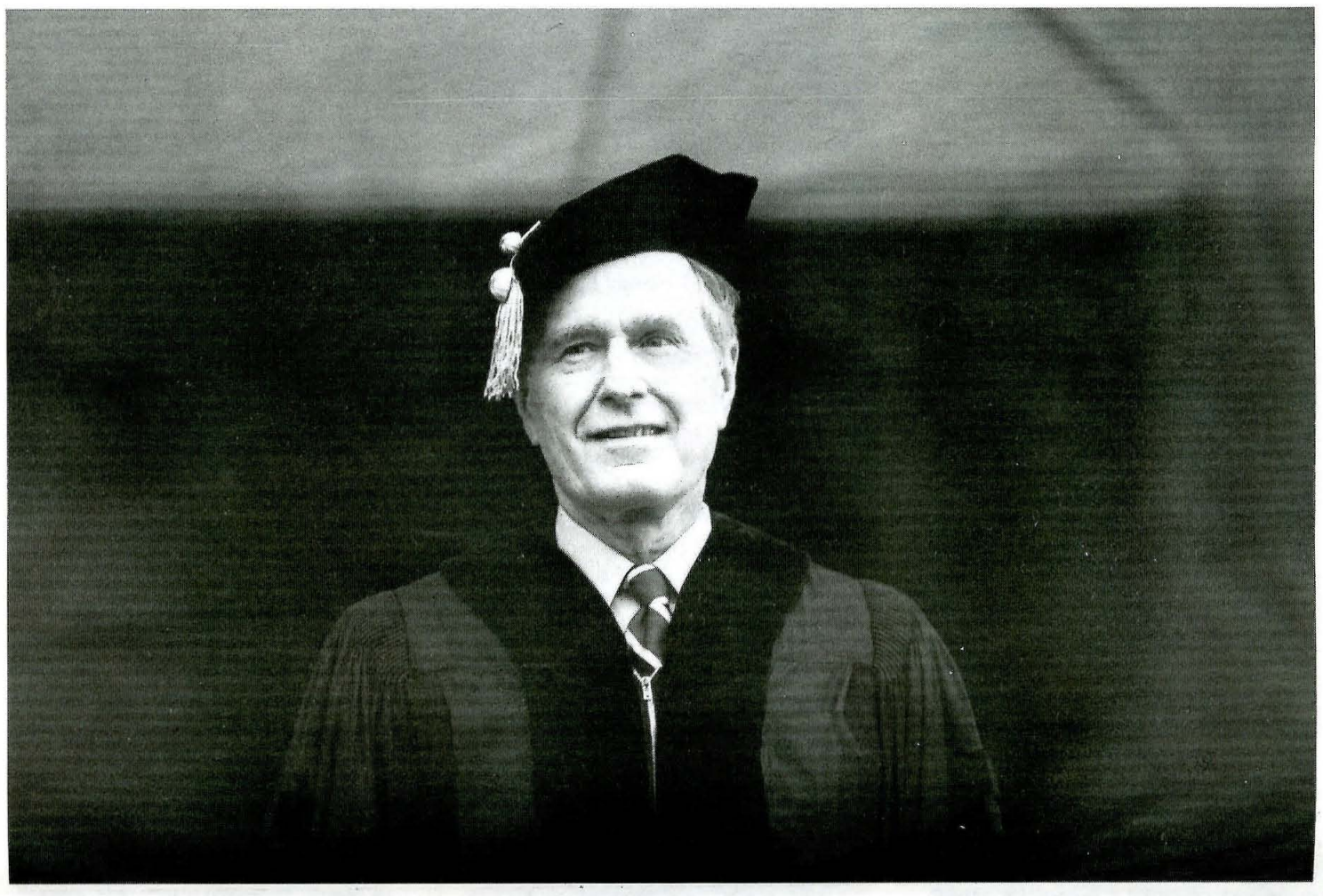
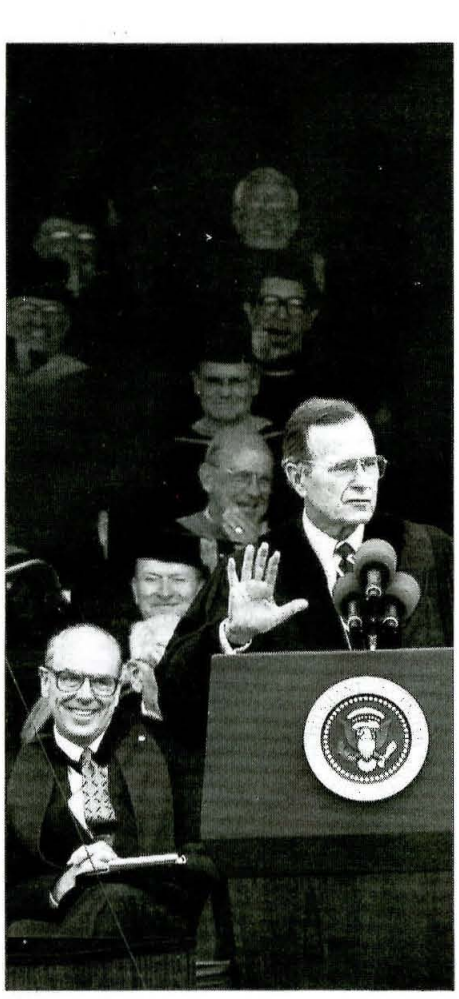
California
Institute of
Technology

Caltech News

Volume 25, No. 4
August 1991



George Bush speaks at commencement



In his Centennial commencement address, President George Bush both praised Caltech for its achievements during its first 100 years, and criticized Congress for failing to press ahead on domestic policy bills to which he has given priority.

Speaking to an audience of 9,000 spectators on Caltech's athletic field, Bush tackled Congress for not taking action on his transportation and crime bills. "The American people don't understand . . . the delay, the inaction, the foot-dragging," he said, "particularly when they see that Congress can pass a funding bill for a ferryboat in Samoa or a study of the Hatfield-McCoy feud while threatening to cancel the manned space program and the Space Station Freedom. . . . "

Assaulting critics of his social policies, President Bush asserted that "I'm not opposed to government per se. I'm not a government-basher. But we in . . . government must understand, bigger isn't better; better is better."

Stressing his support for scientific and technological investment, Bush insisted that "we must invest now in a brighter future. That's why our administration fully supports high-performance computing, and math and science education. We're also proposing a 13-percent increase, bringing research and development to $76 billion. We want to increase funding for the supercollider by more than 100 percent. Government and the free market often converge in the field of basic research. Together, they help produce a brighter future for all Americans."

Bush noted that "this administration has rewarded programs in which government acts intelligently and programs produce results. Head Start, where kids get the tools they need to start school ready to learn . . . we support it. We've expanded Head Start funding by over $700 million in the last two years.

"We advocate programs that employ free-market incentives—like tax credits for low-income parents to choose their own child care—because they use human nature as a lever, not as an obstacle. We support initiatives that create opportunity—like our housing vouchers for public housing tenants. Our HOPE initiative gives public housing tenants control over their lives and their futures."

"Whether in schools, in child-care centers, or factories or neighborhoods," he said, "we must ensure that government is part of the solution—not part of the problem."

But Bush devoted much of his address to commending the achievements of Caltech faculty and graduates, and of the institution over the years since its founding.

"Your students, your professors and your graduates have peered into the heart of the atom, gazed out at stars billions of miles away," he said. "They've inspired new medicines and biotechnologies; and they've hurled rockets into the heavens. And they've helped redefine the sciences upon which modern technology—and modern life—depend. . . .

"We now stand on the verge of a new voyage in the American experience—charting a fresh course to a world of unseen possibilities and promise.

"Many Techers have already explored new worlds—worlds of the positron and the quark, and the fingerprint of the

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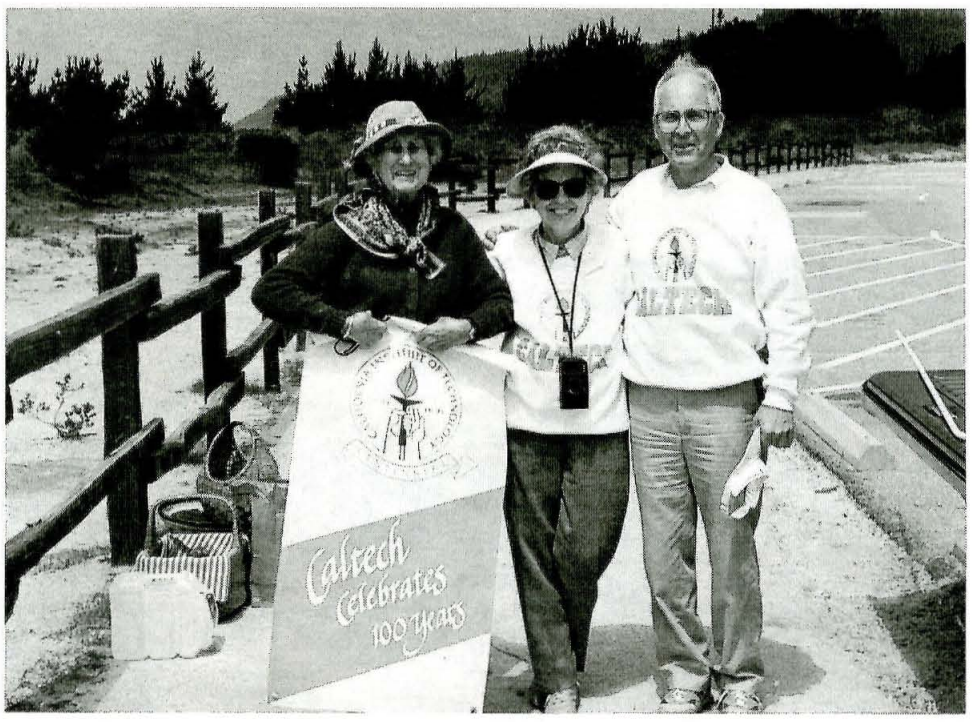
FRIENDS



Martha Throop Smith, Shirley Larson, and Carl Larson (BS '52) at the Ano Nuevos State Park in northern California. Members of the President's Circle visited the state reserve for elephant seals in the early spring.

Earthquake Research Affiliates take field trip

Following in a 39-year tradition, the Caltech Earthquake Affiliates conducted a field trip in April to the San Francisco Bay Area. Accompanied by faculty members from the Divisions of Geological and Planetary Sciences and Engineering and Applied Sciences, 49 participants representing 14 companies participated in the trip, focusing on "Lessons Learned from the Loma Prieta Earthquake."

Caltech faculty participating in the excursion and giving presentations were: Clarence R. Allen, professor of geology and geophysics, emeritus; James L. Beck, associate professor of civil engineering, and option representative for graduate student affairs in applied mechanics; Robert W. Clayton, professor of geophysics, executive officer for geophysics, and a staff member of the Seismological Laboratory at Caltech; John F. Hall, associate professor of civil engineering; George W. Housner, the Carl F Braun Professor of Engineering, Emeritus, who chaired the Governor's Board of Inquiry on the Loma Prieta Earthquake; Wilfred D. Iwan, professor of applied mechanics and codirector of the Caltech branch of the National Information Service for Earthquake Engineering; and Hiroo Kanamori, the John E. and Hazel S. Smits Professor of Geophysics and director of the Seismological Laboratory at Caltech.

The group visited several sites affected by seismic activity, including the effects on the UC Berkeley Memorial Stadium of the Hayward fault movement. Damaged and abandoned buildings in Oakland, retrofitting of freeways and bridges by Caltrans, and a tour of Embarcadero Four, a 47-story seismically instrumented building, were also features of the trip. The group learned about some of the geological aspects of faults as they traveled up the San Andreas fault line from Crystal Springs Dam to the Golden Gate Bridge.

Unrestricted funding from ERA members provides faculty with the flexibility to do innovative research and to make important contributions to their fields.

Three faculty members awarded MacArthur "genius fellowships"

One member of the professional staff and two faculty members at Caltech have been named recipients of tax-free "no strings attached" MacArthur Foundation fellowships ranging from $250,000 to $360,000. The three awards, along with three awarded to members of the Princeton faculty, represent the greatest number of MacArthur Fellowships presented to any single institution this year.

Caltech's new MacArthur Fellows are Jacqueline Barton, 39, professor of chemistry; James Blinn, 42, member of the professional staff and associate director of Caltech's award-winning mathematics telecourse, *MATHEMATICS!*, and James Westphal, 61, professor of planetary science and designer and principal investigator of the Wide-Field/Planetary Camera, which is aboard the Hubble Space Telescope. Barton was awarded $250,000; Blinn, $265,000; and Westphal, $360,000. All three will receive their fellowships over a five-year period and are free to use the awards as they wish. The MacArthur Foundation imposes no reporting requirements or restrictions on MacArthur Fellows.

