washington, D.C. alumni had the opportunity to meet President Everhart during a reception at the National Academy of Sciences on March 1. More than 100 alumni and guests attended, and were welcomed

by the Washington, D.C., chapter president, John Andelin (BS '55).

Other chapter news concerns the expansion of a program of the Student-Faculty-Alumni Relations Committee (SFAR), called summer work experience. In Los Angeles, the SFAR committee for the last two years has helped Caltech students find summer jobs through local alumni and their companies. Now the SFAR committee wants to expand this service to all cities where there are active Alumni Association chapters.

Letters of explanation will go out to chapter presidents, along with resumes of Caltech students from that area. The chapter presidents will be asked to review the resumes and to distribute them to local companies that might be interested in employing Caltech students for the summer. We hope this program will introduce Caltech students to employment that will stimulate their interest in their studies at the Institute.

We will be tracking this program to see how many students get hired and if this service helps local companies in recruiting high-quality student help for the summer.

As a Caltech alumnus, I realize that you receive a lot of mailings from the Institute. Some are from the Alumni Association and some are from the Alumni Fund. I'd like to make it clear that the Association and the Fund are two separate organizations with different functions.

The Alumni Association is a nonprofit corporation formed by Caltech alumni to contribute to the educational and cultural environment at Caltech, to strengthen ties between the Institute and alumni, and to encourage fellowship among alumni.

The Association is governed by alumni like myself who serve on the Alumni Association Board of Directors. The Board and the Association provide many social and cultural activities for alumni — Seminar Day, for example, and reunions, chapter activities, and alumni travel programs. The Alumni Association is a membership organization and is supported by your dues. These provide funding for many of the services we offer to alumni — and to students for various activities and clubs on campus.

The Alumni Fund is a separate organization with the sole purpose of soliciting money from alumni for unrestricted use by the Institute.

Administered by the Alumni Fund Office within the Caltech Development Office, the Fund coordinates the national annual giving campaign and the reunion campaign, and solicits special gifts from alumni. Alumni volunteers across the country assist in the fund-raising effort by contacting alumni in their areas by telephone.

I hope this helps you to understand the difference between the two organizations, and why both ask you for money. We appreciate your support and hope you'll continue to support both the Alumni Fund and the Alumni Association.

Fund leaders chosen for 1988-89

Key Alumni Fund leaders selected for 1988-89 include G. Stan Holditch (BS '48), 1987-88 Alumni Fund chairman; Ben G. Burke (BS '61), regional campaign chairman; Leslie Paxton-Rousseau (BS '79), young alumni chairman; and Kirk Dawson (BS '61), reunion campaign chairman.

Fall New England trip still has openings

A few openings remain for the alumni New England trip, October 2-6, 1988. At that time, alumni will have the opportunity to explore Vermont and New Hampshire amid glorious fall colors. Jo Laird (PhD '77) and Wally Bothner of the University of New Hampshire's department of geology will lead the excursion, assisted by Robert Sharp, Sharp Professor of Geology, Emeritus.

Cost of the trip is \$650 per person, double occupancy, and \$800 per person, single occupancy. This covers all expenses from dinner on October 2 through breakfast on October 6. Persons wishing to participate should call the alumni office at (818) 356-6592 for more information.

Seminar Day speaker: NASA administrator James Fletcher

James C. Fletcher, administrator of NASA, will be the general session speaker at Alumni Seminar Day on May 21. His topic is "Space: The Challenges and Opportunities of the Future."

Fletcher is the first person to have been head of the nation's civilian



space agency on two separate occasions. He was the fourth NASA administrator from April 1971 to May 1977 and became the seventh head of the agency in May 1986.

Speakers from the faculty who will present research seminars on Seminar Day include:

John D. Baldeschwieler, professor of chemistry; Paul E. Dimotakis, professor of aeronautics and applied physics; Jeff Dozier, senior research scientist, geology and planetology section, JPL; Geoffrey C. Fox, professor of theoretical physics; Hiroo Kanamori, professor of geophysics; Shrinivas Kulkarni, assistant professor of astronomy; John O. Ledyard, professor of economics and social sciences; Henry A. Lester, professor of biology; John H. Richards, professor of organic chemistry; Eleanor M. Searle, Edie and Lew Wasserman Professor of History; Richard J. Terile, planetary astronomy group supervisor, JPL; David C. Van Essen, professor of biology and executive officer for neurobiology; and Peter J. Wyllie, professor of geology.

CALTECH ALUMNI ASSOCIATION

NEW ENGLAND TRIP, OCTOBER 2-6, 1988

Please make _____ reservations for the alumni trip to New England.

Name(s) _____ Class Year _____

Address _____

Phone _____

I enclose a check for \$ _____ (\$150 per person) as a deposit.
Make check payable to the Caltech Alumni Association and mail to 1-97,
Pasadena, CA 91125.

