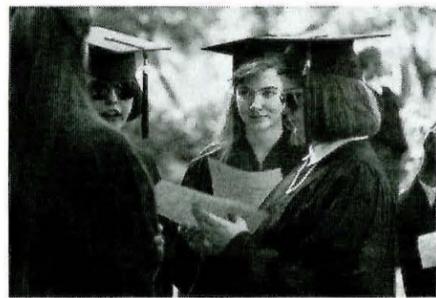


Volume 27, No. 4
August 1993



Caltech's 99th class appears on the mall



"You are the world's human capital," declared commencement speaker Jewel Plummer Cobb as she delivered the send-off for Caltech's 1993 graduating classes at the Institute's 99th commencement exercises on June 11. Caltech was bringing slightly more to the marketplace than usual this year, as it said farewell to the largest senior class in its history. Two hundred and twenty students received the BS degree, 99 with honors. MS degrees were presented to 460 students, the majority of whom will be continuing on for the Caltech PhD, and four graduates received engineer's degrees. Of the 158 new PhDs, 19 received their doctorates in the biology division, 36 in chemistry and chemical engineering, 58 in engineering and applied sciences, 11 in geological and planetary sciences, 6 in the humanities and social sciences, and 28 in physics, mathematics and astronomy.

More than two dozen prizes recognizing outstanding academic achievement and exceptional service to the campus community were also presented this year. Three of these were awarded at commencement.

The Milton and Francis Clauser Doctoral Prize, awarded to the PhD candidate whose research "is judged to exhibit the greatest degree of originality," was presented to Jongsun Kim, who received his doctorate in chemistry. The native of Korea was honored for his ingenious and innovative research in determining the crystalline structure of nitrogenase, an enzyme

that has great potential as an active agent in fertilizer because it possesses the rare capacity to convert nitrogen into agriculturally useful ammonia at room temperature.

Physics major Michael Andrew Nassir received the Frederic W. Hinrichs, Jr., Memorial Award, presented "to the senior who, in the opinion of the undergraduate deans, has made the greatest undergraduate contribution to the welfare of the student body and whose qualities of leadership, character, and responsibility have been outstanding."

And the Mabel Beckman Prize, awarded each year to a junior or senior woman "in recognition of demonstrated academic and personal excellence, contributions to the Institute community, and outstanding qualities of character and leadership," was presented to Catherine Hafer, who graduated with a degree in economics.

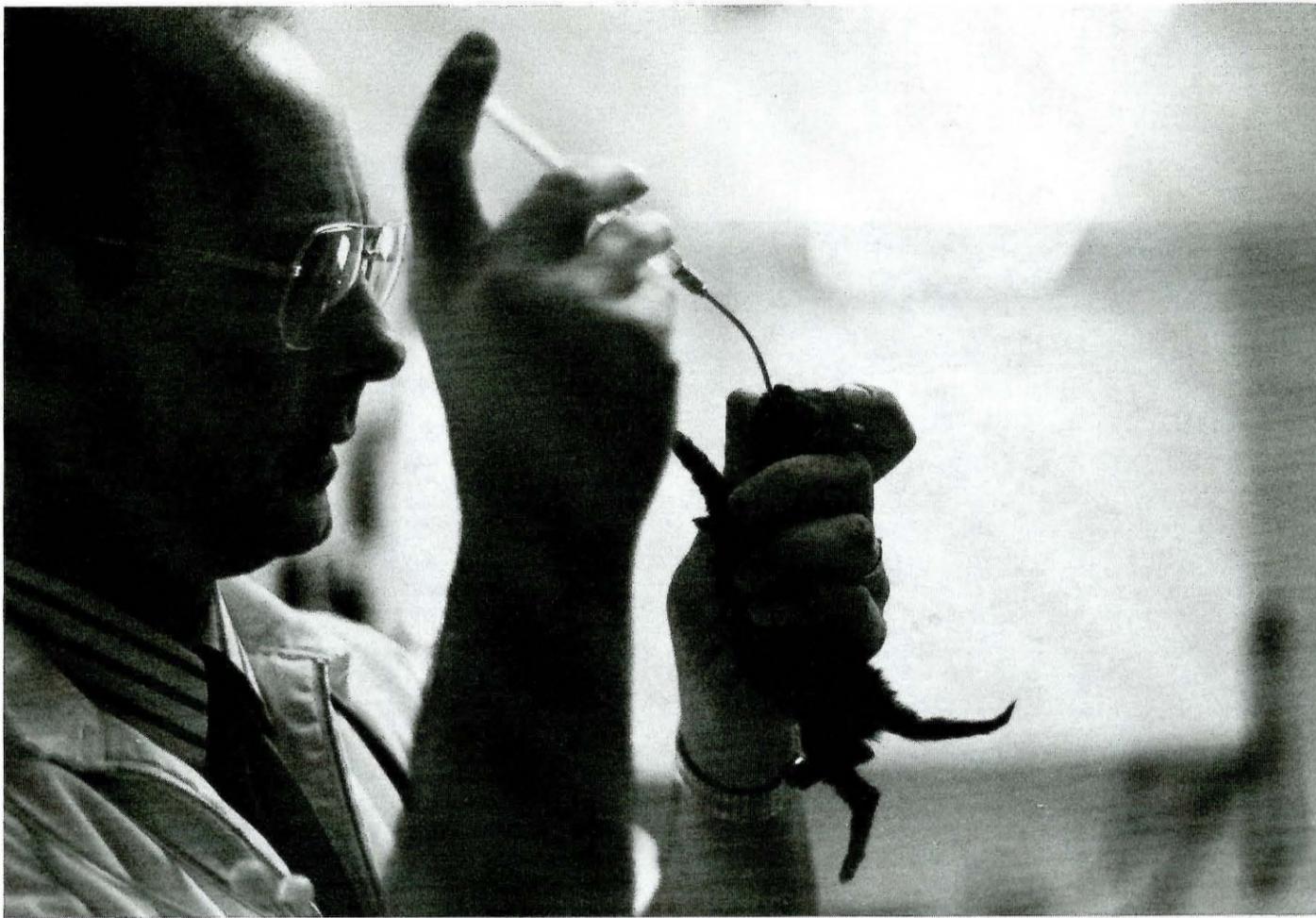
In her address, "Choices and Chances in the 21st Century," Cobb, a research biologist, the president emerita of Cal State Fullerton, and a member of the Institute's Board of Trustees since 1990, urged Caltech's outgoing students to remember that they would be in the vanguard of those shaping the next millennium. "It's an awesome thought," said Cobb, "and a time for reflection as Caltech completes 102 years of world-class leadership in scientific research and technology."

But no matter what the century, Cobb emphasized, Caltech's 99th class shares one indispensable trait with all

the gifted researchers who have preceded and will follow them—"the innate human characteristic of curiosity. Scholars and scientists are one of the few adult groups who can still have fun professionally, acting like a child. We ask, 'Why? What if?' Curiosity is the excitement of life. Discovery is its reward."

For many of the Institute's newest graduates, the path to discovery will lead through graduate school. According to Caltech's Career Development Center, that's where nearly half of the graduating seniors are bound, while about a quarter have found jobs or are seeking employment. (The remaining quarter are undecided or have other plans.) Roughly 20 students plan to attend medical school, several of them in a combined MD/PhD program. Of the master's candidates, 75 percent are continuing their graduate studies, and about 10 percent of the class is joining the work force.

Slightly more than 40 percent of the PhDs have found jobs with industry; 36 percent are going on to postdoctoral positions; and another 10 percent have accepted tenure-track positions at universities throughout the world, including institutions in the United Kingdom, India, Taiwan, Israel, France, Germany, the Netherlands, Canada, and Switzerland. Three more students have joined international management consulting firms; and at least two—bearing in mind that human capital isn't the only variety around—have elected to go the entrepreneurial route.