Barton is a bioinorganic chemist who studies the chemistry of gene expression. Her research contributions concern the binding of transition metal complexes with DNA, and elaboration from these chemical tools of significant DNA structural features.

Blinn is a computer graphics animator who works simultaneously as an artist, educator, mathematician, and scientist. For NASA, Blinn created computerized simulations of the many Voyager encounters with Jupiter, Saturn, Neptune, and Uranus, and he has won a NASA Exceptional Service Medal.

Westphal began as a field geophysicist in the oil industry, and now designs and constructs planetary cameras for space missions. He has worked on acoustic transmission in glacial ice, dynamics of water flow in marine invertebrates, and mechanical deformation in volcanoes, as well as in planetary and galactic astronomy.

Caltech junior named General Motors Scholar

Nathan A. Frei, a Caltech junior, has been selected an Environmental Activities Staff/General Motors Scholar. The award is given to a sophomore on the basis of outstanding academic achievement, participation in extracurricular activities, and long-term interest in the automotive industry. Frei was selected during his sophomore year.

The award consists of tuition, fees directly related to course work, and a book allowance. To gain practical career experience, the recipient also participates in an internship in a General Motors facility to gain practical career experience.

Frei was a member this academic year of the Board of Control, the student organization responsible for overseeing the Caltech honor system. He worked as a laboratory assistant in Caltech's Environmental Quality Laboratory, and as a laboratory assistant for Nathan Lewis, professor of chemistry.

McCollum-Corcoran Professorship endowed

Manfred Morari, professor of chemical engineering at Caltech, has been named the first holder of the Ross McCollum-William H. Corcoran Professorship in Chemical Engineering. The professorship was made possible by a trust created during the lifetime of Ross McCollum, which named Caltech as a remainder beneficiary.

McCollum, a member of The Associates, was a generous supporter of Caltech. Upon his death, on January 10, 1991, the Institute was notified that McCollum wished to permanently endow a professorship named in honor of the late William H. Corcoran.

McCollum was a personal friend of the late William H. Corcoran, Institute Professor of Chemical Engineering at Caltech and, for 10 years, vice president for Institute relations. Corcoran died in 1982 at the age of 62. At Caltech he conducted a wide range of research in chemical engineering kinetics, transport processes, rocketry, process development of pharmaceuticals, biomedical engineering, and engineering design. McCollum was a generous supporter of Corcoran's work.

McCollum received his BS degree in chemistry from UC Berkeley in 1917 and honorary doctor of law degrees from Pepperdine University, the University of Nebraska, and Whittier College. After working for Standard Oil Company of California for many years, he founded the National Oil Company in 1933, which he sold to Shell Oil Company in 1974. He also served on the board of directors of numerous corporations.

Morari's research efforts are aimed at developing design and control strategies to optimize both the efficiency and safe performance of plants in the chemical and petroleum industry. He and his research group have developed several computer-based control and synthesis techniques that have been widely adopted in industry, and he has published a book, *Robust Process Control,* which summarizes much of this work and its applications.

A native of Australia, he graduated in 1974 from the Swiss Federal Institute of Technology and received his PhD in 1977 from the University of Minnesota. He joined Caltech's faculty as professor of chemical engineering in 1983. In 1984, he received the Allan P. Colburn Award for Excellence in Publications by a Young Member of the Institute, presented by the American Institute of Chemical Engineers.

Lindes create venture fund

Caltech trustee Ronald K. Linde and his wife, Maxine, have endowed the Ronald and Maxine Linde President's Venture Fund with a gift of one million dollars from the Linde Fund at Caltech.

In making this gift, the Lindes, who also recently established the Ronald and Maxine Linde Professorship at Caltech, authorized President Thomas E. Everhart to "support particularly creative and important research or educational projects that are difficult to fund on a timely basis from other sources."

The Lindes founded Envirodyne Industries in 1970 and built it into a Fortune 500 company. Ronald Linde is the former chairman of the board and chief executive officer and Maxine Linde is former corporate secretary and general counsel of the corporation, which was sold in May 1989. In 1988 Envirodyne was ranked as one of the United States' fastest growing companies. It was a worldwide leader in the development and manufacture of food packaging materials and systems, operating in virtually every country of the world from 26 manufacturing and finishing plants in North America and Europe.

Ronald Linde earned his MS degree in 1962 and his PhD degree in 1964, both from Caltech. Both he and Maxine Linde earned their undergraduate degrees at UCLA. Maxine Linde was a research engineer at JPL in the early 1960s. She received her JD degree from Stanford in 1967.

Ronald Linde has been a Caltech trustee since 1989. He is also a life member of the Alumni Association. Among his many technical achievements, he has done pioneering research in various fields of physics, chemistry, and engineering, and in the development of new empirical techniques. He is the author of approximately 50 technical publications, and has invented and patented equipment for enhancing chemical reaction rates.

White Rose Foundation makes major gift

Caltech has received a gift of $677,000 from the White Rose Foundation of Sunnyvale to support research in the Institute's Division of Geological and Planetary Sciences, and to provide advanced computer technology for the campus and its students.

Of the grant, $500,000 will be used to support microbeam analysis research by George Rossman, professor of mineralogy. The rest of the gift consists of $150,000 worth of Macintosh computer software and hardware that has been donated to each of Caltech's undergraduate student residences and to one graduate student house, along with additional funding to support student systems managers for the new equipment in each of the student houses.

The White Rose Foundation is headed by Michael Scott (BS '65), who became the first president of Apple Computer in 1977, 12 years after earning his bachelor's degree in physics. Last year, Scott presented Caltech with a gift of $1.5 million to establish a named professorship honoring the late Caltech faculty member and Nobel laureate in physics, Richard Feynman. His latest gift brings Scott's contributions to Caltech to more than two million dollars.

Before joining the founders of Apple, Scott worked as an electrical engineer at Beckman Instruments, in linear product marketing at Fairchild Semiconductor, and in manufacturing at National Semiconductor. During his five years at Apple, he supervised engineering while establishing a modular real-time, on-line data-processing system that coordinated the firm's activities. The company went public in 1980, and Scott semiretired in 1981. He currently is founder and president of White Rose Enterprises, a consulting firm that advises small start-up companies.

Gifts by will

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

Liliore Rains—The final distribution has been made from the Rains estate to Caltech. The money, amounting to $44,286,886, went into an endowed fund to be used for the general purposes of the Institute.

Helen M. Thompson—A bequest of $50,000 was received by the Institute for unrestricted purposes. She was a member of The Associates.

Meta C. Hellwig—A bequest of $574,700 was made to the Institute to create a scholarship fund in the name of Harold Hellwig for students majoring in structural engineering. Meta Hellwig was the wife of Harold Hellwig, who attended Caltech in 1921.

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

Baxter Foundation makes major gift for genetics research

The Donald E. and Delia Baxter Foundation has made a gift of $300,000 to Caltech to support the development of an automated human chromosome mapper. The money will fund research conducted by Leroy Hood, the Ethel Wilson Bowles and Robert Bowles Professor of Biology and the director of the Center for Molecular Biotechnology at Caltech, and a pioneer in the field of biochemical instrumentation.

The gift represents the seventh major contribution the Baxter Foundation has made in support of Hood's work since 1983, and brings the foundation's total support for this effort to more than $1.5 million.

In addition to supporting the development of this technology, the Baxter Foundation funding has provided for computer resources that will be used to analyze the complex arrays of information generated from the effort to map all 23 pairs of human chromosomes. The mapping of human chromosomes is a guide to identifying genes that cause human disease. Over the past 10 years, about 20 such genes have been identified, including genes for Huntington's disease, cystic fibrosis, manic-depressive syndrome, and Alzheimer's disease.

Charles Pankow, Doris Everhart, and Clayton Englar (BS '49) at the President's Circle brunch in the president's garden, at left. Above: Mr. and Mrs. Samuel Krown at the President's Circle brunch.

Campaign for Caltech passes $200 million mark

With leadership gifts from the W. M. Keck Foundation, from Caltech Trustee Gordon Moore (PhD '54) and his wife, Betty Moore, and from the Carl F Braun Trust (made possible by Trustees John G Braun and Pamela Pesenti), gifts and pledges to The Campaign for Caltech: A Second Century of Discovery have exceeded $200 million. Campaign commitments of $215 million had been received by the end of June.

Substantial gifts and pledges have been received for each of the three major components of the campaign: for endowment, $45.4 million; for capital projects, $104.2 million; and for programs and current operations, $65.0 million. The total goal for The Campaign for Caltech, which will conclude in December 1993, is $350 million.

Commencement

Continued from page 1

human gene, and the microcosm of the silicon chip. These brilliant men and women understood the architecture of a problem—and they knew how to navigate the maze of possibilities that stood between them and a solution. Like them, you think about the opportunities—not the obstacles—that lie ahead."

"As this American Century draws to a close," he told the students, "ours is an age of microchips and MTV. Ours is an economy increasingly dependent not upon our natural resources or geographic location, but upon knowledge. As you well know, knowledge is dynamic—never standing still. And it expands beyond the horizon. So my challenge to you today is to push beyond today's horizons and create new and more distant horizons for your future.

"This is the next frontier. In the 21st century, knowledge will shape the power of the individual—as well as the power of the nation. . . .

"Some call this the Third Wave—or the Information Age—or the New Age of Discovery. With a nod to Henry Luce, I believe this serves as a cornerstone for the Next American Century. If we face this future foursquare—if we accept the call to unleash our imaginations—we will transform this nation. And I have no doubt America will transform the world.

"We begin with the free market, the powerhouse of ingenuity. Free markets and free people breathe life into the American Dream. Look at the good that people can achieve: Charles Richter and George Housner's research has saved untold lives through their work on predicting and preparing for earthquakes. Harry Gray's research could lead to our harvesting energy from sunlight the same way the plants do. And medical researcher Pamela Bjorkman's research may someday prevent such diseases as arthritis and diabetes."

"Look at all the creative entrepreneurs, the ones transforming basic research into new products—the ones with that knack for know-how. This is a true story: I got a letter the other day from a company named Gemstar, founded by four Caltech grads. They'd heard me talk about our six national education goals to achieve excellence by the year 2,000. I once joked that the seventh goal should be that by the turn of the century, Americans must be able to get their VCRs to stop flashing '12:00.'

"I admit that I didn't think it was possible. But this team of upstarts, Caltechers, invented a device that solves the VCR clock problem easily. They wrote, 'We respond promptly to your national call for VCR literacy by the year 2,000—in fact, nine years ahead of schedule.'"

Joan Judson, Carl Niemack, Martha Manningstar, and Cloey Niemack rush to hear Bush speak at commencement.

Continuing to expand on Institute contributions, Bush noted advances in astronomy and computer science, pointing out that "with the telescopes on Mount Palomar, with the Keck Telescopes in Hawaii, your astronomers are looking farther than mankind has looked before. Your JPL labs enable unmanned space missions such as the Pioneers and Voyagers to touch the distant boundaries of the solar system. And here in Pasadena, scientists can now use the world's fastest computer."

Challenging his audience to guarantee that the 21st century becomes the Next American Century, Bush stressed that "we must combine the might of the free market and intelligent government with something else: the brilliance of those who make a difference in the lives of others, including the ones that I refer to as the Points of Light.

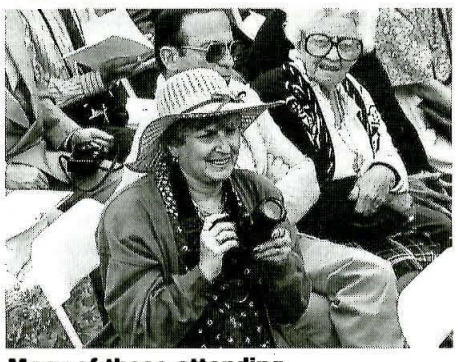
"We know what it takes to solve problems in our own neighborhoods. Some among us have decided to step to the front lines of the war on drugs; others have taken time to teach others to read, or volunteered to care for AIDS babies after work at night.

"Your education here at Caltech enables you to lead, to use your talents for the sake of our country and communities and our children. Those of you who volunteered to help abused women and children at the Hestia House, or taught kids to read in Pasadena, or helped the boys and girls at Five Acres—you have accepted the challenge. You understand that with your diploma today comes a commitment to reach for the horizons of justice and opportunity, freedom and peace.