Alumni Board nominates new members

The Board of Directors of the Alumni Association met as a nominating committee on January 21, in accordance with section 5.01 of the bylaws. Five vacancies on the board, and a chapter representative, in addition to the positions of president, vice president, secretary, and treasurer, are to be filled. These are the nominees for terms beginning at the close of the annual meeting in June 1988.

Officers

President: Charles H. Holland, Jr. (BS '64)

Vice president: Rhonda L. MacDonald (BS '74)

Treasurer: E. Micheal Boughton (BS '55)

Secretary: Gary W. Stupian (BS '61)

Directors

Tway W. Andrews (BS '44) — three years

Joe K. Cheng (BS '85) — three years

Joseph A. Dobrowolski (BS '49) — three years

Hubert E. Dubb (BS '56) — one year (chapter representative)

Rolf H. Sabersky (BS '42, MS '43, PhD '49) — three years

William M. Whitney (BS '51) — three years

Section 5.01 of the bylaws provides that members 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.

Below are biographical summaries of those nominated for directors.

Tway W. Andrews

A resident of Arcadia, Tway Andrews is president of A-F Sales Engineering Company, Inc., in Pasadena. He is a member of The Caltech Associates. For many years he was a member of the Seminar Committee, and in 1984 he served as co-chairman of his 40th class reunion. He also served as reunion campaign chairman for the Alumni Fund in 1985-86.

Joe K. Cheng

Joe Cheng lives in Redondo Beach and is a member of the technical staff at the Aerospace Corporation in El Segundo. He is an active member

of the Undergraduate Admissions Support Committee and serves as the Alumni Admissions Committee representative in the Los Angeles area.

Joseph A. Dobrowolski

Joe Dobrowolski is president of the Concrete Construction Company in Altadena. He previously served on the Board of Directors from 1975 to 1978, and was chairman of the Program and Membership Committees. He has been a member of the Seminar Committee since 1980 and this year is general chairman of the committee for the 51st annual Seminar Day.

Hubert E. Dubb

Hugh Dubb is a patent attorney with the firm of Fliesler, Dubb, Meyer, and Lovejoy in San Francisco. He is a member of The Caltech Associates. He served as the San Francisco chapter vice president in 1978-79, and as president in 1979-80. He also served on the Board of Directors in 1980-81. Currently, he organizes the San Francisco Peninsula monthly luncheons.

Rolf H. Sabersky

Rolf Sabersky has been a member of the Caltech faculty since 1949 and has been professor of mechanical engineering since 1961. He is a recipient of the Heat Transfer Memorial Award of the American Society of Mechanical Engineers.

William M. Whitney

Bill Whitney lives in Pasadena and is the division technologist for the Observational Systems Division of JPL. He has been a member of the Board of Directors since 1985. Whitney is currently chairman of the Publications Committee and is an active member of the Undergraduate Admissions Support Committee.

Caltech legends: Do we need a sequel?

The Alumni Association is considering publishing a sequel to *Legends of Caltech*, as was announced in the February *Caltech News*. The original *Legends* was published five years ago after alumni submitted enough good stories to make it possible to produce a high-quality anthology that chronicles the history of Caltech pranks.

Some of the submissions wound up on the cutting-room floor — victims of space and budget limitations. Other pranks were never brought to the attention of the editors, and still other adventures have taken place since the book was published in 1983.

The Association wants to know if we should try for *Legends, Part II*, and hopes to learn the answer by soliciting contributions to be included in a new volume. Stories of pranks pulled by students at any time since the Institute was founded are welcome.

Any alumni wishing to submit pranks should submit descriptions of them to Chip Smith, Lawrence Livermore National Laboratory, Box 808/F-626, Livermore, CA 94550, as early as possible. Authenticity of pranks should be corroborated by photographs or other material, if possible. Any material submitted will be returned to the sender.

If enough high-quality material is submitted by May 31, the Alumni Association will proceed with the sequel to *Legends*. (By the way, *Legends* is still available from the Alumni Association for \$9 a copy.)

Everhart addresses East Coast alumni



President Thomas E. Everhart with John Andelin, president of the Washington, D.C., alumni chapter. Everhart, who addressed alumni in both Boston and Washington, said that one of the Institute's primary goals is to develop strong, active chapter programs across the country, and to maintain close ties between the Institute and its alumni. "Reaching across the country to the East Coast is a special challenge," he said, "but with enthusiastic leaders like John Andelin, we will be successful."

ALUMNI ACTIVITIES

May 6, 10th reunion, class of 1978.

May 14, 35th reunion, class of 1953, 45th reunion, class of 1943.

May 20, 25th reunion, class of 1963.

May 21, 51st annual Seminar Day, on the campus.

June 3-4, 50th reunion, class of 1938.

June 4, Half-Century Club luncheon, the Athenaeum.