Photos by Hillary Bhaskaran

René Gandolfi '74 administers a mixture of glucose and electrolytes to one of his youngest and most vulnerable patients.

dog.) And second, for animals that have already been lost, have owners fill out the questionnaire we developed with standardized responses like 'orange, black, etc.' for the color of their pet. If you don't have uniformity, you get garbage that the computer data-base can't process." For his Oakland relief efforts, Gandolfi was given an Outstanding Public Service Award from the California Veterinary Association, and his team of volunteers (including those at the Firestorm Pet Hotline) received additional awards.

Luckily, Gandolfi had begun to prepare for such a crisis—though he'd expected it to be an earthquake—as chairman of Alameda County Veterinary Medical Association's Disaster Preparedness Committee. Being the good Caltech-trained scientist that he is, Gandolfi had played the "What if . . . ?" game, asking questions like "What if all the nearby shelters fill up?" and preparing to meet the needs of such a moment. He had the names of dozens of veterinarians stored in his head, and lists of who had horse carriers and such, in his hand. But even with preparation, tackling the project was "like grabbing a tiger by its tail," says Gandolfi, who knows from personal experience that this is not the best approach with an alligator either. And it didn't help that the local officials had no game plan.

"The government will always think of pets as property," Gandolfi says. "It reports the number of human lives lost, then houses, then cars—never even mentioning pets. But an animal is more important than a piece of property; it's a living being." In fact, Gandolfi told his local paper, some Oakland Hills fire victims had no one *but* their pets to turn to after the disaster. Pat Shaw, who has operated the lost-pet hotline since just after the fire, told the same paper, *The Montclairian*, the story of one such owner. "This man had had a stroke after the fire, and he couldn't talk," said Shaw. "But as soon as we located his pet for him, he started talking."

Even with all this excitement going on, Gandolfi still managed to see at least a handful of patients a day in his job as a staff veterinarian at Grove Way Veterinary Hospital in Castro Valley, which is just south of Oakland. He was also having his own clinic constructed. Four months after the fire, in February 1992, the clinic opened as the Castro Valley Companion Animal Hospital. As owner, manager, and veterinarian, Gandolfi sees dogs, cats, birds, rabbits, reptiles, rodents, and fish—with the aid of a receptionist/technician, Kirsten Zollinger, and a technician, Stephanie Booker. By the time the clinic opened, rescue activities had slowed considerably, the lost-pet hotline had become self-sufficient, and Gandolfi was able to settle into a daily

The vet from Caltech

By Hillary Bhaskaran

As René Gandolfi '74 set the tiny animal down in the glass box, a nose crept out from beneath its cloth surroundings. At a glance, it could have been mistaken for a mouse. Then an entire head peeped out and craned around, and, with its mouth straining open, it began to cry. With what could have been fur or feathers plastered against its head, it looked more like a bird than a newborn kitten, until its scrawny, four-legged body emerged. The female kitten had picked up a viral infection, and she was unable to keep fluids down or her weight up. Gandolfi had seen too many cases like this lately, but hers was the worst yet, and he wasn't sure he could save her. He alternated between force-feeding her liquid and trying to reach a UC Davis veterinary professor to get further insight into her illness.

The kitten spent the day in the incubator, with the world bustling around her. While she lay there, Cassy the prize-winning retriever got her weight checked and her diet evaluated, Misty the dog had the fur behind her ears shaved and was checked for skunk bites, a baby barn owl had his throat cultured and his broken wing examined, kennel cages were dirtied by their

residents and cleaned by technicians, phones rang, drugs were ordered, skunk and urine odors wafted through, and another day went by in the life of the veterinarian from Caltech.

A vet from Caltech? Gandolfi has come across only one other such animal, Steve Battelle '72. His undergraduate adviser, Lee Hood, had certainly never heard of such a thing when Gandolfi, as a senior in search of a career, made first mention of this emerging interest. But Gandolfi has never been one to follow the herd; he's more likely to lead the stampede.

And that's just what he did during the Oakland Hills fire in late 1991. Acting on his own initiative, Gandolfi organized a massive effort to rescue and reunite nearly 800 stranded animals with their owners during and after the disaster. He did this with very little help from the local government, he laments, but with tons of help from volunteers. As soon as the Oakland resident knew that his wife and the couple's six cats, one dog, and two canaries were spared from the fire's devastation, Gandolfi wasted no time in helping others who weren't.

First, he stationed volunteers at the Red Cross shelters, where disaster vic-

tims were arriving in droves, often with their pets. As Gandolfi had discovered during the Whittier Narrows quake of '87, these human shelters don't accept pets. So, via endless phone calls, he arranged for the volunteers to transport vanloads of pets to animal shelters throughout the region, and he made sure that the animal shelters were ready to receive them. At the same time, Gandolfi found space for injured pets at emergency animal hospitals. Barely stopping to catch his breath, he set up a pet identification system and a lost-pet hotline—two legacies of the fire that are still reuniting pets and owners two years after the disaster that separated them.

The identification system he established was even passed on to the U.S. Army to help them keep track of animals in the wake of Florida's Hurricane Andrew. When Gandolfi heard that a friend of a friend was helping the Army move hundreds of animals out of that disaster area, he offered two recommendations based on his disaster experience: "First, for animals that are being relocated, implant coded microchips under their skin and record their 10-digit code in a national registry. (It's like keeping a Fedex receipt for your

routine—if you can call it that, considering the kaleidoscope of walk-in (and heel-in) patients that whirl through his clinic each day.

Sure, life might have been quieter for Gandolfi had he stuck with biology research, or it might have been less smelly had he become a lawyer. But Gandolfi's chosen profession suits him superbly. "It lets me apply my training in biology and immunology and be independent," he says, admitting that he once worried he couldn't be a vet because of his tendency to become nauseated and faint at the sight of blood. Having overcome that, he has found that "the critters are real nice, and I get to use manual skills rather than just pushing a pencil around."

And being a vet has given Gandolfi the chance to treat animals and their owners the way that he has always liked to be treated—as an individual worthy of respect. Okay, so he gives the animals shots in the feet and keeps a firm hand on the nervous growlers until they submit, which he wouldn't stand for from a doctor. But he also speaks to them in a reassuring and friendly way, checks in with their owners following their visit, and tries not to hurt the critters too much. Maybe that's why Annie, a bulldog whose polite name belies her lack of grace, bounds toward Gandolfi's clinic with unrestrained glee whenever she's even blocks away. "Her owner lives nearby," explains Zollinger, "and she has to make sure she doesn't take Annie walking in this direction."

On the same busy Monday that the ailing kitten came in, Gandolfi found the time to send sympathy cards to two owners whose pets had passed away. But Gandolfi has little sympathy for owners who don't take proper care of their pets. Two such miscreants were letting their cat, Tiger Lily, live on a roof. When Tiger Lily broke her femur bone, possibly from a fall, the owners asked Gandolfi to fix it for under \$50 or else put the cat to sleep. Gandolfi had other ideas. He pinned the broken bones together with some new equipment that he wanted to try out (in a procedure that would have cost at least \$400), and he kept Tiger Lily at the clinic in hopes of finding a more compassionate owner for her. "I wasn't going to give her back to an owner who let her live on a roof." As it turned out, the vet is "one of the few people Tiger Lily doesn't run away from," so she still lives at the clinic along with Gandolfi's other "hospital cat," Chum.

Of the more caring owners, some have unusual ways of showing their affection, but Gandolfi and his technicians oblige their whims when possible. On that busy Monday, a client was scheduled to pick up her pet, which Zollinger pointed out was in a six-inch square redwood box perched atop the reception desk. What could possibly fit in that box? "This owner had her dog cremated," Zollinger explained, saying that the practice is becoming more common. "She has a whole shelf of her past pets, and she told us, 'When



I die, I want us all to go together."