"In the Next American Century, all of us will have a responsibility to lead. Each part of our communities—the union halls, the police clubs, the chambers of commerce, the parents, teachers—everyone can use their power to solve problems. Because, if you think about it, there isn't a problem in America that isn't being solved somewhere.

"Whether you're drawn to the magic of the marketplace, to the honor of public service, or to the ethic of serving others, each of you will be building an America whole and good. Your generation will map our voyage into the next century. I join you in your quest for faraway places and salute your vision of worlds unseen."

Bush congratulates Elizabeth Warner, winner of the Mabel Beckman Prize.

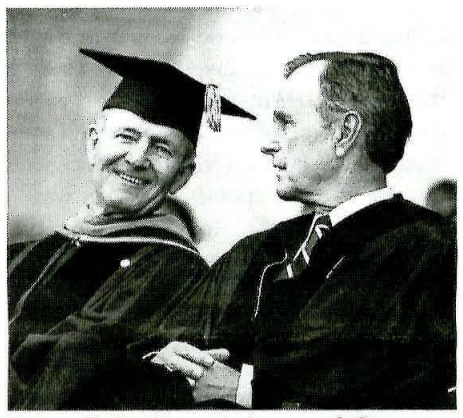


Many of those attending commencement came equipped with cameras.

Mrs. Wilson assists Governor Pete Wilson with his robe. Wilson introduced President Bush.

George Bush with Caltech trustee Camilla Frost.

George Bush, Ruben Mettler, President Thomas Everhart, and Governor Pete Wilson.



Ruben F. Mettler, chairman of the Caltech Board of Trustees, with President Bush.

Gerald Wasserburg, the John D. MacArthur Professor of Geology and Geophysics.

Members of the press corps were active during the commencement ceremonies.

Caltech senior asks for—and gets—a hug from Bush

The crowd wondered what Jack Prater was whispering to President George Bush, when he went up to receive the prestigious Hinrichs Award, given for extraordinary contributions to the student body. Then the president gave him a big hug.

Prater said later that he asked Bush if it was all right to hug him, that he didn't want to get shot by the Secret Service if he tried a sudden embrace. His spontaneous request was one of few spontaneous moments in an otherwise well-choreographed ceremony. Many graduating seniors pinned broccoli sprigs to their graduation gowns to poke fun at Bush's dislike for the vegetable, and quite a few bubbles wafted up through the air, generated by wire hoops and bubble solutions that had been tucked in gown sleeves.

Trusty, a friendly brown dog of mixed heritage, wearing a mortarboard, accompanied his owner, Golda Bernstein, to accept her diploma. (The Secret Service checked Trusty's mortarboard when he came in, Bernstein noted.) The cannon in front of Fleming House was fired as usual, at the conclusion of the commencement services, an annual rite also cleared by the Secret Service. But more sophisticated pranks were absent from the day's ceremonies.

A series of AIDS activists and abortion-rights advocates interrupted the presidential speech with shouts and banners and were quietly removed from the scene. "This is mild compared to what I normally run into," Bush joked. "I feel, out of respect for the office, it ought to be greater."

The sun was hidden behind gray clouds throughout the ceremony, adding a chill to the air. Early-morning sprinkles created some concern, but no rain fell.

President Bush left after the conferring of special awards, slipping into a limousine in a waiting motorcade. An observer on the top bleachers noted that he was escorted past one limousine resplendent with flags and surrounded by Secret Service agents, into a more anonymous vehicle, one of many security precautions.

Two Milton and Francis Clauser Doctoral Prizes were awarded this year. This prize, always announced at commencement, goes to the PhD candidate whose research is judged to exhibit the greatest degree of originality, as evidenced by its potential for opening up new avenues of human thought and endeavor, as well as by the ingenuity with which it has been carried out. One winner was John Lincoln Bowman, whose biology thesis was entitled "Molecular Genetics of Flower Development in *Arabidopsis thaliana*". The second prize was awarded to Marcus Dantus; his chemistry thesis was "*Ab Initio* Three-Dimensional Atom-Diatom Reaction Cross Sections Using Hyperspherical Coordinates and Variational Surface Functions."

Michael Avery Newkirk broke the traditional pattern of degree presentation, receiving his PhD degree in applied physics from his grandfather, R. Stanton Avery, former chairman of the Caltech Board of Trustees.

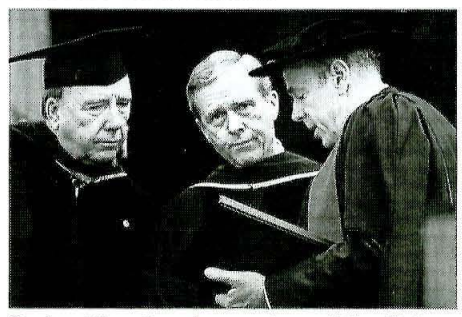
President Everhart announced the conferring of 186 BS, 160 MS, 2 Eng, and 154 PhD degrees, for a total of 502. He also told the crowd that 81 out of 186 graduates, or 44 percent, had graduated with honor—B+ or better.

"This is a special class and a special commencement," Everhart said. "This is Caltech's Centennial year. The president of the U.S. was here, and there were more people to witness this commencement than ever before.

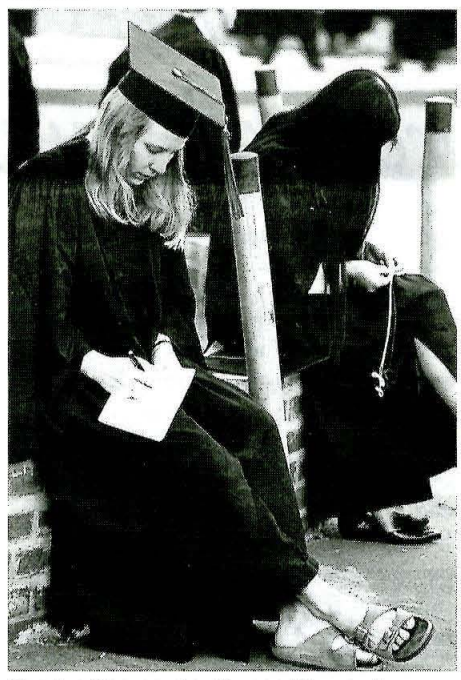
"You are the class I first greeted at Freshman Camp. I have learned much from you, and made many friends among you."

Admonishing the graduates that "to those whom much has been given, much is expected," Everhart told them that "today is the commencement of your ongoing educations. You have the capability to improve the world, using the educations you have earned here. You can make a great difference. If you have been inspired here, go on and inspire others."

President Bush arrives.



Carlos Moorhead, member of the U.S. House of Representatives, with President Everhart and Governor Pete Wilson.



Graduating senior Susan Howard.

Bush dispenses inside humor

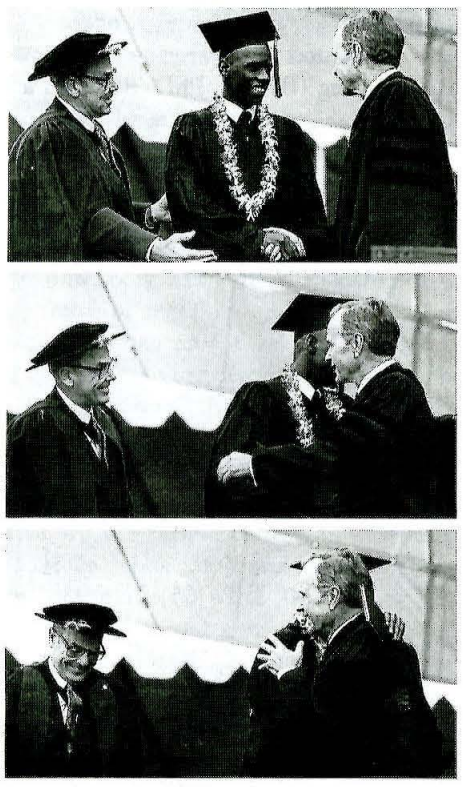
President Bush took time out from criticizing Congress for its slowness to act on his domestic bills, and from lauding Caltech's achievements, to interject some inside humor. Some examples:

- "My trip back to Washington . . . will be delayed. Some of Caltech's Finest reassembled Air Force One in the lobby of my hotel. Ditch Day, perhaps."

- "Let me tell you about a Yale graduation. I will confess to having gone to Yale. A minister gave the graduation speech. 'Y,' of course, was for youth. That took 40 minutes. 'A,' altruism—brushed that one off in 20 minutes. 'L' was for loyalty—45 minutes. 'E' for enterprise—30 minutes. The speech ended and most of the kids had left. There was one guy praying. The minister went over and said, 'Oh, son, I'm glad to see a man of faith here. What were you praying for?' He said, 'I was giving thanks that I didn't go to the California Institute of Technology.'"

- "Here in Pasadena, scientists can now use the world's fastest computer. I hear that the computer is so advanced, it can actually calculate the number of Tommy's Burgers that you all eat—and I am told . . . it can reprogram the scoreboard at the Rose Bowl even faster."

- "Caltech is one of the few schools in the country where 'PC' has always stood for personal computer."



Jack Prater gets the hug he requested from President Bush.

Cass Nakasone is bedecked for graduation.

More than 9,000 people attended commencement ceremonies on the athletic field.

Trusty accompanied his mistress, graduating senior Golda Bernstein, to commencement.

The Convocations Brass and Percussion Ensemble provides music for the event.

President Everhart with recipients of the Distinguished Alumni Award: Arthur Bryson, Jr., Navin Nigam, George Smith, and John Andelin, Jr. Paul Jennings, provost, is at right.

Caltech honors four distinguished alumni

Four Caltech graduates were presented with the Institute's highest honor, the Distinguished Alumni Award, during Seminar Day activities. Presented since 1966, the award is bestowed on former Caltech graduate or undergraduate students for "high achievement in science, engineering, business, industry, or public service."

Selected to receive the honor were John P. Andelin, Jr. (BS '55, PhD '67), assistant director for science, information, and natural resources of the Congressional Office of Technology Assessment; Arthur E. Bryson, Jr. (MS '49, PhD '51), Pigott Professor of Engineering at Stanford University; Navin C. Nigam (PhD '67), director of the Indian Institute of Technology in Delhi, India; and George F. Smith (BS '44, MS '48, PhD '52), retired senior vice president and director of Hughes Research Labs.

Andelin provides direction for national energy policy. He has testified to Congress on many important issues, ranging from air pollution and municipal, toxic, and radioactive wastes, to education policy and new communications technology.

Bryson has long been a leader in research, education, and public and professional service. His work in the interdisciplinary area of aeronautical and astronautical systems control and optimization has contributed significantly to defining a field that did not exist when he was a graduate student at Caltech. A former chairman of the National Research Council's Aeronautics and Space Engineering Board, Bryson has exercised academic leadership in his field. His work at Harvard, MIT, and Stanford has helped foster the world-class reputations of these schools' departments.

Nigam has played a seminal role in the development of engineering education and research at universities in India. His work on random vibration is internationally known, and he has been a key figure in designing earthquake-resistant structures in India.

Smith served for 25 years, until 1987, as codirector or director of Hughes Research Labs. During that time, the Labs produced a multitude of important innovations in electronics and electro-optics, many of which were eventually used in Hughes Aircraft Company products. His own work also included the development of the first laser range finder, as well as research on the first Q-switched laser.

Seminar Day attracts record turnout: 1,886

An occasion the participants would never forget. That's what the Alumni Seminar Committee, Alumni Reunion Committee, and the Alumni Association staff wanted to make the Centennial Seminar Day and alumni reunion weekend. The huge turnout (1,886—the largest number by far to attend any Seminar Day) and the enthusiastic comments on the part of those who came, indicate that the planners surpassed their own expectations.

"The best ever" was a comment frequently made by alumni who came to campus for a busy round of activities—activities ranging from receptions in the student houses to a centennial concert, from a bridge tournament to a wine and cheese reception, from an all-class reunion to tours of the Huntington Library and JPL, from 20 research seminars to a demonstration in the ancient oriental art of paper folding.

"It's always difficult to choose the seminars to attend," was one frequently heard comment, "but this year it was almost impossible. They should have been spread over two days so we could have heard them all."

A popular favorite was the talk on "Caltech from the Inside," by Robert P. Sharp, the Robert P. Sharp Professor of Geology, Emeritus. "This was very enjoyable," one listener commented. "Bob Sharp's talk would be great for a general session."

James M. Bower, associate professor of biology, spoke on Caltech's Project SEED, which introduces exemplary science teaching into the Pasadena Unified School District. "Great talk!" said one listener. "This is what we need nationwide. The presentation was fascinating. Project SEED may turn out to have the greatest impact on the U.S. of any activity on the campus!"