June 16, Alumni Association annual meeting and dinner. The Athenaeum.

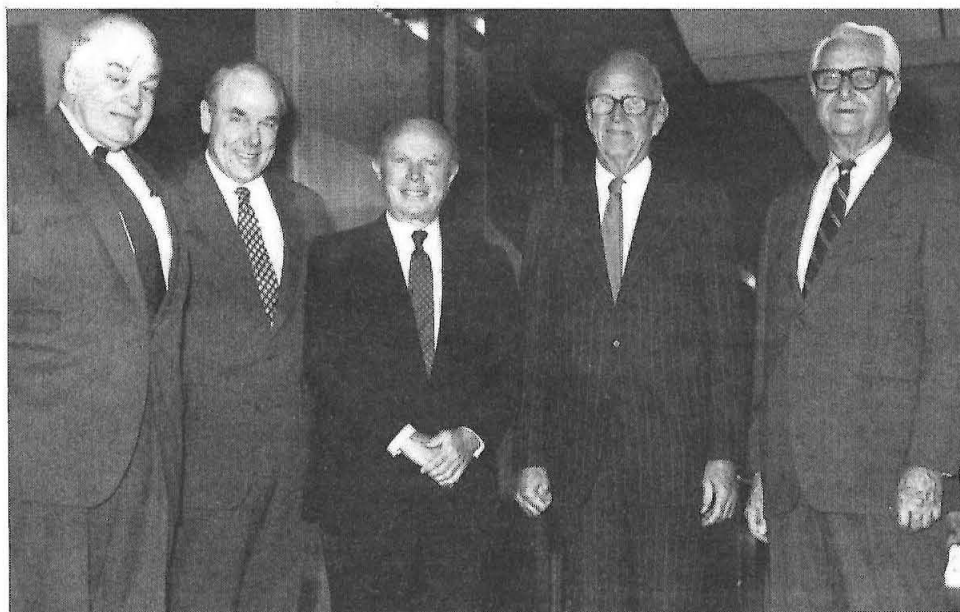
October 2-6, New England travel program. See article in this issue.

SURF anniversary

Continued from page 4

Through the fund-raising drive, SURF is seeking to augment its general operating budget and to increase by seven the number of endowed SURF fellowships, each of which is worth \$50,000. There are currently seven endowed fellowships, including one being created by the class of 1936 and one set up by his students to honor the late Professor Lester Lees.

1988 Associates Executive Committee



Members of The Associates of Caltech 1988 executive committee with Caltech President Thomas E. Everhart are, from left: Hugh Colvin, president; Dr. Everhart; Frank Whiting, secretary; Kenneth Rhodes, vice president; and Arthur Adams, treasurer. Joanna Muir (Mrs. Downie Muir III), vice president, was not present for the photograph.

Improving performances characterize basketball season

Although the past season was difficult to evaluate on a win-and-lose basis, the team made great strides in individual improvement.

Caltech had a returning starter in Brad Scott, 5'8", a junior who is also the team captain. Jason Karceski, a 5'10" sophomore guard, was also a returning letterman. These lettermen, along with two freshmen, Huck Seed, a 6'6" forward, and Bill Swanson, a 6'8" center, and senior Adam Slovik, a 6'3" forward, formed the starting lineup.

Sean Hillyard, a 6'2" junior forward, and Randy Ralph, a 5'11" guard, were the first substitutes off the bench. Other members of the squad were freshmen Scott Kister, Dan Kollmorgen, and Dave Peterson; sophomores Dean Oliver and Marty O'Brien; and senior Gino Thomas.

The Beavers improved during the season to the point that they went to the wire with most of the teams on the schedule. The defense was Tech's strong point while offensive execution registered the greatest improvement. Only two seniors leave this year, so prospects for next year look good.

This was the third year of playing conference junior varsity teams, and while Tech was very competitive, the record was 2 wins and 10 losses. Tech chalked up non-conference wins over Loma Linda University and Arizona College of the Bible. The hardest loss to take came at the hands of the Caltech alumni, 51-37.

Jason Karceski was selected as winner of the Vesper Trophy as the outstanding player, and Huck Seed was the winner of the Carl Shy Freshman Trophy. Brad Scott was reelected as captain for 1988-89. Other awards went to Bill Swanson as leading rebounder, and to Brad Scott for most assists and highest free-throw percentage.

In SCIAC competition, Claremont-Harvey Mudd won the championship, closely followed by Occidental and Whittier.

OBITUARIES

1924

HOWARD M. WINEGARDEN, MS '27, PhD '31, on December 4, in Oakland, California. A member of Tau Beta Pi, Sigma Xi, the American Chemical Society, and a Fellow of the AAAS, he retired in 1960 as vice president for research and development at Cutter

Laboratories of Berkeley, California. He is survived by his wife, Ruth; sons, Howard and Winston; seven grandchildren; and three great-grandchildren.