However one spells respect, it's what Caltech showed Gandolfi, attracting the high-school student to the Institute despite his best intentions. As student body president of a huge New York City high school, himself a voice for expanded busing programs and student involvement in the PTA, Gandolfi was applying to liberal arts colleges with his eye on becoming a lawyer. To him, Caltech was too high-tech and only wanted "kids who had Nobel Prizes by age 13." Having no chance of meeting this "qualification" (except maybe in dog years), he *did* have the distinction of being a National Merit Scholar finalist. It was this accolade—plus a case of mistaken identity—that brought Caltech knocking at the high school senior's door.

"Dear Ms. Gandolfi," Caltech's first letter began. It wasn't the first time a prospective college had mistaken René Gandolfi's name for a woman's. And Caltech was on the lookout for women, as the letter went on to mention. "We're currently going coed, so this will be our chance to blah, blah, blah." The letter was stamped with Director of Admissions Peter M. Miller's signature. Gandolfi thought, "Geez, this is ridiculous. Caltech makes computers. Those guys got my name off a computer printout, why the hell can't they get it right?"

Armed with his grandmother's typewriter and a piece of paper, he wrote a "real flippant" letter back: "Dear Dr. Miller, in case you didn't notice, there's only one 'e,' not two 'e's, at the end of my first name, which by any correct French spelling makes me male, not female. You also probably got my name from the National Merit computer printout, on which I checked the 'male' box. As regards your undergraduate women, I may be interested in

A baby barn owl endures a few moments of daylight to have its broken wing examined. Helping Gandolfi is an employee of a nearby nature center where the vet has volunteered since 1987.

them, but not for reasons of admission." He mailed the letter to Caltech, "expecting, at best, for it to be thrown in the trash."

Within two weeks he got a letter back. "Dear Mr. Gandolfi," it read. "I'm terribly sorry about the mix-up with the spelling. You're right, your name *does* have one 'e' at the end of it. I checked, and you *did* mark the 'male' box. I've instructed all of my secretaries to brush up on their French spelling so we won't make that mistake again. As regards our undergraduate women, you'll have to *be* here to see them." Miller himself signed this response, to which he added a P.S. thanking Gandolfi "for a really fun letter that put a bright spot in a really dull day." Miller's personal, jovial reply hit the spot, so Gandolfi forked over the \$10 application fee out of principle. He was further impressed when a Caltech representative flew out and interviewed him at his high school. "Again I was treated as an individual, and not as applicant number 27501," he said. Still it was a shock to the would-have-been lawyer when he was accepted—with a scholarship. He "had no idea what Caltech was all about," but sums up his final choice of colleges as follows: "It was either go to Caltech free for a year or freeze in Buffalo."

Once at Caltech, Gandolfi found the same respect for individuals that Miller had shown him, especially from faculty members, among the students at Dabney House, and within the school's honor code. He also found that, "geez, some of these guys really *can* compute rocket trajectories in their head," and that he was going to have to "struggle through college" (with honors, as it turned out). Along the way, he needed to choose a major. Geology didn't pan out, he says, "because I was color-blind and couldn't even read a streak test."

Continued on page 5



The typewriter that produced the infamous letter to Caltech is here used by Zollinger to type prescription labels. Gandolfi's computer is used for other tasks, such as the 1991 project of matching lost pets with owners after the Oakland Hills fire.

FRIENDS

Harvard administrator Jerry Nunnally to head development office

J. Ernest "Jerry" Nunnally has been named Caltech's new assistant vice president and director of development, following a national search. As the head of development, Nunnally will



Jerry Nunnally

have responsibility for planning, organizing, and directing Caltech's national fund-raising program. He comes to the Institute from Harvard, where he has been on the development staff since 1985, most recently as associate director of university development. Nunnally will arrive on campus in October to take up his new responsibilities.

At Harvard, Nunnally has also held the positions of director of school relations and director of corporations and foundations. From 1977 to 1985, he was director of foundation and corporate relations at Dartmouth College. Prior to that he served as manager of college relations for Continental Illinois National Bank in Chicago for three years and director of development at Dillard University for three years.

Nunnally received his BA degree in 1969 from Dillard University in New Orleans, and earned a master's of education degree from Harvard in 1984. He serves as a member of the Board of Trustees of Hampshire College, and is a recipient of the Marion L. Anderson Prize, awarded by the Harvard College Fund. He and his wife, Brenda, have three children—Martin, 17, Adia, 12, and Amanda, 4.

Irvine Foundation awards \$1 million for minority student fellowship support

The James Irvine Foundation has awarded Caltech a grant of \$1 million to support the continuation of an Institute fellowship program for minority graduate students and to establish a Dean's Fund for Community Outreach and Service. The support, which will run through 1997, brings to \$2 million the amount that the foundation has extended to Caltech for the support of minority students since 1989, when the Irvine Minority Fellowship Program was initially established on campus.

The purpose of the Irvine Fellowship Program is to help increase the numbers of African Americans, Native Americans, Hispanics, Native Alaskans, and Native Pacific Islanders in the sciences and engineering. Another goal of the program is for the Irvine Fellows to become role models and draw other young people of minority groups to careers in science and technology. Currently six Caltech graduate students and three postdoctoral scholars are Irvine Fellows, in fields that include aeronautics, chemical engineering, mechanical engineering, and applied mechanics. The new funding will support the creation of three additional Irvine graduate fellowships for 1994–95, two for 1995–96, and two for 1996–97, for a total of seven new fellowships.

The Institute will also use the new Irvine grant to establish the Dean's Fund for Community Outreach and Service Programs, an effort aimed at organizing programs that will strengthen the relationship between Caltech and the Pasadena community. One major use of the fund will be to augment Caltech's highly successful Young Engineering and Science Scholars (YESS) Program, a multifaceted, multidisciplinary summer science program that has been offered since 1990 to disadvantaged high-school students, who would not otherwise have access to such specialized training and resources. The Dean's Fund will also be used to facilitate off-campus volunteer and work-study community activities for Caltech students, and to expand the Caltech–Urban League Partnership program, which provides summer internships for Pasadena-area high-school and college students.

The James Irvine Foundation is dedicated to enhancing the social, economic, and physical quality of life throughout California, and to enriching the state's intellectual and cultural environment. The foundation has been a major leader in encouraging women and underrepresented minorities to pursue higher education.



Linda Maepa, shown here as she prepares a DNA sample for analysis, is the first recipient of the Howard Reynolds Memorial Prize in Geology, given each year to a sophomore or junior who demonstrates excellent potential in geology and contributes to the quality of student life. A senior this fall, Maepa has worked for the past two years with geology faculty on a project to study the composition of Earth's atmosphere and oceans in the Precambrian era, 600 million years ago. The Reynolds Prize was established with gifts from family and friends to commemorate the late Howard Reynolds '40, past president of Ricketts House, who pursued a successful career in geology and petroleum engineering.

Gifts by will

Trusts and bequests provide welcome support to Caltech's operating and endowed funds. The following are recent gifts received by the Institute:

Anna M. Wild, wife of deceased alumnus John M. Wild, who graduated in 1940 in aeronautics, made a bequest of a portion of her estate, in the sum of \$386,120, to benefit aeronautical engineering.

Kenneth K. Kelley, a friend of the Institute, made a bequest to

Caltech of \$1,409,247 in unrestricted funds.

John M. Peat, a 1939 graduate in geological sciences, made a bequest of approximately \$1,060,000, which will go into the John M. Peat Endowed Scholarship Fund.

For information about wording for bequests to the Institute, call the Office of Gift and Estate Planning (818) 395-2927.