"Excellent" and "super" were accolades given Leroy E. Hood, the Ethel Wilson Bowles and Robert Bowles Professor of Biology, and director of the Center for Molecular Biotechnology. Hood talked on the genome initiative, and on biology and medicine of the 21st century. And R. Stephen Saunders, senior research scientist at JPL, who talked on the geologic exploration of Venus, drew "simply outstanding!" as an evaluation.

Presented at the general session was a proclamation dedicating the 54th Seminar Day to the memory of Clarence Frank Kiech (1903–1968), who conceived the idea of Seminar Day and organized the initial event. Kiech, who earned his bachelor of science in electrical engineering in 1926, was president of the Alumni Association in 1939-40. He was also a member of the Alumni Study Group of 1966, which provided long-range recommendations for strengthening alumni-Institute relations, including retaining a professional executive director, establishing an alumni house, and founding *Caltech News*.

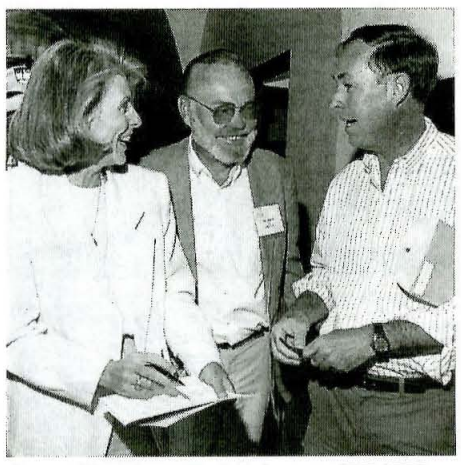
Popular and new this year were the student house receptions for alumni. The receptions gave alumni the chance to meet others who had shared the same house experience, to talk with students, and to see the houses as they are today.

The Ritz-Carlton Huntington Hotel was the setting for the all-classes Centennial reunion dinner, a special event never attempted before. Classes were seated by year, and, in all, 785 attended. Frequently expressed was appreciation for the fact that the dinner gave alumni the opportunity to chat with people in classes on either side of theirs, something not possible under the traditional reunion arrangement.

Exhibits were popular with the guests, and included a JPL space exhibit; the Caltech Seismological Laboratory Real-Time Picker, a computer-automated p-wave analyzer that makes a preliminary estimate of an earthquake's epicenter; the shock-tunnel laboratory on Guggenheim Laboratory's roof; the Beckman Room in the Beckman Institute, which includes four display areas and the film *Arnold O. Beckman: The Man Behind the Machines*; Caltech's mineral and gem collection; the Caltech bookstore, which had a special display of books by Caltech authors; a demonstration of the ancient oriental art of origami, by Robert Lang (BS '82, PhD '86); and a talk to high school students by Dan Langdale, Caltech's director of admissions, about studies and life at the Institute.

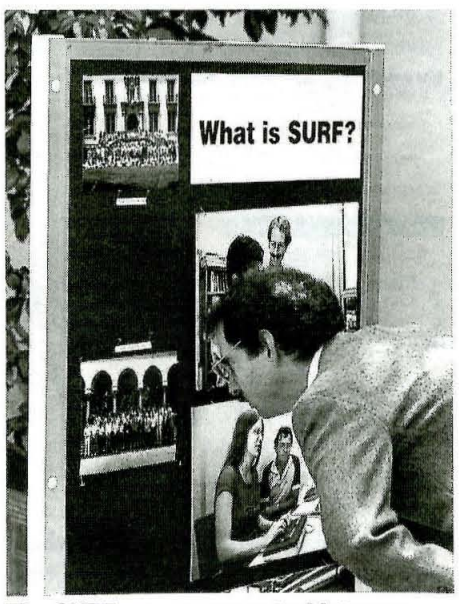
Coming the longest distance was Robert Connelly (BS '51), who, with his wife, Jane Connelly, flew in from Tokyo for his class's 40th reunion dinner at the Athenaeum. Robert Geitz (BS '41) from Suffield, Connecticut; Kenyon Bush (BS '36) from Charleston, West Virginia; Myron Black (BS '56, MS '57) from Ann Arbor, Michigan; Robert Hall (BS '42, PhD '48) from Schenectady, New York; and Neil Sheeley, Jr. (BS '60, PhD '65) from Alexandria, Virginia, were a few of the others who traveled long distances to attend.

The Centennial Seminar Day is over, but many warm memories linger, and alumni are already beginning to look forward to another special weekend next year.

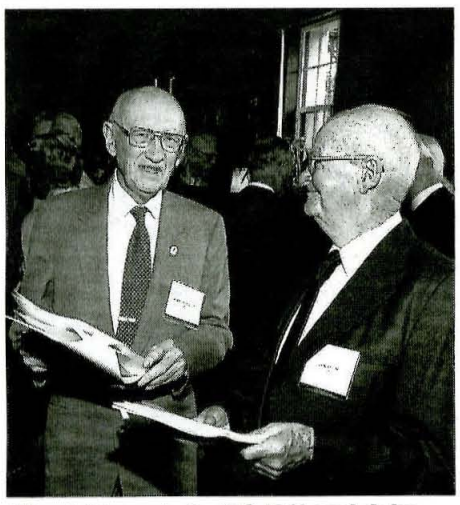


Janet Fletcher, Ted Johnson (BS '57), and Louis Fletcher in Dabney Hall.

Victor Rader and Janet King (BS '89).



The SURF program created intense interest among those attending Seminar Day.



Albert Atwood, Jr. (BS '32) and John Bascom (BS '32).

Don Hudson (BS '38, MS '39, PhD '42) and Phyllis Hudson with Thomas Caughey (PhD '54), Navin Nigam (PhD '67), and George Housner (MS '34, PhD '41).

William Simons (BS '49) and Barbara Simons.

Sara and Wilfred Charette (BS '62, MS '64, PhD '69).

Francis Mason (BS '69), Alexandria Mason, and Lindsey Foster Mason.

Louis Kelchenman and Jo Mullikan in Dabney Garden.

Press creates grim picture of ecological future

The planet faces ecological disaster due to global warming and the greenhouse effect unless the countries of the world take strong action, Frank Press, president of the National Academy of Sciences, told alumni when he spoke at the general session on Alumni Seminar Day. Press said that avoiding the strong likelihood of ecological catastrophe will require major financial and policy commitments dedicated to ameliorating these problems—and also to drastically curbing population growth.

"We have been aware for several years of the degradation of the ozone layer over the Antarctic due to the use of chlorofluorocarbons," Press noted. "New observations this year have detected an ozone hole over the Arctic, and a reduced ozone level of several percent over our own country." Among the dangers, he said, are a significant increase in skin cancer for humans, and a possible risk to the entire food chain.

Fortunately, Press told his audience, several substitute compounds are being tested for safety, and—although more expensive—they will do much less damage than the present ones. Helping poor countries convert to these more expensive compounds through technology transfer and perhaps subsidies is something we should consider, he said.

Another problem—one with more unpredictable consequences that may require unprecedented political, economic, and cultural changes—is that of global warming, Press told his audience. "By now the public knows about the greenhouse effect—the fact that the earth's atmosphere contains certain greenhouse gases that are transparent to incoming radiation from the sun, while selectively absorbing significant amounts, in certain spectral bands, of outgoing radiation." The presence of these gases raises the temperature of the surface of the earth by some 35 degrees Celsius above the value that would hold in the gases' absence. "This has made life possible as we know it," Press summarized.

"But the greenhouse gases emitted by human activity—carbon dioxide, the CFCs, methane, nitrogen oxides—are enhancing the greenhouse effect. So is deforestation, because burning and decaying trees release carbon dioxide, and dead trees no longer absorb it as part of the photosynthetic process," Press explained. "Some 63 percent of the greenhouse gases the human race is generating derive from energy use, 21 percent from agriculture, 11 percent from the chlorofluorocarbons, and 5 percent from other sources."

Drawing on data in a National Science Foundation report, Press predicted that, by the year 2050, if the proliferation of greenhouse gases is not curbed, the atmosphere may warm from 1 to 5 degrees Celsius—an average temperature higher than at any time in the past million years. Predictions for rises in the polar regions are for as much as 10 degrees, a temperature change comparable to all of the warming since the last ice age. "Perhaps more important," Press said, "this warming may be accompanied by regional changes in temperature, rainfall, cloudiness, windiness, and droughts—all of which could have substantial effects on agriculture, water supply, health, biological diversity, energy demand, and sea level. Agriculture would be seriously affected by these

Continued on page 13

Winsor Brown (MS '57), Billy Brown, and Joan Brown.

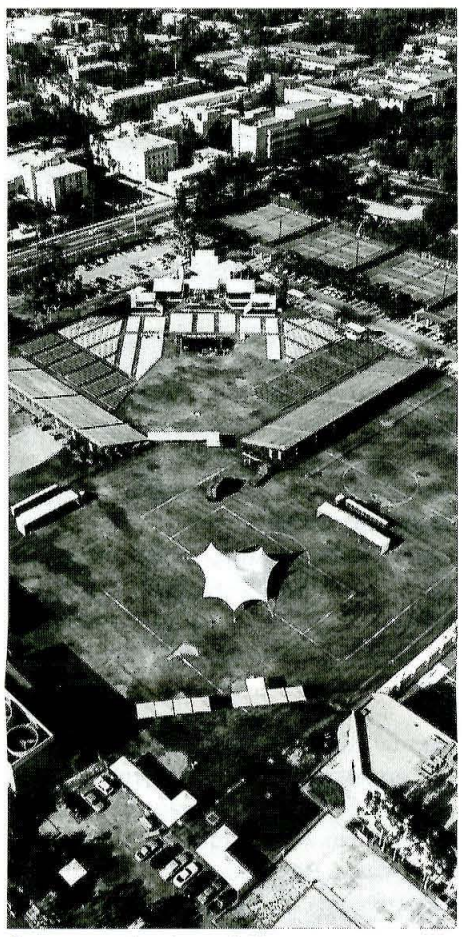
Edward Hall (MS '41) and Edna Hall.

Dana Farrington, Paul Farrington (BS '41, MS '47, Eng '48, PhD '50), Dora Hall, Robert Harris (BS '47), and Robert Hall (BS '42).

Raul Turcios, physical plant, helps set up for commencement.

Robert O'Rourke (right), assistant vice president for public relations, with two members of the White House Press Office advance team.

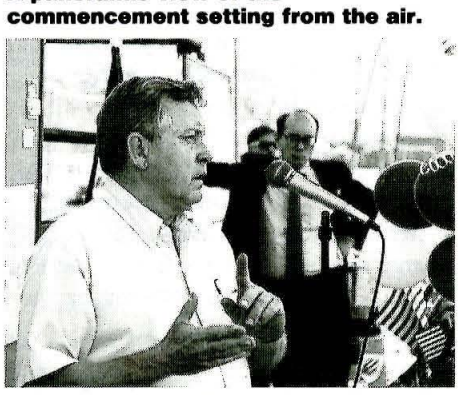
Everything is ready for the 9,000 guests who will soon fill the athletic field.



A panoramic view of the commencement setting from the air.

Jerry Willis, director of public events, played a major role in commencement. With him is David Wood, a member of the Convocations Committee.

James Reckon of public events was one of many employees who helped with commencement preparations.



Tom Lehman, public events, played a major role in preparations.

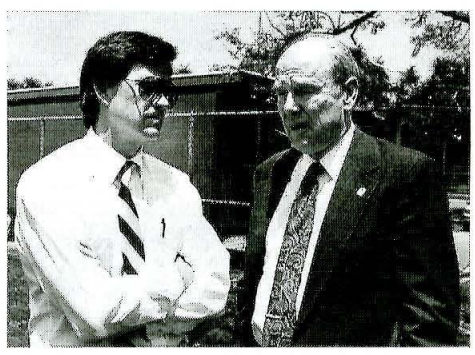
President Everhart; Tom Anderson, vice president for Institute relations; and Judith Amis, executive director of the Alumni Association.

Caltech gears up for a presidential visit

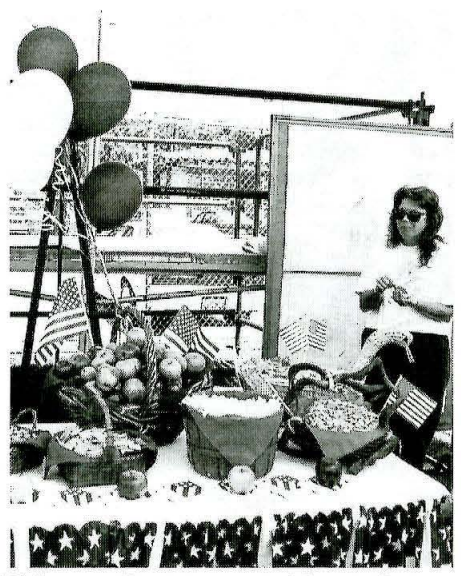
In 30 official working days, the Institute learned, the president of the United States would be coming to speak at commencement. For Jerry Willis, manager of public events, and his crew, that would mean the equivalent of constructing a miniature city. For the rest of the public events staff, and for many other offices and individuals on campus, it would mean intensive planning and concerted effort. Central to the mammoth effort were David Wales, chairman of the Convocations Committee, and Mary Webster of the president's office.