1926

EDGAR P. VALBY, of Pasadena, California, on November 16. A Life Member of the Alumni Association, he worked for 41 years as a senior special projects engineer for Atlantic Richfield Company, retiring in 1968. In the early 1930s he helped develop a gas-lift technique now familiar to the oil industry. He is survived by a son, Richard.

BURNETT B. WISEGARVER, of Temple City, California, in November. A research chemist employed by Dr. Gordon Alles Laboratories until his retirement, he assisted Dr. Alles in many important scientific advancements in the field of chemistry. He was also an avid chess enthusiast, and participated in tournaments. He is survived by his wife, Lucille; his brother, Maurice; his sister, Virginia Gamble; and his nephew, Norman Gamble.

1927

JAMES BOYD, of Carmel, California, on November 24. After graduating from Caltech, he went on to receive both his master's and doctoral degrees from the Colorado School of Mines. His academic career at the Colorado School of Mines took him from instructor in geology to dean of the faculty. In 1951, he joined the Kennecott Copper Company as exploration manager, and went on to become vice president in charge of exploration in 1955. In 1960, he became president of the Copper Range Company. Dr. Boyd also served as director of the U.S. Bureau of Mines. A member of a number of professional mining and geological societies, he won the A.I.M.E. gold medal, the Copper Club Man of the Year Award, the Colorado School of Mines Distinguished Service Award, and the Legion of Merit with Oak Leaf Cluster. A recipient of the Institute's Distinguished Alumni Award, he was also a Life Member of the Alumni Association, and an Associate. He is survived by his wife, Clemence; sons, James Brown, Bruce, Douglas, and Hudson; daughters-in-law, Susie, Penelope, and Betty Ann; and nine grandchildren.

JOHN E. B. FORSTER, of Duarte, California, on January 9. He is survived by his wife, Mary; daughters, Gabrielle and Katharine; and four grandchildren.

1929

DALLAS E. COLE, of Ojai, California, on December 27. Retired from his position as chief engineer for the Colorado River Board of California, he was a member of Caltech's Alumni Association and a life member of the American Society of Civil Engineers. A patron of the Ojai Festivals, he was a member of Ojai's HELP, and of the Neighborhood Church of Pasadena. He is survived by his wife, Sally; daughters, Susan E. Cole, Patricia Detting, Susan Wayland, and Carolyn Delozier; son, Lawrence Martz; eight grandchildren; and three great-grandchildren.

1930

CLYDE E. GIEBLER, MS '32, of Escondido, California, in October. A Life Member of the Institute's Alumni Association, he had been active with family, church, and community.

1935

DAVID J. LEHMICKE, of Akron, Ohio, on November 25. After receiving his BS from Caltech, he later went on to earn a PhD in analytical chemistry from the University of Minnesota, graduating in 1946. He worked 23 years for Firestone as a research chemist in the study of nylon, retiring in 1978. After his retirement, he served as a part-time instructor in both the physics and chemistry departments at the University of Akron. In 1984, he attended his 50th reunion at Caltech. He is survived by his five children and nine grandchildren.

SETH H. NEDDERMEYER, PhD, in Seattle, Washington, on January 29, of complications from Parkinson's disease. A physicist credited with developing the implosion trigger that enabled the atomic bomb to be detonated, he was working for the National Bureau of Standards when J. Robert Oppenheimer tapped him for the Manhattan Project in Los Alamos, New Mexico. After leaving there in 1946, he went on to become a professor at the University of Washington, where his research on cosmic rays helped lead to the discovery of subatomic particles called muons. The U.S. Department of Energy gave him its highest scientific honor, the Enrico Fermi Award, in 1983.

1936

JOHN P. KLOCKSIEM, of Los Altos Hills, California, in November of 1986. A Life Member of the Institute's Alumni Association, he worked for many years as a senior staff engineer at Lockheed's Missiles and Space Company in Sunnyvale, California. He is survived by his wife, Dorothea; a daughter; and two sons.

1938

JACK F. DOUGHERTY, MS '39, of Houston, Texas, in July. A Life Member of Caltech's Alumni Association, he served as president of JFD, Inc.

JOHN C. WELLS, MS, of Mill Valley, California, on March 26, of leukemia.

1940

NEWTON C. STONE, MS '41, of Cathedral City, California, on November 21. He is survived by a daughter, Beverly Mustard.

1942

JAMES F. MEAD, PhD, of Pacific Palisades, California, on November 30, of leukemia. Professor emeritus of biological chemistry and former associate director of the Laboratory of Nuclear Medicine and Radiation Biology at UCLA, he retired in 1984, after nearly 40 years of teaching. A 1980 research winner of the American Oil Chemists Society's annual award, he was a specialist in lipid biochemistry. He is survived by his wife, Denney; two daughters; a son; and six grandchildren.