At the Associates' President's Circle Garden Party, held last June in the President's Garden, hosts Tom and Doris Everhart (top photo) greet Bob Herzog '56, Eng '64, while Sam and Linda Oschin (bottom photo, left), benefactors of Palomar Observatory's Oschin Telescope, and longtime supporters of Caltech's astronomy program, share a moment with DuBridge Professor of Astrophysics, Emeritus Jesse Greenstein and his wife, Naomi.



Vet from Caltech

Continued from page 3

Gandolfi settled on biology. It was “a good way to avoid more physics and advanced math,” and he liked the courses—especially molecular biology, immunology, and a class taught by Ray Owen (now professor of biology, emeritus), in which the students visited a different Caltech biologist every week. One week the host was Max Delbrück. “So here we are having dinner at the house of a Nobel Prize winner,” recounts Gandolfi, “and being the meek little freshmen that we were, we say, ‘Dr. Delbrück, can we see your Nobel Prize?’” After agreeing, Delbrück had to think for a while about where it was. “So he goes stumbling down the hall, and you hear him rummaging through closets, cursing in German, and 10 minutes later he comes out and says, ‘I don’t know where it is.’ This is the kind of genius you’re dealing with,” adds Gandolfi. “It’s like the prize didn’t mean diddly. Big deal, the prize [Delbrück might have said]; talk to me about slime mold—that’s what I’m doing my research in.”

Within a year, Gandolfi joined the research group of another Caltech “genius,” Professor of Biology Lee Hood ’60, PhD ’68, who had made his fame studying mouse immunoglobulins. Hood personified the Caltech tradition of not looking down on undergraduates, says Gandolfi. “In Lee’s group, I was treated as an equal, which means I was questioned and forced to think as an equal.” One story about his professor sums up the Tech attitude for the vet. As a senior, Gandolfi went for his “exit interview” with Hood and had to tell him that, after two and a half years of trying to isolate immunoglobulins in a certain way, he didn’t think it would work. Hood said, “Thanks, we won’t try that route anymore.” Gandolfi admired Hood for trusting him and for having the perspective “to accept that there are dead ends.”

While working for Hood (an M.D.), Gandolfi developed a “medical thought pattern” and overcame his nausea at the sight of blood. Having endured thousands of mouse dissections, he now says grimly, “I owe mice a lot for those years.” It wouldn’t be long before he’d be making it up to much of the animal kingdom, for the wheels were already in motion. What had begun as a way for Gandolfi to eke out a Caltech degree had led to a strong interest in immunology and medicine.

As his interests were taking shape in the lab, Gandolfi “didn’t want to be molded” in his personal life. He chose to live in Dabney House, which he says welcomed people with a strong “sense of individuality.” It attracted people like his friend Ron Rubin, Ex ’74, who was thrown out of a freshman rotation dinner at another house when he met its strict dress code by wearing a con-

federate jacket and a bowtie. According to Gandolfi, while the Darbs took *in* characters, they took *to* his taste in music. “None of the Darbs listened to the Grateful Dead until I started dragging people to concerts,” he recounts, and ever since he has seen people wearing Dabney shirts at Dead concerts. No wonder he was social vice president at the time. Now, 20 years later, these Darbs plan get-togethers of a more cosmic nature. In 1991, alumni from both Dabney and Ricketts met for an informal multiclass reunion in Baja, California, to view a solar eclipse. This time it was Ray Spears ’73 who rounded them up, and it was Spears who turned Gandolfi into a devoted “eclipse chaser.” Now the vet’s looking forward to the next reunion, planned for 1998 in the Caribbean.

But before reunions came Gandolfi’s graduation, and then the big question: “What do I do now?” He couldn’t handle the thought of taking another exam, not even the Graduate Record Exam. Newly married, he was waiting for his wife, Stefanie, to finish her degree in English at UCSB. He knew he didn’t want to be a doctor—for people, that is—because his mother’s bout with cancer was bringing human illness “too close to home.” Doing research seemed too narrow and kept him indoors too much. Having enjoyed assistant teaching as a senior, he decided to pursue that avenue at a private school near Santa Barbara.

“This high school was the absolute antithesis of Tech,” Gandolfi says with frustration. “Where Caltech ran on the honor system, this school ran on the boarding-school system of a police state. And my feeling coming out of Tech was that people will rise to whatever level you ask them to. If you treat them as adults, then adolescents will move up to that level.” The high school didn’t go for that, so Gandolfi went on. He began volunteering at veterinary clinics in Santa Barbara, one of which had two vets who shared his outlook. “Right away they both said, ‘You’re a college graduate, you don’t need to clean kennels, just call ahead and get involved.’” They let Gandolfi help take X rays and give shots, and they didn’t even say he screwed up when he nervously stuck his first needle right through to the other side of a dog’s leg. Instead, his supervisor nonchalantly caught the white cream that had spurting into the air instead of into the dog. Rubbing it onto the dog’s skin, he said, “It doesn’t work as well topically.” Gandolfi had found his calling, and in 1977 he enrolled at UC Davis in California’s only veterinary program. It hadn’t been easy getting in, according to Gandolfi, who had had to explain Caltech’s method of granting pass/fail grades for freshman courses and research work. Once at Davis, it was Stefanie Gandolfi’s turn to bide her time, so she got her second degree and became, ironically enough, a lawyer.

It didn’t take the vet student too long to feel like a transplanted Techer and scientist. He shook his head seeing

all these students who had been “spoon-fed” through college. He saw them become “overwhelmed by vet school, where you were shovel-fed and had to think, where synthesizing a lot of disciplines together required problem-solving.” Gandolfi was ready. He asked questions and took chances, surprising fellow students by calmly tackling his first dog-spaying operation. Why get nervous when this was his chance to experiment? After all, he says, “I had the entire resources of the vet teaching hospital to bail me out if I messed up.”

Gandolfi has carried his investigative approach into professional life, to the point where salespeople hawking the latest miracle drug hate to call on him. “You’re selling a vaccine?” he quizzes them. “Why is this the best? What tests were used to develop it?” Not surprisingly, Gandolfi’s pet peeve is ignorance, especially ignorant vets. He fights the veterinary tradition of practicing “medicine by religion,” which he says has just started to change in the last 5 to 10 years. As an example, he cites a recent research article he read about feline leukemia, which was based on “dogma that’s been taught and referenced in every paper on the subject.” Gandolfi decided to trace the reference back—through 13 papers to a 1963 publication—and found that the research “results” were based on only three cases. “That’s the sort of stuff we tore apart at Caltech,” Gandolfi protests. So he took the non-scientific findings to task in his article, “Vaccination against the feline leukemia virus: a complicated endeavor,” published in *Veterinary Medicine* in 1991. In three previous papers, the vet had reported on unusual syndromes he’d observed in opossums and cats that hadn’t yet been noted in the literature.

It’s not only in the research arena that Gandolfi draws on his undergraduate experience. In the worst of times, he relies on the concepts he explored in

his Caltech philosophy class, with Professor Charles Bures. There he learned how to reconcile himself to the many deaths that a vet encounters in the course of a career. That’s not to say he wasn’t affected when the ailing kitten died of the pernicious virus. Or when the dog of a family friend died of cancer soon after. “Every time that happens, I relive the death of my own dog from cancer,” says Gandolfi.

“But amazingly enough, usually within a day of an animal dying, someone comes in with a new puppy. Nature, [or Professor Bures,] or whatever, slaps you in the face and says, ‘Hey, there’s a cycle here.’” The most difficult deaths for Gandolfi to handle happen outside his clinic—to the “millions of unwanted pets that are killed off each year.” But get the pets on his veterinary table, and he’ll give each one his best shot, putting that Caltech creativity to work.