Officials estimated that up to 10,000 people would be coming to the campus. They considered four sites for the commencement ceremonies—the traditional site on Beckman Mall; a site in the same vicinity, but with the speakers' platform in front of the Beckman Labs; the athletic field; and the Rose Bowl.

The students who participated in planning wanted to keep the activities in the traditional location, but it was decided that so many people could never be accommodated there—and besides, there were too many windows in this area to suit the Secret Service. The Rose Bowl was never seriously considered, and the athletic field was the

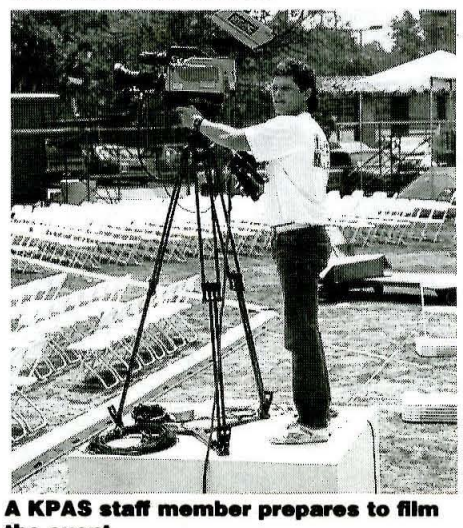


Hall Daily, director of media, government, and community relations, with President Everhart.



This repast was a reward for workers.

Caltech students helped by ushering. Here, Eric Wemhoff carries chairs.



A KPAS staff member prepares to film the event.

Juan Serna wipes chairs.

Institute photographer Robert Paz was kept busy taking photographs.

winner.

Now the task was to erect seats for 10,000 spectators, and to create a platform to accommodate the speakers, the Board of Trustees, the Convocations Brass and Percussion Ensemble, and the Caltech Glee Clubs. Of course, there would also be a platform for the press—45 feet wide, 20 feet high, and 12 feet deep, precisely 70 feet from the president. Naturally, the whole edifice would have to be aesthetically pleasing. To Tom Lehman of public events went the responsibility for designing and making arrangements for construction of the stage—and for putting up the bleachers. As the edifice grew, neighbors came to visit, and the site became something of a tourist attraction.

Besides planning and erecting the structure itself, the effort also called for creating an infrastructure—one that included 40-plus portable toilets; a communications system; a power distribution system; booths to dispense coffee, doughnuts, and soft drinks; a first-aid center; accommodations for the physically challenged; and a signer for the hearing impaired. Parking would be as far away as Santa Anita Race Track, Huntington Library, and Pasadena City College, with shuttle buses to the campus.

A representative of the Los Angeles branch of the Secret Service visited the campus early in May, and the pre-advance team moved in on June 3. The advance team, 70 strong, moved in during the week of June 7. Caltech personnel became acutely familiar with the term *line of sight*. Reducing it to absolute minimum with regard to the president was a major priority. Also increasingly familiar was the word, *patus*, short for the president of the United States.

The decision was made to close the Keith Spalding Building, south of California Boulevard, on the day of commencement, for security reasons. A fence was erected along California; both the fence and the tennis courts were draped to reduce visibility. Drapes also were placed along both sides of the speakers' platform.

Considerable discussion ensued over whether to place a tent over the Board of Trustees' seating area. Caltech officials strongly favored one, but the White House advance team feared a tent—which would also shield the president from the sun—would make it appear that he was receiving special treatment. After lengthy discussions including President Everhart, Caltech officials prevailed, and a tent covered the platform.

Caltech personnel soon discovered a distinct difference in the viewpoints of the Secret Service and the White House advance team. "Secret Service would have liked to keep President Bush in a steel-lined box," Willis said. "The White House advance team wanted maximum press and public exposure. There was a lot of difference in their positions."

During all the preparations, says Willis, "we sought cooperation in reaching an understanding that Caltech is an educational institution, that commencement is a traditional ceremony, and that some things have to go on as normal." Willis expressed gratification that, in the long run, more than a third of the presidential speech consisted of "inside stuff"—jokes about student pranks and material about Caltech accomplishments. The speech writer came to campus and interviewed the student body, and material about Caltech from the president's office and the media relations office flowed back to Washington. The speech was viewed as a departure from most of those Bush has given at commencement ceremonies—speeches that have been almost exclusively political in nature.

"We worked hard to make the ceremony as traditional as it possibly could be with the president of the U.S. here," Willis said.

Despite their intimate involvement in preparations for the presidential visit, none of the Caltech personnel knew what the president's point of arrival or departure would be. What they did know was that a robed Secret Service agent would sit behind the president on the platform, and that steel plates would be placed both before and behind Bush.

As crews were constructing the miniature city on the athletic field, 300 calls a day were flowing into the commencement "hot line" manned by the public events staff—calls having to do with the visit. Work days for those most involved swelled—Willis and several others worked seven days a week, 15 hours a day, for the last few days before the presidential visit.

A major concern—in fact, a major conviction—among those involved in preparations was that Caltech students would rise to the challenge they were offered, and attempt a prank on commencement day. "We got word out that the Secret Service really felt negatively about that possibility," says Willis, "and we were all relieved that students restrained themselves to wearing broccoli sprigs on their lapels."

Commencement day dawned gray and overcast, but the rain that threatened never fell. Some 9,000 guests began arriving before 8 a.m., and patiently awaited their turns at one of the 11 airport-type metal detectors manned by Secret Service personnel. Checking in went smoothly, and there were no significant delays. More than 100 people were involved in security—including agents of the Secret Service, Caltech security officers, and members of the Pasadena Police Department.

The academic procession—normally consisting of some 525 individuals—swelled to more than 700 as a larger number of faculty members and graduating students elected to participate. Graduates received their diplomas individually on the platform and shook hands with President Everhart. By that time, President Bush had departed—by an unknown route and to an unknown destination.

Caltech drew praise from the White House advance team and Secret Service officials as one of the best places they had worked in preparing for a presidential visit. And Caltech personnel drew praise from Willis for their hard work, ingenuity, and patience under pressure. "The most remarkable part of the experience was the way everyone worked as a team to make something happen," he said. "One thing that really pleases me is that, in spite of all the pressure we were under, I can't ever remember anybody yelling at anybody else. Now that it's all over, I feel a little depressed. It was an exciting time for all of us."

Bush not first president to visit

George Bush is not the first U.S. president to attend a Caltech function. There have been five others—all Republicans. William Taft came while in office; Teddy Roosevelt and Herbert Hoover visited after leaving the Oval Office; Richard Nixon came while he was vice president; and Ronald Reagan attended a Caltech event while he was governor of California.

The visit that drew the most attention, as evidenced by the local papers, was Teddy Roosevelt's on March 21, 1911. He was touring southern California and stopped in Pasadena to give a lecture as a part of Throop's extension course. His talk—"A Zoological Trip Through Africa"—was given in a 2000-seat amphitheater at the Hotel Maryland, which was at the corner of Colorado and Euclid. Five dollars got a front-row seat; for $1 you could stand in the back. Although the auditorium was reported to be full, it was not sold out.

Teddy Roosevelt on a visit to the campus in 1911.

Every minute of Roosevelt's visit was reported in detail in the *Pasadena Star,* including instructions on which street corners various civic groups were supposed to meet in order to greet the former president's motorcade down Colorado Boulevard.

During his tour of Pasadena, TR visited Throop Hall, where he had some kind words to say about the institution. "I believe that the most important work for us in America today, in the way of education, is to train our people vocationally."

William Taft's visit was much less elaborate. On October 16, 1911, Taft was being hurried to Los Angeles for an appointment. He took time out to give a brief speech to students of Throop Polytechnic Institute who were assembled in Tournament Park. On the study of technical subjects Taft told the students, "Your mental discipline will be just as good when derived from these practical subjects as if you secured your mental discipline the old-fashioned way." Taft continued, "I have no doubt that this will be a most successful institution and congratulate Pasadena upon having it within her walls."

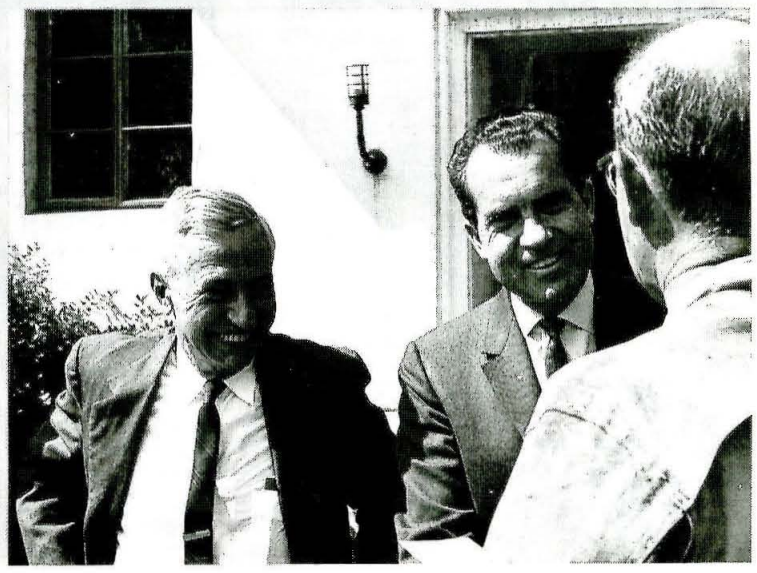
Herbert Hoover came to a dinner of The Associates at the Athenaeum on March 14, 1936—three years after he had left the White House. The occasion was the dedication of North Mudd and Arms Laboratories. In reflecting on Caltech Hoover said, "In the expansion of human understanding and the lift to the human mind comes the advancement of civilization."

Richard Nixon visited the campus twice. Photographs exist of a 1958 trip that show Nixon and President DuBridge on the athletic field, talking to reporters and shaking hands with well-wishers. Nixon was the vice president at the time. The second visit was in 1962, when Nixon was campaigning, unsuccessfully, for governor of California.

Ronald Reagan is the only president not to have set foot on the campus. He gave a speech at a gala dinner at the Ambassador Hotel on November 8, 1967, which kicked off Caltech's development campaign to raise $85 million. The event was attended by 800 friends of Caltech, who heard Reagan's speech, "Science for Mankind."

Caltech almost had another presidential guest in 1966. Arrangements were well under way for a visit from then-president Lyndon Johnson, who was going to help celebrate the Institute's 75th anniversary. However, nine days before the event, Johnson canceled the appearance.

Members of the senior class were glad that Bush followed in the footsteps of his Republican predecessors. B.W.



Richard Nixon visited the campus twice. Here, he is with Lee A. DuBridge, Caltech President Emeritus.

ALUMNI

Chapter news

Boston Chapter hears David Middlebrook

Members of the Boston chapter heard a talk by R. David Middlebrook, Caltech professor of electrical engineering, following light refreshments at the Green Building on the MIT campus, during June. Middlebrook spoke on "The Power Electronics Revolution: From Tiny Power Supplies to Electric Cars."

Modern power processing, based on switched-mode conversion, permits a drastic reduction of power-supply size and cost, Middlebrook told the group. This development will have a corresponding impact on computers, word processors, and other "smart" equipment, and will also open the door to efficient speed control in traction, and in industry in general.

Middlebrook directs the research of Caltech's Power Electronics Group. He is a Fellow of the Institute of Electrical and Electronics Engineers, and is well-known as an author, lecturer, and consultant.

Jenijoy La Belle speaks at Seattle meeting

Jenijoy La Belle, professor of literature, spoke to members of the Seattle chapter at a dinner meeting in July. Her topic was *The Authorship Question; or, Will the Real William Shakespeare Please Stand Up?* La Belle pointed out that, since the late 18th century, many theorists have doubted that the plays traditionally attributed to William Shakespeare were actually written by him. The story of these attempts to ascribe the works of Shakespeare to other writers is a fascinating chapter in the history of literary scholarship, as described by La Belle.