1956

FORREST L. CARTER, PhD, of Cabin John, Maryland, on December 20. A Life Member of the Institute's Alumni Association, he is survived by his wife.

PERSONALS

1927

ALAN E. CAPON has ended 14 years of retirement to accept his former position as acting general manager of the public service department of the City of Burbank, California, the electric and water utility of the city. Capon has been a member of the Public Service Advisory Board for the past ten years.

1929

WILBERT W. BAUSTIAN, of Tucson, Arizona, retired in 1971 as chief engineer at Kitt Peak National Observatory. Until last year, he was consulting with various observatories, including those at the University of Michigan, University of Wyoming, and University of Mexico.

1931

ROSS E. MORRIS, MS '32, of Vallejo, California, is retired, but still doing consulting in rubber technology and failure analysis of tires and other rubber items.

1942

KENNETH URBACH, of Sunnyvale, California, retired from Lockheed M&S Company at the end of January 1987. In February, he returned to work on a part-time basis, on the Hubble Space Telescope.

1944

JOSEPH M. PHELPS, MS '47, who played varsity golf for Caltech in 1943-44, has retired as chairman of Phelps/ABC Civil Engineering and started a new career as a teaching golf professional. He has constructed a private 9-hole course on his property in Rancho California for use by his students. Phelps's book, *Stress-Free Golf*, scheduled for publication this year, will present a new approach to mastery of the "auld game".

1948

HARRY LASS, PhD, of Altadena, California, earned his JD degree in May 1987 and passed the California Bar Exam two months later.

T. A. WILSON, MS, has retired from The Boeing Company, ending a 44-year career there. Wilson has been elected chairman emeritus of the board of directors, and will continue to serve on the board. Named Boeing president in 1968, Wilson assumed the added duties of chief executive officer in 1969. In September 1972, he was elected chairman of the board. Milestones of Wilson's career with Boeing include major responsibility in the development of the revolutionary B-47 swept-wing bomber; project engineer on the B-52 program; and proposal leader and program manager for

the Minuteman ICBM. Among the many honors and awards he has received are election to the National Aviation Hall of Fame for engineering and managerial achievements, 1983; receipt of the National Academy of Science Award in Aeronautical Engineering, 1985; and membership in the National Academy of Engineering and the Aerospace Industries Association.

1951

HARDEN M. McCONNELL, PhD, professor of chemistry at Stanford University, was awarded the 1987 Pauling Award for outstanding achievement in chemistry. McConnell used his theoretical insights into nuclear magnetic resonance (NMR) spectroscopy, a powerful analytical tool, to probe how electrons are arranged in molecules, and how their arrangement influences the course of chemical reactions. He also combined valence bond theory, molecular orbital theory, and electron spin distribution data to explain the observed paramagnetic resonance spectra of organic free-radicals, a highly reactive class of compounds, which play a key role in causing certain kinds of cancer. Another contribution of McConnell's, the "spin-labeling" technique, has since been used to study biological membrane processes on the molecular level.

1952

JAMES K. LaFLEUR, chairman, president, and chief executive officer of GTI Corporation, of Burbank, California, plans to retire in April 1988.

1953

WILMER A. JENKINS II, PhD, director of packaging products for the Polymer Products Department (PPD) of the Du Pont Company, retired in December after 35 years with the company. Jenkins joined Du Pont in 1952 as a research chemist in the Pigments Department at the Experimental Station in Wilmington. He became a research supervisor in 1957 and later held various management posts in research, technical services, and manufacturing. In 1970, he was named director of the Research and Development Division of the Explosives Department. He assumed that same position in 1972 with the Polymer Intermediates Department. He subsequently served as director of the Polyester and Acrylic Intermediates Division in the Polymer Intermediates Department and as director of the Packaging Films Division of PPD, before assuming his present position in 1979. Jenkins and his wife, June, live in Carrcroft, a suburb of Wilmington, Delaware.

1955

MARCO R. NEGRETE, director of corporate standards at Hewlett Packard Company, has been reelected to the board of directors of the American National Standards Institute.

1956

HOWARD M. BRODY, MS, PhD '59, of Philadelphia, Pennsylvania, has published *Tennis Science for Tennis Players*, which is now in its third printing with the University of Pennsylvania Press.

1960

EDWARD R. McDOWELL, MS, PhD '64, retired manager of the Reservoir Engineering Division of Chevron Oil Field Research Company in La Habra, California, has been elected vice president of the American Institute of Chemical Engineers. After serving as vice president in 1988, McDowell will automatically assume the presidency of the organization in 1989. During his 27 years with Chevron, McDowell's accomplishments have included the computer-simulated modeling of enhanced oil recovery processes. He was responsible for developing the computer program used by Chevron subsidiaries and affiliates worldwide to locate production and injection wells.