When faced with a particularly tricky case, Gandolfi remembers Professor Richard Feynman’s advice, that every problem should be “reduced to graspable pieces.” Which brings us to the vet’s weirdest encounter. This was the case of the alligator that needed stitches in its tail. Now, if Feynman had been Gandolfi, knowing that a few feet from the alligator’s tail was its mouth, which part would *he* have grasped? The vet and his colleagues went for the mouth, but only after they had gotten the alligator to take a big chomp on a broom-sponge contraption. “When an alligator gets a hold of something, it doesn’t let go,” Gandolfi knew. But to be doubly sure, he wrapped duct tape around the mouth-broom-sponge formation several times. Then he was able to stitch the tail in peace, while remaining in one piece himself. “That one was easy,” says the vet from Caltech.

Sadie gets the A-OK from Dr. Gandolfi but doesn’t stick around for the bill.



ALUMNI

Where have all the veterans gone? The class of '43 has its 50th reunion

"I don't think you'll find too many reunions like this one," mused Rex Rhoades, as he gazed across the Athenaeum Courtyard, where his fellow graduates were greeting good friends, renewing old acquaintances, reliving past escapades, and posing for photos with wives, former roommates, partners in pranksterism, and Tom and Doris Everhart as they celebrated the 50th reunion of the class of 1943.

"I knew every one of these fellows so well," said Rhoades, who served as vice president of the class that year and was one of the organizers of the event that brought more than a hundred of his former classmates back to campus for Seminar Day Reunion Weekend. "I

think this group was exceptional in the sense of our common experience."

Surely Rhoades meant uncommon experience. How many Institute graduates went straight out of four years at Caltech and right into the Second World War? Take Rhoades, who had no sooner received his degree in applied physics than he joined the Navy, where for the next two years he put his Caltech education to use designing sonar technology for submarines. Or Robert Bashor ("more commonly known as 'Bubbles' and definitely a smoothie," according to the 1943 *Big T*), who went from being president of Fleming House to being an engineering officer aboard a destroyer.



"As an incentive for the propagation of the higher elements of society, and in the interests of the fairer sex whose lives and happiness depend on the success of their marriages and succeeding events," 12 members of Fleming House drew up a Marriage Insurance Policy and posed for a group testimonial in the 1943 *Big T*. From left, standing, the students are listed as: Bennett, Johnson, Lingle, Mead, Bashor, Spencer, Reid. Seated: Blayney, Merritt, Fair, Alpert, Bragg. Below, four of the would-be propagators, 5 decades and 12 children later, at their class reunion. From left, Robert Bashor, Robert Bragg, Ken Johnson, and Robert Bennett.



Reunion Committee chairman Art Schneider, with President Everhart.

Or Herbert Lassen ("He has a way with women," trumpeted the *T*), who was already in the naval reserve when he received his BS in mechanical engineering. Lassen would later earn a Caltech PhD, go into aerospace research, and win a sheaf of honors for his role in conceiving and designing Pioneers 10 and 11, the first spacecraft to explore Jupiter and Saturn.

"I always wanted to be part of planetary exploration and going to the moon," said Lassen, who fulfilled that ambition so well that he is today known as the "father of the Pioneer." But before going to the moon, Lassen had to go to war. He served off Australia and the Philippines as an engineering officer in the submarine service and was present at the signing of the Japanese Surrender in Tokyo Harbor on September 2, 1945. Like all Institute undergraduates, Lassen and his classmates came to Caltech secure in the conviction that they had it within them to make a mark on the world. Half a century later, seated around dinner tables at the Athenaeum, proudly discussing their careers, their grandchildren, and their memories of the war they had fought to create a secure future for those grandchildren, few could doubt that they had succeeded.

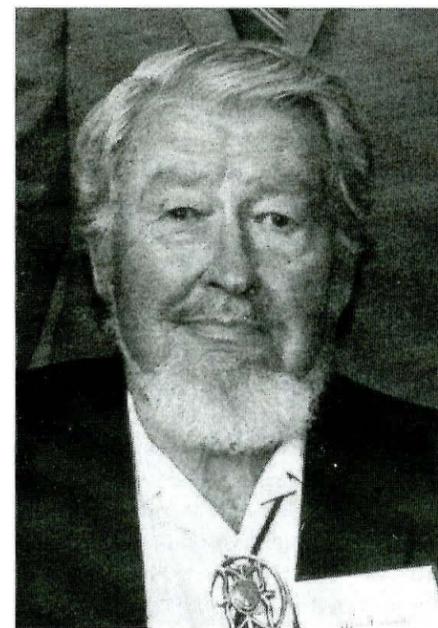
Art Schneider was another student who left Caltech for the service in 1943, graduating with not only his BS but also his MS in mechanical engineering. He trained as a pilot in the Navy, where, he said, "I was one of those people intended to provide air support for the invasion of Japan." That invasion of course never came, so Schneider came back to Caltech, added a PhD to his degree lineup, and went to work in defense R&D, first for Aerojet, then for Hughes Aircraft. Now here he was fifty years later, chairing his class's reunion committee, a role he had unwittingly started preparing to fill five decades earlier when he served as Blacker House's social programs manager. ("Actually," said Schneider, "I think I got tapped because I live in Pasadena.") A four-year letterman in track at Caltech, Schneider still runs—in 1980 he was the national marathon champion in his age group. Helping him cross his 1993 finish line were reunion committee members Dave Arnold, Mitch Dazey, John Essick,

Jesse Graner, Rex Rhoades, and Dick Schamberg. The group spent several months working with Caltech's Alumni Association to bring together the members of the last four-year class to graduate from the Institute before the end of World War II.

"Most of us got a year's deferment to finish school, but I don't know of a single student who didn't plan to join the service or who wasn't already in the reserves," said Graner, who spent three years in the Navy after receiving his degree in civil engineering. "We were absolutely eager to go."

Even at the height of action in the Pacific theater, said Graner, he never quite lost touch with Caltech. One evening he stood on the deck of the aircraft carrier *Intrepid*, watching as rockets were attached to the war planes. Right there, stamped on the sides of the rockets, were the letters CIT. The weapons had been manufactured by the Institute's wartime rocket project. "It seemed incredible to me that I should see the name of my alma mater out there in the middle of the Pacific," said Graner. "I've never forgotten it."

Among the alumni back on deck for the reunion were a group of former Army Air Corps cadets who came to Caltech in 1942 for a year of intensive specialized training as weather officers and left in 1943 with master's degrees in meteorology. During the round of reminiscing that went on during dinner at the Athenaeum, one graduate of this program, Ray Harless, rose to



Herbert Lassen

make a graceful tribute to the hospitality Caltech had extended during the war. "The time we spent here was a terrific experience for us," he said, adding with perhaps a touch of hyperbole, "We went off to win the war on behalf of Caltech." From campus, Harless was posted to Alaska and the Aleutian Islands, where he flew numerous weather missions over the north Pacific, advanced to the rank of captain, and won the Distinguished Flying Cross. After the war, he went into the civil service. When another alumnus rose moments later to regale the room with the details of how his postretirement career as a

free-lance consultant and writer had brought him a windfall of income tax write-offs, he may not have realized that Harless, now retired himself, had for many years been deputy commissioner of the IRS.

Back on common ground, the class members shared memories of what the campus had been like in 1943. The Institute was working hard to help win the war, with two rocket programs and officer-candidate school in full swing, but then, as now, most undergraduates were just working hard, period. "We had a lot of fun, and we worked our fannies off," said Rhoades. "I spent the most challenging four years of my life at Caltech," said Robert Bragg, as his old friend from Fleming House, Robert Bennett, rolled his eyes in agreement. "I never did anything harder in my life before or since."

Ken Johnson, who was executive officer on a submarine chaser in the Atlantic during the war, found that his Caltech education was invaluable in helping him advance through the service. "I went through two naval training schools and was at the top of each one, thanks to the training I received here." After the war, Johnson continued to advance—he got a master's degree from Stanford, became a specialist in natural-gas exploration, earned six patents, and founded several companies. "Caltech gave us the kind of discipline we needed to succeed anywhere."