Monterey Bay alumni meet for lunch

Stan Wolfberg (BS '38) writes that "touching bases with Caltechers" continues to be an interesting and informative monthly occasion at informal luncheons at the Hollins House, overlooking the Pasatiempo Golf Course and Monterey Bay.

Among those who recently attended are Glenn Schlegel (BS '25), Linton Von Beroldingen (BS' 29), H. Victor Neher (PhD '31), Stanley T. Wolfberg (BS '38), Ed Flavell (BS '43), Herb Lassen (PhD '43), Fred Karstedt (BS '44), Conrad Fong (PhD '46), and Bob Shacklett (PhD '56), along with Jack Goldberg, a UCLA graduate who worked for JPL.

Wolfberg reports that the Victor Nehers recently moved north to Oregon, where the Wolfbergs visited them in Medford during the spring.

Ernest Janzen leads Seattle chapter

Ernest G. Janzen leads a thriving alumni program in Seattle—an area where there are some 500 alumni. Janzen has been active with the Alumni Association program there for a year (he was elected chapter president three months ago), after working for four years with the Alumni Fund; he was regional chairman for Boeing-Seattle.

Janzen, an engineer for Boeing Computer Services, earned his BS degree in 1961, in physics. A Seattle resident for 22 years, he previously was with the Naval Postgraduate School, Stanford Research Institute, and the Naval Ordnance Test Station.

The father of two adult children, he likes to hike, square dance, and read, and enjoys "keeping a 17-year-old sports car running."

Janzen views an alumni chapter as a means for people of common back-

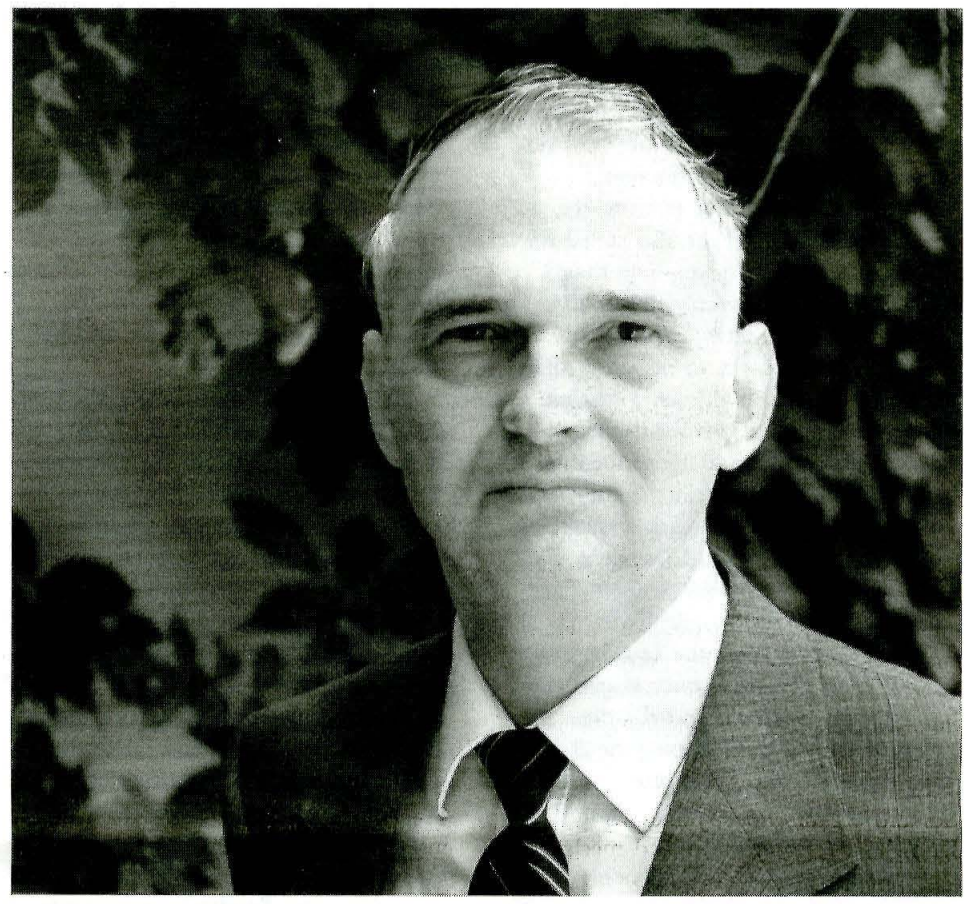
Ernest G. Janzen, (BS '61).

grounds to get together and share mutual social and intellectual activities. Some 30 to 60 people usually attend the alumni meetings, which are held about four times a year.

A recent speaker was Parker MacCready (MS '86), who has developed a human-powered hydrofoil. MacCready conducted a demonstration of the hydrofoil at the Seattle Yacht Club. Jenijoy La Belle, professor of literature, was another recent speaker; her talk was on the controversy that surrounds the authorship of Shakespeare's plays.

From the alumni president

By Gary Stupian



Under Mike Boughton's leadership, the past year has been a period of rewarding activity for the Alumni Association. Our Centennial weekend, which included an expanded Seminar Day and all-classes reunion, is now history. The weekend's events were enormously successful in all respects. None of the many potential disaster scenarios over which the Reunion Committee agonized (e.g., a delay in the opening of the refurbished Huntington Hotel) came to pass. Special thanks are due to all those who participated in the organization of the Seminar Day/Reunion weekend.

I now have the privilege of succeeding Mike as president of the Alumni Association. In this, our Centennial year, Caltech has roughly 17,000 living alumni, hardly more than the freshman class in many a state university system. About 40 percent of us are members of the Association, which is a good level of participation in comparison to other alumni groups. I am convinced that this percentage would increase if alumni were even more aware of the Association's many good works. Describing these activities is the basic purpose of this column.

The Association exists not only to serve alumni, but to make life more pleasant for students at Caltech. A substantial part of our annual income is spent in support of students. In addition to direct support of student activities, the Association is involved in many other projects that influence life on campus. For example, a network of alumni has been formed to assist in the undergraduate admissions process. We also participate in the Summer Day-on-the-Job and ASPIRE programs, which help provide job opportunities for students. All alumni events are nonprofit and are intended to break even.

The best view of the Association is obtained from within by those alumni who have become actively involved, but let me try to lift the lid a bit so that we can all peek inside. Policy decisions are made by the Board of Directors, which meets monthly during the academic year. Most of the Association's activities are centered in various committees made up of Board members and as many other alumni as we can talk into serving. The day-to-day work is carried forward by our small, dedicated, and energetic staff at the Alumni House. The Association is definitely not a monolithic bureaucracy. The staff, as well as the alumni serving on the various committees, are real people, with names and faces. Drop by the Alumni House at 345 South Hill Avenue when you visit the campus, and say hello. You do not, however, have to be living in southern California to be active in the Association! Chapters in 12 cities host talks by faculty members, and numerous other events. Undergraduate admissions volunteers are needed all across the country.

Caltech is an exciting place, and the Alumni Association provides an important bridge between alumni and the Institute. In subsequent articles, I'll describe various facets of the Association in more detail. Your comments are always welcome, and you can contact us at: Caltech Alumni Association, mail code 1-97, Pasadena, California 91125, 818/356-6592. Those of you who have joined the Information Age can send your remarks to me via electronic mail at STUPIAN@JULIET.CALTECH.EDU or GSTUPIAN@CALTECH.BITNET.

New honorary members of the Alumni Association: James K. Knowles, Carolyn Merkel, Amytis Barrett, and Robert O'Rourke.

Association receives four honorary alumni

The Alumni Association welcomed four new members as honorary alumni at its annual dinner in the Athenaeum in June. The honorees are Amytis Barrett, a staunch supporter of student life and participant in many Caltech activities and organizations; James K. Knowles, professor of applied mechanics; Carolyn Merkel, director of the SURF (Summer Undergraduate Research Fellowships) program; and Robert O'Rourke, assistant vice president for public relations. Honorary alumni are chosen on the basis of contributions to the campus community and to students and their activities.

Micheal Boughton (BS '55), 1990–1991 president, turned the gavel over to Gary Stupian (BS '61), who was installed as 1991–1992 president. Other new officers installed were Le Val Lund, Jr. (BS '47), vice president; William M. Whitney (BS '51), treasurer; and Peter V. Mason (BS '51, MS '52, PhD '62), secretary.

New directors announced were Trudy L. Bergen (BS '74), Robert C. Burket (BS '65), Glen R. Cass (PhD '78), Jeanine M. Gainey (BS '86), and David B. Ritchie (BS '80). Walter Specht (BS '57, MS '61, PhD '65) will serve as chapter representative.

Boughton, the outgoing president, was presented with a birch armchair with the Institute logo, and a plaque bearing the presidential gavel. The annual meeting preceded the festivities.

Half Century Club welcomes class of 1941

Becoming members of the Half Century Club is always an exciting event, but for the class of 1941 the occasion was even more special than usual. The Caltech Centennial was under way, and Seminar Day weekend was buzzing with activity.

At the center of planning for the class of 1941 reunion was chairman Joe Lewis (BS '41), who, from his San Marino home nearby, had been working for months to coordinate activities. They began on Thursday evening, with a reunion dinner in the Athenaeum where members shared memories of their lives during the 50 years since they left the Institute.

Festivities began Thursday evening, with the 50-year reunion dinner. Early on Friday, the former classmates met for breakfast at the Alumni House and then for a campus architectural tour. The Half Century Club luncheon was next on the agenda as 41 members of the class, along with their spouses, joined 137 members of earlier classes for lunch at the Athenaeum. Max Alcorn, from the class of 1923, was the oldest alumnus present. Also represented were the classes of 1926, 1929, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, and 1940.

Micheal Boughton (BS '55), president of the Alumni Association, greeted the class and introduced President Thomas E. Everhart, who pointed out that the class of 1941 was the last to graduate before the United States was drawn into World War II.

Everhart alluded to the philosophical origins of Caltech in the philosophy of Millikan and Hale, noting that their intent to offer a strongly focused education continues to be Caltech's objective. "Millikan believed that the US needed quality in education," Everhart said. "Under his leadership, Caltech became highly selective and is so today." He pointed out that 95 percent of Caltech students were in the top 10 percent of their graduating class, and that the average SAT score among students at the Institute is one of the highest in the country.

Some things have changed, he noted, pointing out that in 1940, tuition was $300 a year, and in 1950, $600—but currently $13,300. "We've attempted to hold our tuition down, and it is considerably cheaper than that of some of the other schools we compete with," he remarked.

Caltech makes every effort to ensure that "the students who deserve to come here, based on merit, can continue to come," Everhart said, pointing out that 75 percent of the undergraduates receive some form of financial aid—an average of $7,500 for every student enrolled.

The Institute's enrollment has remained fairly stable, although rising slightly through the decades, Everhart said. "We want Caltech to remain small and focused on strong personal interaction between faculty and students, as well as between members of the faculty," he said, observing that in the latter case, "the round tables at the Athenaeum serve an important function."

Briefly discussing Caltech's funding sources, Everhart pointed out that "half our support comes from the federal government and half from private sources. We don't believe the federal government should provide support because we're entitled to it, but to improve the welfare of the US," he said. "An investment in Caltech is an investment in the welfare of the nation." Everhart concluded by noting that "the sort of basic and applied research that we do here lays a foundation on which many other people can build."

Before the new Half Century Club members went out to have their group picture taken, Fred Thiele (BS '41) announced that the class of 1941 had raised 97 percent of its class-gift goal of $110,000. He suggested a prize to the person who could reveal the whereabouts of the statue of Apollo, a former campus landmark which has been notably absent from public view for some years.

The class of 1941 concluded its day of reunion activities with a reception at the home of Joe and Anne Lewis. The next day would be even busier, with Seminar Day activities and the first ever all-classes reunion dinner.

Liz Warner wins Mabel Beckman Prize

The sixth annual Mabel Beckman Prize was awarded to Elizabeth Warner, who graduated from Caltech in June. The Mabel Beckman Prize is presented each year to a junior or senior Caltech woman who "has achieved academic excellence and demonstrated outstanding leadership skills, a commitment to personal excellence, good character, and a strong interest in the Caltech community."

Warner, who majored in geochemistry and chemistry, demonstrated leadership qualities through her extensive involvement with athletics during her four years at Caltech. She was captain of the 1989 cross-country team and the 1990 and 1991 track-and-field teams. She is also the current record holder in these women's track-and-field events: the 100 meters, 200 meters, long jump, and triple jump. In addition, she was a member of the record-holding 400-meter and 1600-meter relay teams.

She has also assisted with new-student orientation on Catalina Island during the last two years. Warner plans to attend graduate school at Stanford.