JAMES C. SORENSEN, of Allentown, Pennsylvania, recently became the director of technology and development for Air Products and Chemicals, Inc., Advanced Separations Department.

1961

ALEXANDER F. GOETZ, MS '62, PhD '67, of Boulder, Colorado, reports that he is finally getting used to academic life after two years as professor of geological sciences and director of the Center for the Study of Earth from Space at the University of Colorado. Now he's growing accustomed to a new challenge: being father to son Julian, born last March.

1963

DONALD R. DAVIS, Ex, of Austin, Texas, has become editor in chief of the *Journal of Applied Nutrition*, a small journal published since 1947 primarily for practicing physicians, dentists, and other clinicians.

1964

TERENCE M. MURPHY is now chairman of the botany department at the University of California, Davis, where he lives with his wife, Judith, and their 12-year-old daughter. Starting July 1, Murphy will take charge of a North American office for the Scandinavian plant physiology journal, *Physiologia Plantarum*.

1965

JOHN C. SIMPSON, JR., was named vice president of planning for Mobil Oil Corporation's worldwide Marketing and Refining Division, in November 1987. Simpson has been regional executive of Mobil Europe Inc. since 1984. He joined Mobil in 1967 as a supply analyst and held a number of supply and Middle East assignments, becoming manager of financial planning for Middle East transportation and supply in 1975. He was named manager of operations for sales and supply in 1979 and manager of crude oil and fuel products in 1982. Simpson and his wife, Carolyn, live in Chappaqua, New York. They have a son, Elliott.

1967

LOREN D. LUTES, PhD, has been named professor of civil engineering at Texas A&M University, College Station, Texas, effective January 1988.

1969

MOHSEN M. BALIGH, MS, PhD '72, professor of civil engineering at MIT, has been named winner of the American Society of Civil Engineers' 1987 J. James R. Croes Medal. The award recognized Baligh for his paper, "Strain Path Method", which was published in the September 1985 *Journal of Geotechnical Engineering*. Baligh's work provides a comprehensive framework for systematically approaching deep foundation problems and the interpretation of in-situ tests. Predictions achieved by this method have led to fundamental changes in researchers' understanding of deep penetration mechanisms as well as to the development of new tools and techniques to validate predictions and estimate soil properties.

CHARLES ELACHI, MS, PhD '71, was recently appointed as the assistant laboratory director for space science and instruments at Caltech's JPL. In this role, Elachi will oversee space science research efforts and manage development of the Lab's many instruments used in planetary science, astrophysics research, and Earth observation, as well as associated information systems. Elachi teaches a course at Caltech on the physics of remote sensing. He recently published two textbooks: *Introduction to the Physics and Techniques of Remote Sensing*, and *Spaceborne Radar Remote Sensing*.

JACK F. JURACO, MS, of Manhattan Beach, California, is an assistant program manager for the HS 393 Spacecraft, Commercial Systems Division, Space and Communications Group, of Hughes Aircraft.

1973

CLIFF DAVIDSON, MS, PhD '77, was one of four Caltech alumni whose articles were published in the fall 1987 issue of Carnegie Institute of Technology's *CIT Engineering News*. Davidson's article was concerned with detailed studies of atmospheric contaminants in the Greenland Ice Sheet, work that has enabled him to understand long-term and seasonal trends in acid deposition. Parallel computing and the solution of very large combinatorial optimization problems is one area of interest to GREGORY McRAE (MS '75, PhD '81). His article showed that breaking world records with a parallel computer can provide the basis for solving very large-scale, practical, scheduling problems. Air pollution is a major focus of the studies conducted by ARMISTEAD RUSSELL (MS '80, PhD '85). His article described how substituting methanol for gasoline as an automotive fuel offers the prospect of cutting air pollution in the Los Angeles Basin in half. T.E. (ED) SCHLESINGER (MS '82, PhD '86) described his research on probing the nature of superconducting materials and the use of sputtering to deposit superconducting thin films.

1975

TIMOTHY E. ERICKSON, of Oakland, California, and Meg Holmberg are proud parents of Anne Katherine, born in September. Erickson finished his PhD in May and is pursuing a double career in fatherhood and teacher education.

1978

JAMES C. EISENACH, MS, has been promoted to assistant professor of anesthesia at the Bowman Gray School of Medicine of Wake Forest University in Winston-Salem, North Carolina. Eisenach joined the Bowman Gray faculty in 1986 and is active in the department of anesthesia's programs of teaching, research, and patient care. His research involves a study of drugs that might provide long-term pain relief for patients following surgery.

NEIL HICKEY, concluding that too much sun and good weather can't be good for you, has moved back to Maine. He has also moved his consulting firm, NDH Consulting.