But if the academic milieu hadn't changed all that much, certain social mores at least appeared to have. Reunion co-organizer Mitch Dazey recounted how after his discharge from the Navy, where he participated in radar research, he and his girlfriend decided to tie the knot. Both had been accepted by the same graduate school, and, said Dazey to a roar of laughter, "We felt we had to get married to go to Berkeley."

Caltech's decision to admit undergraduate women in 1970 was another major change, and one that some alumni acknowledged they'd originally been uneasy about. "Initially I was strongly opposed to the decision to admit women—I thought they would change everything," Graner said. "But then, several years ago, I heard a young woman who was a student here present a talk on a scientific subject, and she was absolutely terrific. She turned me completely around."

"There were no women on campus in our day, that's for sure," said Rhoades. "We had to go out looking."

Twelve members of Fleming House were so optimistic about what they would find, Bennett and Bragg recalled, that they made a marriage pact. "We agreed that whenever any of us got married, the rest of us had to chip in \$10 each," said Bennett, one of the signatories. In the event of divorce, the recipient had to make a full refund, and a quadratic equation covered assessments to be levied upon the birth of each child. A 50 percent bonus was mandated for all newborn boys, a shocking bit of sexism faithfully re-

After 50 years, the face isn't familiar, but . . . "We all recognized the names on the tags and then the faces came back slowly," said Lewis Rambo (top photo, left), whose beard no doubt added to the confusion for some of his old friends and acquaintances. One face Rambo had no problem recognizing was that of his longtime JPL colleague Earle Bunker (right). And Harry Steele (bottom photo, left) and Mitch Dazey (right) weren't only Blacker house-mates, they also double-dated with their future wives all through college. Just like today's students, "we spent a lot of time going to the beach whenever we could get our grades under control," said Dazey, confirming that no matter how many years go by, some things don't change all that much.



corded in the pages of that year's *Big T*.

Were this same pact to be solemnized today, Bragg and Bennett would probably bestow bottles of wine in lieu of cash. Each now owns and operates a vineyard in the Napa Valley.

Supplementing a recap of personal history from each alumnus was a talk on Caltech's history by the evening's speaker, Institute archivist Judith Goodstein. Her account of the signal achievements and no less signal idiosyncracies of some of Caltech's best and brightest prompted an anecdote from Rhoades—one that the archivist hadn't heard before. "I used to work in the biology library far into the night," he said. "Often, it was only me or one other person there. This old man used to shuffle in each night and turn off every light in the library except where somebody was sitting. I used to wonder who he was—much later I discovered it was Thomas Hunt Morgan."

"That's a great story," said Goodstein, adding that she always enjoyed speaking before alumni groups because they so often responded by telling her new and offbeat tales about their own lives and experiences at the Institute. "That's how history gets written," she said. The reunion of the class of '43 offered some insight into how it gets made.

ALUMNI ACTIVITIES

August 7, *Mount Wilson Observatory Tour.*

August 12, *Santa Cruz Area Monthly Luncheon*, Peachwood's at Pasatiempo Inn, noon. For reservations, call Bob Shacklett at 408/722-6021. The next two lunches will be on September 9 and October 14.

August 17–23, *Asbland Shakespeare Festival*, with Jenijoy La Belle, professor of literature.

August 19, *San Francisco Peninsula Monthly Luncheon*, Ming's Restaurant in Palo Alto, noon. For reservations, call Hugh Dubb at 415/362-3800 or 408/773-9100. The next two lunches will be on September 16 and October 21.

October 23–24, *Mitchell Caverns/Kelso Dunes Campout*, with Robert Sharp '34, Robert P. Sharp Professor of Geology, Emeritus.

January 1, 1994, *Tournament of Roses Parade Event.*

February 13–27, 1994, *Guatemala Travel/Study Program*, led by William Schaefer, senior research associate in chemistry.

For more information, please contact Arlana Bostrom for chapter events (818/395-8363), Patsy Gougeon for Seminar Day/reunions (818/395-8366), and Helen Shafran for travel/study and local programs (818/395-8364).



From left, Orange County Chapter president Tom Tyson '54, PhD '67; Trudy Bergen '74; Donald Keenan '73, PhD '77; and Hiroshi Kamel '51, MS '52, were among the 37 alumni who heard President Everhart address the Orange County Chapter on "The Alumni Role In Shaping and Achieving Caltech's Mission," in June.

ALUMNI



for morning breaks," opined one respondent. "Box lunches needed salt/pepper and napkins," suggested another. "Box lunch was delicious; perhaps include a 'washup' moist toilette," said a third, who presumably meant a towlette. And this from a fourth attendee: "Lunch should not have been on white bread."

When they weren't finding out about the faculty's latest research breakthroughs or assessing the nutritional content of their noontime meal, campus visitors took in a wealth of other programs and exhibits, including geology's always popular gem and mineral display and one of the newest showpieces in the Beckman Institute's collection—a high-performance mass spectrometer that does sophisticated analyses of the amino acid and base sequences of, respectively, proteins and DNA. Visitors also flocked to the Guggenheim aeronautics lab to experience the T-5 shock tunnel, perhaps the closest thing to a Disneyland attraction on campus; enjoyed an illustrated presentation about the range and variety of research under way at Caltech's astronomical observatories; and looked on appreciatively as the seismological laboratory put its Real-Time Picker—a computer-automated seismic-wave analyzer that makes a preliminary estimate of an earthquake's epicenter—through its paces.

Seven reunions were also held during Seminar Day Weekend, for the classes of '43, '48, '53, '58, '63, '68, and '83. (A story on the 50th reunion of the class of 1943 appears on page 6.)

In the day's other highlights, Nobel Laureate Rudy Marcus presented the keynote address, "Electron Transfer and Stockholm," and President Everhart presented seven Distinguished Alumni Awards, remarking as he did so, "The most important thing that we do is go out and educate people who can make a big difference in the world." For their part, the newly Distinguished recipients commented on the difference Caltech had made in their own lives.

Alvin Tollestrup, known for his experimental high-energy physics research at CERN and Fermilab, singled out "the professors who taught us that we could pick apart a problem and

solve it; and always conveyed a sense of the joy of discovery." Stephen Ross who went from a degree in physics to the Sterling Professorship in Economics and Finance at Yale, credited Caltech with instilling "a wonderful sense of intellectual confidence, as well as the good sense to realize you're not as important as you think you are."

Said John McCarthy, professor of computer science at Stanford and a pioneer in the field of artificial intelligence, "Caltech taught me that one should always look for opportunities to do something useful with science." And, said William Moore, who with his former classmate and longtime corporate partner Trent Dames, was honored for his stewardship of the international engineering consulting firm Dames and Moore, "One of the most important things I learned from Caltech was to constantly keep looking for something new." By returning to campus for Seminar Day, Moore and 1,700 other visitors had certainly come to the right place to find that.



For "working hard, unselfishly, and efficiently, benefiting over 350 alumni with her help," Gerry Silver, research chemist in Caltech's Division of Geological and Planetary Sciences since 1960, was named the Alumni Association's honorary alumna for 1993 at a dinner honoring her and the Association's new officers on June 17. Silver, who does research to determine the development of continental crust, was honored for her volunteer staffing support on nine alumni trips to Yellowstone and Alaska. The award is presented each year to recognize significant contributions to the Association or to its broader purposes.