Caltech established this award in 1986 to honor Mrs. Mabel Beckman, the wife of Arnold O. Beckman, chairman emeritus of Caltech's Board of Trustees. Mrs. Beckman died on June 1, 1989, at the age of 88.

Bruce Lawrence (BS '41) and Beverly Lawrence at the class of 1941 reunion breakfast.

Large-scale structure in universe is Centennial topic

A two-day Centennial symposium on "The Origin and Evolution of the Large-Scale Structure in the Universe" will be sponsored by the Division of Physics, Mathematics and Astronomy on September 26-27.

The symposium will be divided into four sections, each with a separate topic relating to the main subject. The morning session on September 26 will feature "The Nature of the Galaxy Distribution in the Nearby Universe." The afternoon session will be on "Observations of the Distant and Early Universe." The September 27 morning session will deal with theories of large-scale structure directly related to the observations discussed the previous day. On the afternoon of September 27, there will be a discussion of the relationship between particle physics and astrophysics, and how this relationship concerns the structure of the universe.

Jerry Nelson, professor of astronomy at UC Berkeley, will give the evening lecture on September 26, speaking on the Keck Telescope, its performance and promise. Stephen Hawking, the Lucasian Professor at Cambridge University, will be the evening speaker on September 27, talking on "The Origin of the Universe."

Speaking during the morning and afternoon sessions will be John Huchra, Harvard; Sandra Faber, Lick Observatory; Marc Davis, UC Berkeley; Wendy Freedman, Carnegie Institution; Richard Ellis, Durham; James Gunn, Princeton; Maarten Schmidt, Caltech; Anthony Readhead, Caltech; Edward Wright, UCLA; Martin Rees, Cambridge; Richard Bond, Toronto; George Efstathiou, Oxford; James Peebles, Princeton; Bernard Sadoulet, UC Berkeley; Leonard Susskind, Stanford; Andrei Linde, Moscow; and Alexander Vilenkin, Tufts.

Day sessions will be held in Baxter Auditorium; evening sessions, in Beckman Auditorium. Persons wishing to attend the entire symposium should contact Michael Strauss, 818/356-4000, Mail Code 104-24, Caltech. There will be no charge for the evening sessions; however, information about admission to these sessions may be obtained from the division office, 818/356-4633.

Each year, the Alumni Association presents Donald S. Clark Awards to two outstanding juniors in engineering, in memory of the late Donald Clark, who was a professor of engineering, secretary of the Alumni Association, and director of placement. This year, the awards went to Elizabeth Wang and Eric Stout. With the award winners is Gary Stupian (BS '61), then vice president of the Alumni Association Board of Directors.

Gary Tanigawa, young-alumni chair

Gary Tanigawa, the young-alumni chair for the Annual Fund, has a new New York address. He's finished graduate school at Harvard, where he earned his PhD doing research in genetics, and he's now doing a postdoc at the Memorial Sloan-Kettering Cancer Center. There he is investigating vesicle transport to see how proteins get localized within cells. Tanigawa came to Caltech in 1979, and in 1983 earned his BS degree in biology. He was a member of Ricketts House. All of this has taken him a long way from Hawaii, where he grew up.

But the move to New York will not affect his responsibilities for the young-alumni campaign, now in its third year. The campaign began under the leadership of Leslie Paxton-Rousseau (BS '79), and Tanigawa became its chair this year. Work for the Annual Fund is not new to Tanigawa. He responded to a request for volunteers five or six years ago, and soon went on to become chair for the area campaign in the Boston-Cambridge area. His next volunteer role was that of regional chair for New England.

This year he was asked to lead the Young Alumni Campaign, an effort that involves working with alumni who have graduated within the last nine years. Earlier volunteers had become aware that young alumni tended to participate less in the Annual Fund than older graduates, and a special campaign was devised for them. "We've learned that people respond better if they know the person soliciting them," Tanigawa says.

The campaign structure that is being assembled involves naming a chair for each house and, within that house, a chair for each year. The total volunteer structure, when it is complete, will include some 70 workers. At present, Tanigawa explains, chairs have been appointed for six of the seven houses, and "we have the year chairs pretty well fleshed out."

Tanigawa finds the assignment particularly enjoyable. "I know most of the people I contact, and I can catch up on gossip, not just talk about Annual Fund matters," he says. He also enjoys coming to Pasadena in September for the annual planning meeting. "I like getting back to the campus every year," he explains.

Meanwhile, Tanigawa is happy to point out the growth in gifts and participation this year, compared with last. Participation has increased by 4.4 percent, from 19.4 percent of young alumni to 23.8 percent. Contributions have grown $2,600, from $16,064 to $18,675. Money collected is now at 129.2 percent of the sought-after amount. Most astounding of all, the number of volunteers has risen from 1 to 34.

Astronaut Carl Meade (MS '75) visited the campus during the spring. Here he presents a photographic display to President Everhart.

Alumni Activities

August 6—*New Mexico chapter dinner/meeting* with SURF students as guest speakers.

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

October 17—*Japan chapter event* with Amnon Yariv, the Thomas G. Myers Professor of Electrical Engineering and professor of applied science, guest speaker.

October 19-25—*Hawaii Travel/Study Program*, with Robert P. Sharp, the Robert P. Sharp Professor of Geology, Emeritus.

January 1, 1992—*Rose Parade event*: breakfast and lunch, the Athenaeum; reserved seating for the 103rd Tournament of Roses Parade at Hill and Colorado.

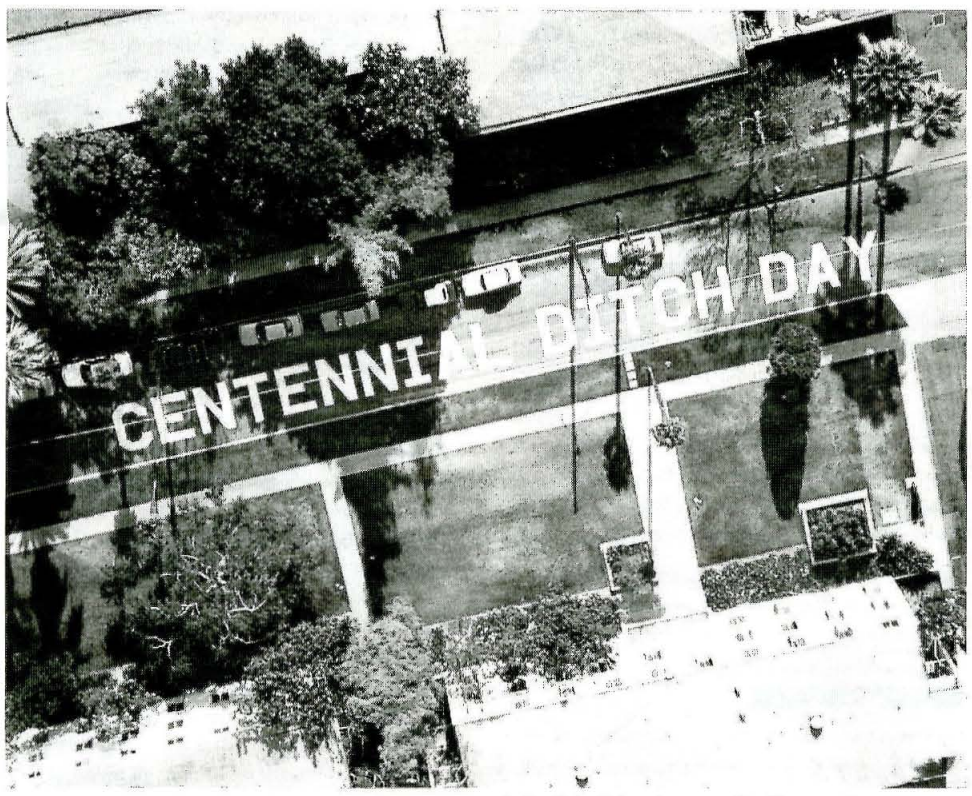
Unless otherwise indicated, for information please contact Arlana Bostrom, chapter events, at 818/356-8363, or Helen Shafran, travel/study programs, at 818/356-8364.

World's fastest computer unveiled

The Intel Touchstone Delta system, the world's fastest, most powerful computer, was dedicated and unveiled on campus during May. The machine will be used to tackle some of the world's most challenging problems in computational science and engineering.

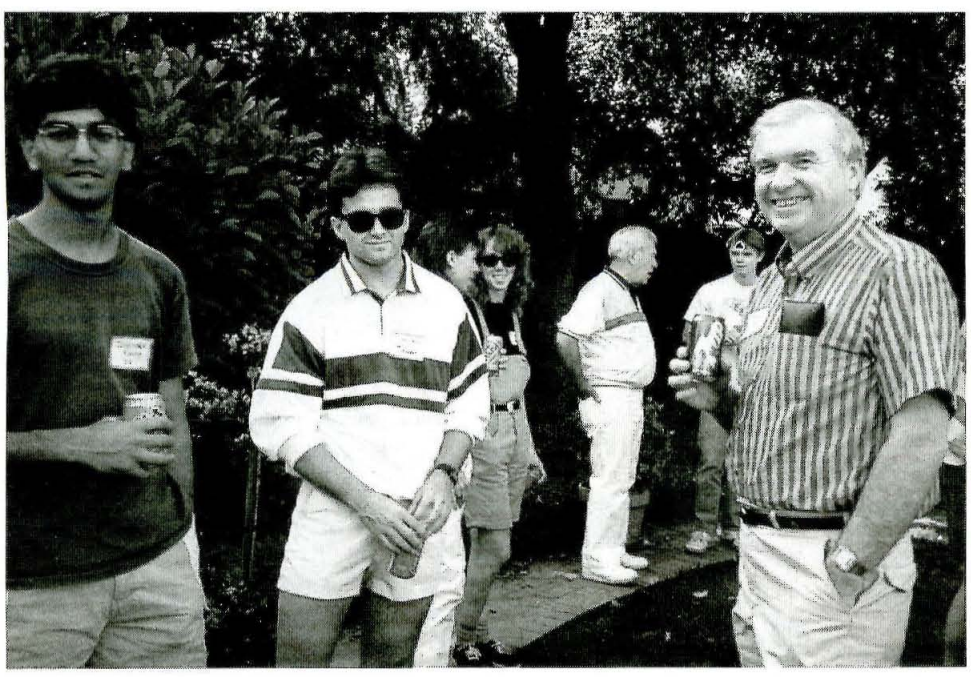
Although housed at Caltech, the Touchstone Delta system will be operated by the Concurrent Supercomputing Consortium, an organization of more than a dozen prominent research institutions and government agencies. Members of the consortium will use the Delta for various large-scale computations, including: modeling and simulation of global climate change, calculation of the rates of chemical reactions from the first principles contained within quantum theory, searching through large volumes of radio-telescope data for the faint and complex signatures of binary pulsars, visualization of scientific data returned from the Magellan and Galileo spacecraft, high-fidelity aerospace vehicle simulations, simulations of realistic models of brain circuits, reengineering of enzymes for enhanced biodegradation, and modeling of molecular processes in natural and contaminated systems.

The Touchstone Delta system was built by the Supercomputer Systems Division of Intel Corporation.



Ditch Day antics commemorate the centennial with this sign on Holliston Avenue.

A barbecue honoring graduating seniors was held at the Alumni House during the spring. The event was sponsored jointly by the Alumni Association and Annual Giving. Each senior who attended received a T-shirt specially designed for members of the class of 1991. Franklin Dryden (BS '54, MS '57) talks with two graduating seniors.



Frank Press

Continued from page 7

changes, Press pointed out, and sea level, based on current predictions, might rise by as much as 60 centimeters by 2100, causing critical damage to beach areas.

"Robust nations are resilient and probably could weather the situation," Press said. "Poor nations would suffer the most, their disaster leading to mass migrations of hundreds of millions of people looking for new places to live." Another possibility—not widely discussed—includes that of disease due to climate change. "Vectors for the transmission of diseases are sensitive to climate," Press noted. "Certain mites, mosquitoes, and other bugs have niches that depend on climate. These niches will move into areas where the populations are not immune to the diseases, and one can envision the kind of rapidly introduced epidemics that we may not be able to handle."

Another danger of great concern to ecologists is whether forest and other species of plant life—which move north during periods of gradual warming—could tolerate such a sudden change in temperature, or whether they would become extinct, Press said. Still another threat—estimated at about one chance in ten, or greater, by experts—is that of a "very bad surprise" of some sort, based on the radical environmental changes stemming from climatic shifts.