1979

STANLEY A. COHN and his wife, Sara, finished their PhDs last year, graduating back-to-back (Stan from the University of Colorado at Boulder, and Sara from the University of Denver). They have just moved to Denver, where they are expecting their first child in May. Stan is working as a postdoctoral fellow at the National Jewish Center, while Sara is a school psychologist in a suburban school district.

MARK D. IWANOWSKI, MS, of San Diego, California, has retired from the National Football League and is now working as program manager for Honeywell, Inc.

MATTHEW L. SPITZER, PhD, a member of the USC Law Center faculty since 1981, has been named the William T. Dalessi Professor of Law. Spitzer's expertise is in law and economics and in broadcast regulation. His recent research has focused on content control of broadcasting, which he examines in his recent book, *Seven Dirty Words and Six Other Stories: Controlling the Content of Print and Broadcast*, published by Yale University Press in 1986.

WILLIAM E. STUMPH, PhD, was awarded tenure in September 1987 and promoted to full professor in the chemistry department at San Diego State University.

1980

JOHN McLEAN, PhD, and wife, Suzanne, have named their first child, James Philip, born in January 1988, after Caltech alumnus JAMES MUELLER (PhD '82) and Philip Saffman, Caltech professor of applied mathematics. John and Suzanne were RAs at Ricketts House 1978-80. John is now a project manager for TRW in Redondo Beach, California.

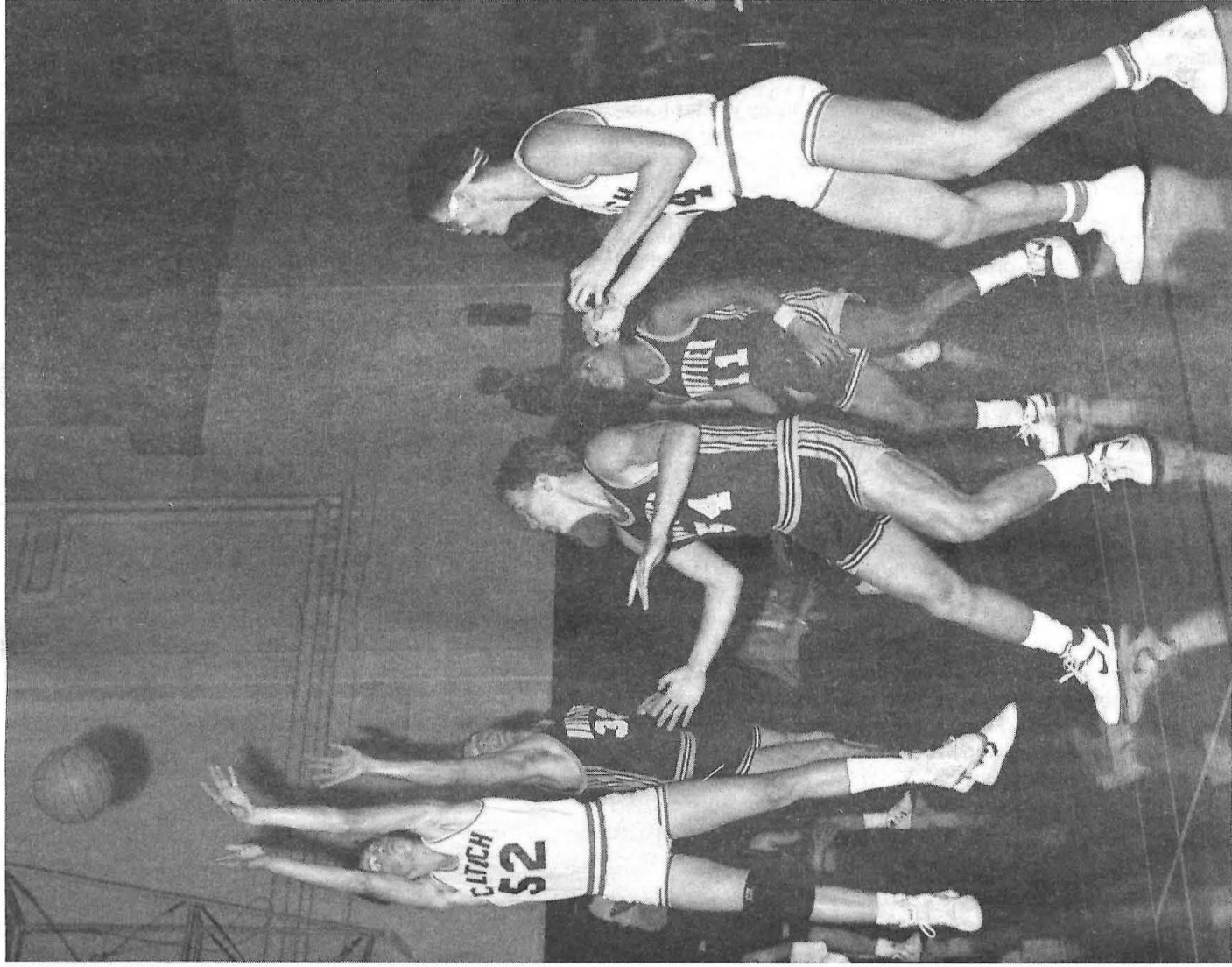
1982

SAM CHAN and wife GINNY (BS '83) have welcomed into their family a son, Kyle Edward, who was born in October of 1987.