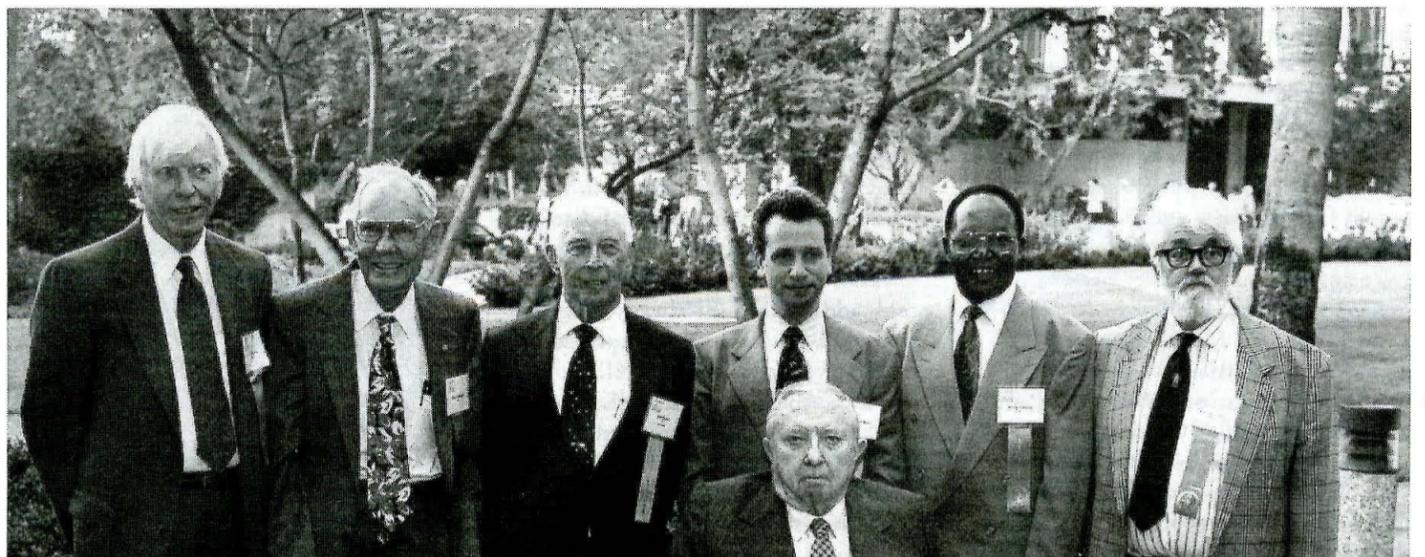
Alumni enjoy a full Seminar Day

Food for thought, and thoughts on food—that just about sums up the Alumni Association's 56th Annual Seminar Day. There was no shortage of sustenance for the intellect—the more than 1,700 alumni, friends, and family members who turned out on May 15 for the annual event could pick and choose from a veritable Chinese menu of topics, ranging from cells that murder their own proteins, to futuristic

fertilizers, to the indispensable role of the nematode (roundworm) vulva in illuminating the dynamics of embryonic development and carcinogenic mutations. As for less provocative forms of nourishment, a sampling of the questionnaires returned by no less than 15 percent of those who came back to campus reveals what concerns were uppermost in some minds.

"Need more coffee and doughnuts

Receiving Caltech's Distinguished Alumni Award at the Alumni Association's 57th Annual Seminar Day were (left to right) Alvin Tollestrup, PhD '50; Thomas Hudspeth '41; William Moore '33, MS '34; Stephen Ross '65; Trent Dames (seated) '33, MS '34; Phillip Mwangi Githinji, MS '61, Eng '63; and John McCarthy '48.





From left, Ed Lambert (secretary) '82, Frank Dryden (treasurer) '54, MS '57, Le Val Lund (past president) '47, Bill Whitney (president) '51, and Peter Mason (vice president) '51, PhD '62 are the Alumni Association's new officers for 1993-94.

The Association's new president looks ahead

By Bill Whitney '51

The Alumni Association's new president, Bill Whitney, and Caltech go back a long way, starting with the BS degree in physics Whitney received in 1951 and continuing right through his current job as division technologist for the Observational Systems Division of JPL. Whitney has participated in a wide range of Association and Institute committees and projects and played a particularly active role in Caltech's SURF (Summer Undergraduate Research Fellowships) program, where one of his latest achievements has been to establish and oversee the provocatively titled program, "Can You Do Research for a Living?" The answer in Whitney's opinion is, of course, yes, and he sees the Alumni Association playing its part in furthering that goal as it applies to Caltech. Speaking in June at the Association's Honorary Alumni Dinner, Whitney talked to his audience of Caltech alumni, administrators, faculty, and guests about some of the Association's goals and plans for 1993-1994.

I want first to thank Le Val Lund for his service to the Association as president during the past year. We have all benefited from his creativity, energy, and enthusiasm, and I am glad that we will continue to have access to those qualities. Now, as I begin my term as Le Val's successor, I'd like to outline and highlight some of our objectives for the coming year.

As you know, the Committee on Long-range Planning recently submitted its report on the Association's operations, goals, and directions to the Board of Directors. We will be studying its findings carefully, and we hope by October to write a letter to all committee members stating our plans in response to their recommendations.

During the coming year we will examine the feasibility and desirability of changing our fiscal year so that it coincides with that of the Institute. We will also take the steps necessary to change our tax status from 501C4 to 501C3 so that, for example, we can

solicit ads for *Engineering & Science*, and can qualify for lower postal rates. (This move may require revising our bylaws and perhaps amending our articles of incorporation.) And we will take an in-depth look at the activities of all our committees to ensure that we are doing the right things in the right way for our two primary clients: Caltech and Caltech alumni.

One of the year's most challenging and important tasks will be to review and revise the Trilateral Agreement, which sets out the terms and conditions of the relationship between the Association, Caltech, and the Annual Fund. I know that many alumni (including Association members) and many friends of Caltech (including Associates and Trustees) have never heard of this document, so I am going to spend my remaining minutes at this meeting, and no doubt many more minutes throughout the year, discussing it.

What many people do not know is that the Alumni Association, an independent corporation of the state of California, is not the organization responsible for soliciting monetary gifts from alumni for Caltech. That function is the responsibility of the Annual Fund, an office of the Institute. This important work is carried out by a large nationwide corps of alumni volunteers (most of whom are Association members), under the direction of the Fund's professional staff.

The Trilateral Agreement describes the separate responsibilities of the Association, the Annual Fund, and the Institute in relation to one another, and establishes guidelines affecting how they carry out these responsibilities. The agreement, which is renegotiated every 10 years, was last signed off in 1983, so this is the year for reexamining, reworking, and reaffirming the relationships.

The first party to the agreement is the Institute. Its mission, as we all know, is to educate students and to

advance knowledge. I'm sure that all of us take satisfaction and pride in our association with this small but prestigious school, with its distinguished faculty and carefully selected students.

Approximately 21,000 people have graduated from Caltech, and more than 18,000 of them are living alumni. What is most interesting is that Caltech continues to inspire so much interest, enthusiasm, and support not only from recent graduates, but also from alumni who were students here long ago. It is clear that what keeps us enthusiastic about Caltech is not just the memory of what it was like when we were students. The far more likely source of our support is that this school still embodies the goals, traditions, ideals, and high standards that drew us here in the first place. And, of course, there is also the excitement of seeing what the faculty and students of this institution are accomplishing today, and of imagining what they might accomplish tomorrow.

The second party to the Trilateral Agreement is the Annual Fund, spun off from the Alumni Association in the late 1960s to focus exclusively on the mission of raising money from Institute alumni so that Caltech in turn can accomplish its mission. The Fund's job is made easier in direct proportion to the number of alumni who stay enthusiastic about their Caltech experiences and about the principles and practices of the Caltech of today. In other words, the good will of the alumni year after year is an important asset. Without it, the task of the Fund becomes far more challenging, perhaps impossible.

It is the third party to the agreement, the Caltech Alumni Association, that bears a major responsibility for ensuring that the good will is there. Consequently our efforts not only complement but precede and make possible those of the Annual Fund.

The Association, strictly speaking, represents the interests of all Institute alumni, but in particular those alumni who are Association members. Roughly half of Caltech's alumni have indicated some degree of enthusiasm and support for Caltech by becoming life or annual members of the Association, or by being involved with Caltech in other ways. However, half of the living alumni are not and have never been Association members.