In response to these threats, the National Science Foundation has made extensive recommendations for measures to deal with chlorofluorocarbons and to reduce global warming pressures on the planet. "Under residential and commercial energy management, we considered residential and commercial lighting, commercial refrigeration, fuel efficiency, fuel switching (of coal to oil or natural gas)," Press said. "Under transportation, which represents 40 percent of our energy needs in the country, we considered fuel-efficiency standards for light vehicles and aircraft, and alternative fuels. Under electricity and fuel supply, we considered the possibilities of greater use of nuclear energy, solar power, photovoltaics, and natural gas. Certainly conservation in all respects was considered. We came up with a list of recommended options based upon cost effectiveness."

These recommendations included reducing emissions, in carbon dioxide equivalents, by 10 to 40 percent of what is emitted today—a goal Press said can be achieved at relatively little cost to the country, by increasing the fuel efficiency standards of autos to 32 miles per gallon and by improving industrial energy and transportation system management. Other recommendations included reforestation, and changing to safe nuclear reactors and gas-fired turbines that use coal in their production. "If we implement these, the cost to the country will be less than 10 billion dollars per year, for a reduction in carbon dioxide emissions of between 10 and 40 percent," Press said. "This reduction would mean that there still would be a lot of carbon greenhouse gases going into the atmosphere." But, he said, to achieve a reduction of 80 to 90 percent would cost trillions of dollars per year.

Other recommendations explored by Press included a 50 percent reduction in the emissions from fossil fuels and automobile exhausts that produce acid rain—to cost up to 5 billion dollars per year and to be paid for primarily by consumers of electricity and by drivers of automobiles. He additionally recommended a "fast-track initiative" to improve the science of climate change, including the study of historical natural changes; improving data acquisition; achieving an understanding of the atmospheric and ocean systems by conducting global experiments; improving models; and directing more people to work on this problem.

Energy initiatives that have merit independent of climate change, such as improving our own energy security, were also recommended. Press suggested that we begin now to reduce carbon dioxide emissions by conservation, call for cars that attain higher mileage than those now sold, and provide incentives for conserving energy in industry, transportation, and homes. Water conservation in agriculture and industry is vitally important, Press said, as is the initiation of major research and development for safe, alternate energy sources—for example, solar energy, biomass, and safe nuclear technology. Also central to the planetary survival program is the genetic engineering of new kinds of food plants that use less water and fewer chemicals. "In the investments we make in coastal zone management, let us now anticipate a significant sea-level rise," he said.

In addition, "New programs addressing emergent diseases and a surveillance program to detect new viral diseases as soon as they emerge should be included," he said. Moreover, he told his audience that "we need to cut off all production of CFCs as soon as possible, certainly not later than by the year 2000, and replace them with alternatives. And in the development policies in our own country and those of other countries, and of the World Bank, we should make sure our funds are used toward sustainable environmentally sound projects—in either agriculture or industrial development.

"The cost to the world of all the steps would be several tens of billions of dollars a year. I believe this is manageable and justifiable as a prudent measure if the consensus view of scientists holds for a few more years.

"Do not expect the advances in science and technology to solve enormous environmental, economic, and political problems created by uncontrolled population growth," Press told his audience. "This issue must be addressed in all of its political, economic, and social dimensions, with the highest priority we can muster."

Men's, women's athletic season mixed

The men's track and field team achieved an overall record of 18-7 this year, distinguishing itself as the most successful among Caltech teams. The team's SCIAC record was 2-5. At the SCIAC championships at Pomona-Pitzer, virtually every Caltech athlete set a personal record in each event he competed in.

The golf team finished seventh in the conference, with an overall record of 0-14. Fielding a team of five rookies, Caltech played well but was unable to catch any of the other teams.

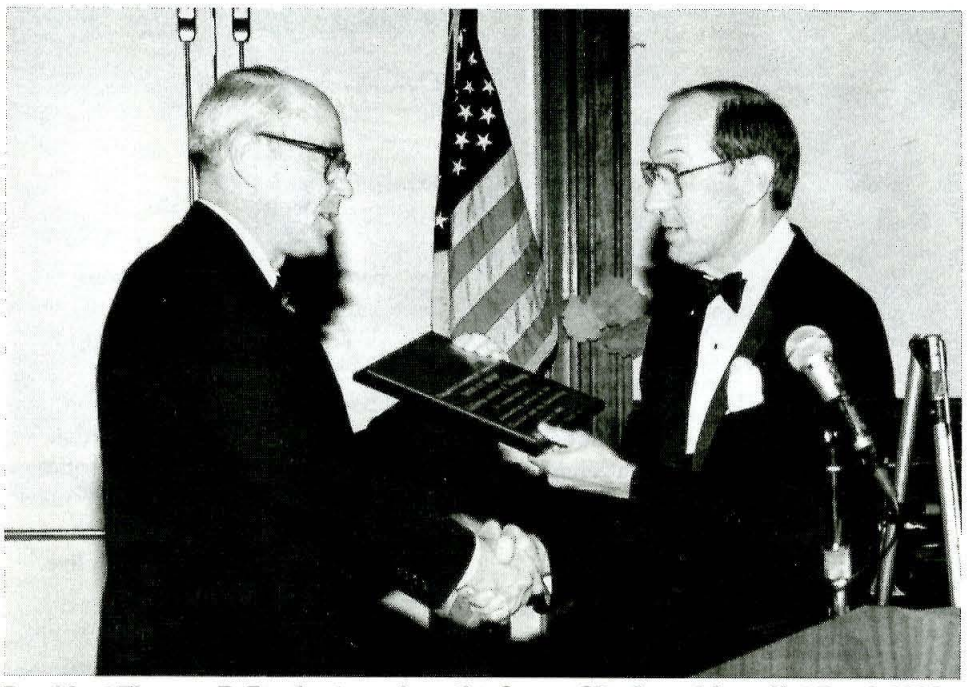
The final overall record for men's tennis was 3-14, with a fifth-place tie with Whittier in the SCIAC. Caltech went to the SCIAC tournament tied with Whittier and hoping to overcome the Poets in the final conference standings. But both teams gained two wins in the conference, with a continuing tie as the result.

Women's tennis posted a season-final record of 4-16, with a SCIAC record of 2-10. Caltech traveled to Redlands for its final conference match of the season, but the Bulldogs remained strong, defeating the Beavers 8-1. Caltech played some tough matches in the SCIAC tournament. Diane Wong was the point winner in singles, handily defeating her Whittier opponent 6-2 and 6-1. In doubles, Wong and Yu-Chien Kuo volleyed to a 6-2, 6-3 first-round win, going on to play the semi-finals against top-ranked Pomona-Pitzer. Although the Beaver duo lost 6-2, 6-2, Coach Karen Nilsen believed Wong/Kuo played their best match to date.

Women's track and field completed a successful season with a record of 11-13, including 2-5 in SCIAC play. The women clinched fifth place at the conference meet, and set records in the 400-meter and 1600-meter relays. Liz Warner and Emmeline Naranjo achieved all-conference in four events each. Two new school records were set during this meet, as Naranjo dropped her own record for the 100-meter hurdles to 16.6 seconds. Meanwhile, the 1600-meter relay team trimmed almost six seconds off the previous record, blazing to a fourth-place 4:28.47 split.

The baseball team finished with an overall score of 3-27-1, and a SCIAC record of 0-18.

Graduating senior Liz Warner received the Caltech Outstanding Athlete Award and also received the Francis W. Davis Award as Caltech's outstanding female athlete. Warner was voted Caltech's outstanding female track athlete during each of her four years at the Institute.



President Thomas E. Everhart receives the Crown City Award from Nat Reed, 1990-91 president of the Pasadena Chamber of Commerce. The award is presented annually by the chamber to a member who has made a "singular and significant contribution to the community" during the previous year.

Booklet available on Y 75th anniversary

The Caltech Y is celebrating its 75th year as an integral part of the campus community, sharing in a special way in Caltech's Centennial. Now those 75 years of service, fun, and student leadership are chronicled in a booklet, *The Caltech Y: 75 Years of Involvement,* available at the Caltech Y office.

Author of the booklet is Theodore Combs (BS '27), whose 65 years of service to the Institute have included much involvement with the Y. As an undergraduate, Combs served for two years as vice president of the student cabinet of what was then the Caltech YMCA, and he has been a board member several times since graduation. He cochaired the Friends of the Y for a few years, and currently is a board member.

An invitation to a dedication

Caltech alumni, faculty, staff, and students are invited to the Nelder Grove to join participants of the Alumni Association's Owens Valley/Yosemite Travel/Study Program for the dedication of five Caltech giant sequoias. At midmorning on Monday, September 27, 40 alumni and guests, led by Le Val Lund, Jr. (BS '47), and Ted Combs (BS '27), will walk the Shadow of the Giants trail, located just a few miles below the southern entrance of Yosemite National Park, to climb through the forest to the grove containing trees to be named for Millikan, Hale, Noyes, Throop, and Fleming. A commemorative plaque will diagram the location of each tree, so that all future visitors to the Caltech grove can identify the giants, which are some of the largest in the world. All are welcome to attend this special event. Please contact Helen Shafran at the Alumni Association at 818/356-8364 for additional information and directions. (See article in the April issue of *Caltech News* for the complete story of the Caltech grove.)

Letters

Dear Editor:

Thoughts on reading "Charles Wilts dies while hiking," April 1991.

He taught me EE and control theory during my senior and master years in 1953/4, at a time when the development of analog computers was at a peak. His name, however, was known to me before coming to Caltech. We both had graduated from LA City College, where he was the prize pupil of Dr. Winger, the physics teacher, before he, and later I, made the big leap to Pasadena.

He always had a pleasant smile on his face and was dedicated to his students, and you got the feeling that you were a human being in his presence. I remember him for that and for our common love of the mountains, particularly the San Jacintos above Idyllwild, where I have hiked the mountains for many years, though I never climbed the rocks with as much enthusiasm as he did.

Sincerely, Rolf D. Weglein
BS '53, MS '54

PERSONALS

1941
TOM HUDSPETH, who has been with Hughes Aircraft for 45 years, is chief scientist for the company's Space and Communications Group. He is credited by Hughes with having helped make it the world's leading manufacturer of communications satellites, and has twice been given the company's prestigious Lawrence A. Hyland Patent Award. Hudspeth has received more than 20 patents during his career.

1944
ALFRED G. KNUDSON, JR., PhD '56, has been elected to the American Philosophical Society (APS). He is a senior member of the Institute for Cancer Research, Fox Chase Cancer Center, in Philadelphia. The APS—which was founded by Benjamin Franklin, among others—is the United States' oldest learned society.

1957
ED BERRY was the winner in his age group of the 1991 Norcal Duathlon Series. The series consisted of three separate events—a 5-kilometer run, a 30-kilometer bicycle ride, and a second 5-kilometer run. "For the past year," he writes, "I have added swimming workouts to my normal running schedule. All with the goal of being ready for this summer's triathlon events."

1960
MEREDITH B. MITCHELL wrote on June 10, "Today I was honored by being elected president of the C. G. Jung Institute of Los Angeles. The term of office runs two years. I became a certified Jungian Analyst in 1974, immediately after having graduated from this same Institute. I shall, of course, continue my private practice in Van Nuys."

1966
DOUG HOLFORD, of Houston, Texas, having practiced primarily in the field of civil litigation since graduating from Harvard Law School in 1973, has been Board Certified in Civil Trial Law by the Texas Board of Legal Specialization.

1974
RIK FISCHER SMOODY, EX, wrote in May, "I have returned from Japan and am consulting in object-oriented computer systems (d.b.a. 'smOOdynamics'). Barbara and I will celebrate our sixth anniversary by hosting an all-night dance June 22nd for a few hundred of our dancing friends."

1979
KOLEEN MATSUDA FRENCH writes that her first child, Elizabeth Nenita, was born January 25 at six pounds seven ounces. French and her husband, Bob, have been in the Philippines since 1988, working on a remote island as evangelical Christian missionaries.

1981
DAVID B. ARAGON has received the TRW Chairman's Award for Innovation. TRW Chairman Joseph T. Gorman presented the award during a formal dinner on May 22, at the company headquarters, in Cleveland, Ohio. Aragon is the manager of Image Recognition Software, at TRW's Financial Systems Group, in Berkeley, California. He was honored for having developed TRW's high-speed, high-volume Image Character Recognition system, which recognizes both machine-printed and handwritten characters and permits the automated reading of dollar amounts on checks.

Caltech*News*

Volume 25, No. 4
August 1991

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

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USPS 085-640

California Institute of Technology

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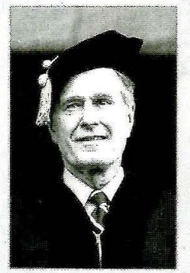

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