1984

TED E. WILLIAMS is a guest professor at Aarhus University, Denmark.

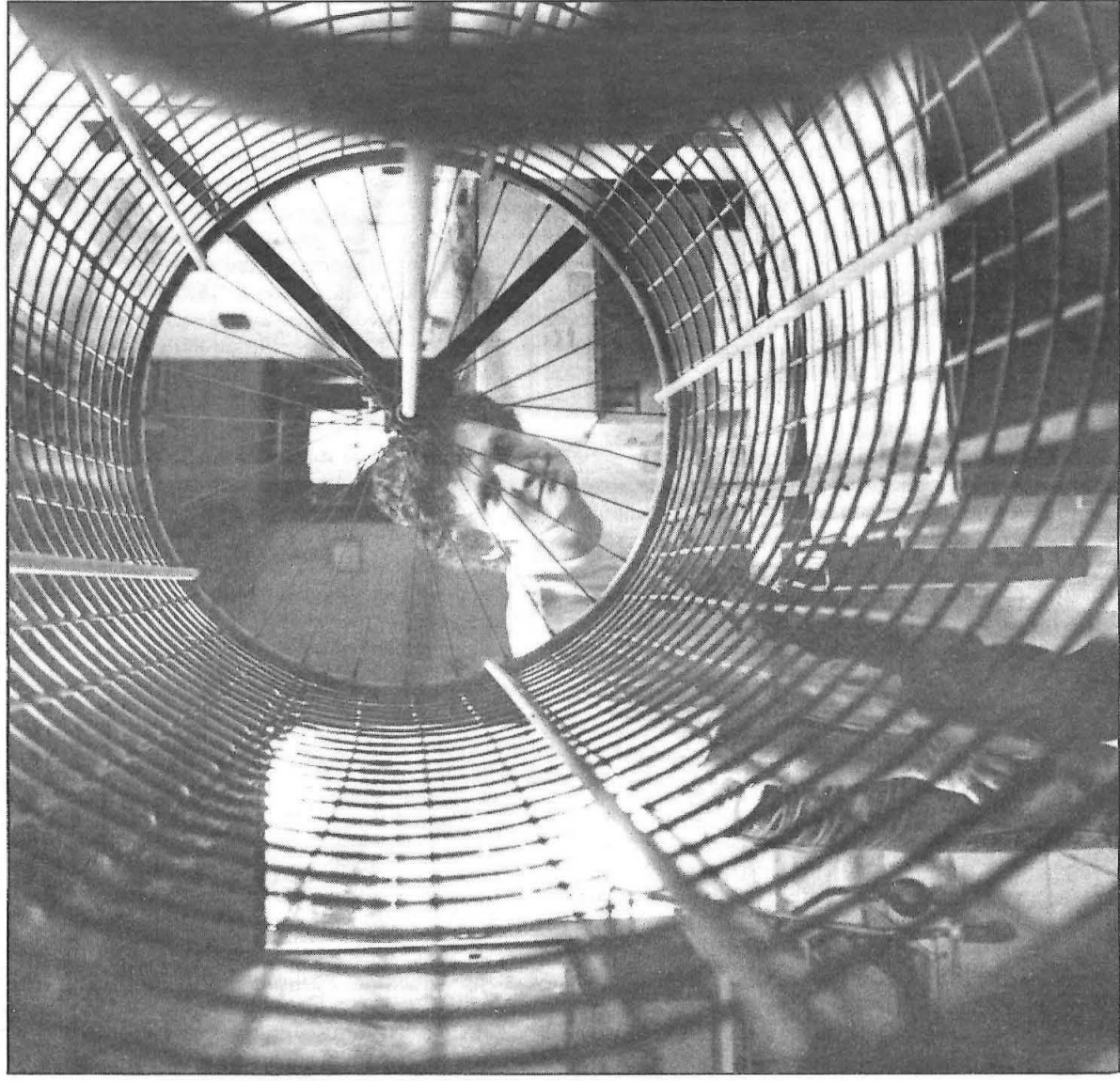
CALTECH NEWS



Huck Seed, forward, takes a shot in a game with Whittier on Caltech's home court. Center Bill Swanson is at right. Caltech defeated Whittier, 65-57, on Whittier's home court, but lost, 71-65, at home.

CALTECH NEWS

Published for Alumni and Friends of the
California Institute of Technology
Volume 22, No. 2, April 1988



Seismological technology: The old yields to the new. See page 2.

April 1988