Because the Association has two clients—Caltech alumni and Caltech—we have a dual role. For the benefit of the Institute, we try to keep the traditions and ideals of Caltech alive in the minds of people who otherwise might have little contact with the school. At the same time, for the benefit of the alumni, we try to represent their interests, concerns, and in some cases their needs or desires, to Caltech.

The large group of interested and still loyal Caltech alumni, many of them Association members, represents a significant resource for Caltech, a resource that is no less important than the money they may contribute

through the Annual Fund. These people help keep awareness of Caltech alive by involvement in their local alumni chapters. They help the Admissions Office by recruiting students. They help find jobs for students returning to their communities for the summer. And, in what is becoming an increasingly valuable role, they are able to use their often extensive contacts to help find jobs for graduates.

Even more significant may be the indispensable role that Caltech alumni play in shaping public perceptions of their alma mater. If our alumni value their experience here and say so, their friends and colleagues are likely to think well of us. By the same token, if they hold negative views, people in their communities are likely to be influenced by those attitudes. Positive or negative, the opinions of our alumni have an important impact on potential students and potential donors.

An important mission of the Association, then, is to build goodwill for Caltech. We do this by trying to be aware of, and to meet the needs of, alumni for contact with one another and with the Institute; we do it by providing opportunities for those who wish to work on behalf of the Institute; we do it by making an effort to help guarantee that the experience of today's students will be a positive one, and that they will carry away with them an attitude that will ripen into continuing good will toward Caltech.

In reexamining the Trilateral Agreement, all three parties, I think, have to go back to basics, look at their roles and activities, and make sure that their long-range goals and the principles on which they conduct their day-to-day affairs are in alignment, so that the good will that has been built up over such a long time is maintained and strengthened, and so that Caltech, through the efforts of the Annual Fund, can reap the benefits of this asset.

And we all ought to be concerned how we can awaken the interest in Caltech of those eight or nine thousand people, roughly half of its graduates, who, so far, are not listed among those who are Alumni Association members.

So, on behalf of the Association, I can say that we look forward to working with the Institute and the Fund on revisiting the Trilateral Agreement, and in undertaking all the other tasks we have laid out for ourselves. I hope that, a year from now, a very short time from today, I will be able to report results that we all are pleased with.

And I hope that those of you who didn't know it before now have a better picture of what the Alumni Association does for Caltech. I also hope that those of you who do know the story will carry the message to others whenever you have the opportunity.

PERSONALS

1936

LEO J. MILAN, of Los Angeles, retired in 1975 and has been devoting his time to his hobbies of horticulture, photography, and travel. In 1982 he added microscopy. He recently donated to Caltech nine 20-by-30-inch posters enlarged from 35-mm slides. The posters may be viewed in the north wing of the Beckman Institute. These crystal micrographs were photographed from recrystallized chemicals, and then the pinhead-sized subjects were photographed with cross-polarized light.

1946

EARNEST HUBERT (HUBIE) CLARK, JR., MS '47, of San Clemente, California, was elected to a two-year term as the 27th chair of the National Board of YMCAs at the board's Chicago meeting. The position is that of chief volunteer officer for the nationwide system of 2,104 YMCAs. Clark is a Navy veteran of both the Second World War and the Korean War, and, during his successful career with Baker Oil Tools, he rose to the position of president and general manager in 1962, and chief executive officer in 1965. Baker merged with Hughes Tool Co. in 1987. Having retired from Baker Hughes two years ago, Clark now heads the Friendship Group, an investment partnership, in Newport Beach. He has been a YMCA volunteer since 1953, serving on the branch board, the Los Angeles Metropolitan YMCA board (from which he recently resigned as chairman), and the national board. He is also a trustee of Harvey Mudd College, serves on the boards of CBI Industries, Honeywell, Kerr-McGee, and Beckman Instruments, and is the advisory director for Renascent Energy. He is a past president and director of the Petroleum Equipment Suppliers Association, a member of the American Institute of Mechanical Engineers, and a retired director of the American Petroleum Institute. He and his wife, Patty, have five sons, one daughter, and 13 grandchildren.

1948

MIHRAN S. AGBABIAN, MS, Fred Champion Professor of Engineering at USC, has been appointed as the founding president of the American University of Armenia (AUA), which has been established in Yerevan, Armenia. AUA is a graduate school offering degrees in business management, industrial engineering, and earthquake engineering. It currently has 200 graduate students and, in addition, offers university extension courses. The University of California Board of Regents voted in July 1991 to make AUA its affiliate, thus providing academic and administrative guidance to this newly established university in the former Soviet Union. AUA's educational impact in that part of the world as an American institution of higher learning is being quickly recognized by both the U.S. government and the local population.

1951

THORNE J. BUTLER, of Las Vegas, Nevada, writes that in February he was "presented the Alexander O. Gettler Award by the American Academy of Forensic Sciences for outstanding analytical achievements in forensic toxicology. One cannot help being reflective when recognized by professional colleagues. I was both touched and appreciative of the award."

EUGENE PARKER, PhD, Subrahmanyan Chandrasekhar Distinguished Service Professor of Physics at the University of Chicago, has received the British Royal Astronomical Society's 1992 Gold Medal for Astrophysics.

1952

FRED BARKER, MS, PhD '54, a geologist with nearly 40 years of service in the U.S. Geological Survey, has received the Meritorious Service Award, "the second highest honor given by the Department of the Interior, for significant contributions to the earth sciences and to management and administration of the scientific programs of the USGS." Barker was honored for "his outstanding contributions as a world-renowned expert on the formation of igneous rocks and their importance to understanding the origin of the continental crust." He has authored and produced over 100 scientific publications and is a member of the American Geophysical Union and the Geological Society of America. He and his wife, Margaret, and their three children, Matthew, Thomas, and Aileen, live in Golden, Colorado.

1961

CONCETTO R. GIULIANO, PhD, of Placitos, New Mexico, writes, "After 28 years at the Hughes Research Laboratories, Malibu, California, I took an early 'retirement' in late 1989, at which time I went to the island of Maui, where I was employed as program director at an Air Force observatory atop Mount Haleakala. In January 1993, I returned to the mainland, this time to New Mexico, where I have a dual position—Research Professor at the University of New Mexico and Director of the Alliance for Photonic Technology. The Alliance is a partnership between Los Alamos National Laboratory, Sandia National Laboratories, the U.S. Air Force Phillips Laboratory, and the University of New Mexico. Its principal mission is to transfer technology to the private sector with the goal of enhancing U.S. competitiveness in the global arena. From the Santa Monica Mountains, where I lived for many years at 2500 feet elevation with a spectacular view of the Pacific and the mountains, to the tropical paradise of Maui, to the Rio Grande corridor where I live now with my wife, Joanne, in a country adobe not far from Santa Fe, I have been fortunate to have been immersed in a wide variety of environments possessing unsurpassed natural beauty, adding great enrichment to my life."

1965

ARTHUR N. CHESTER, PhD, a veteran of 24 years with Hughes Aircraft Company, has been elected to the new position of senior vice president for research and technology of Hughes Aircraft and its parent organization GM Hughes Electronics (GMHE), which is a subsidiary of General Motors Corporation and is composed of Hughes Aircraft and Delco Electronics. He continues as director of Hughes Research Laboratories, Malibu, California, and also becomes a member of the office of the chairman, the 11-member top management body of Hughes Aircraft and GMHE. He has directed the activities of Hughes Research Laboratories since 1988, and before that he was a group vice president in Hughes' Electro-Optical & Data Systems Group and manager of that group's space and strategic systems division. He has published more than 40 papers and edited eight books, is a recipient of the Institute of Electrical and Electronics Engineers' Centennial Medal, and is past president of the Lasers and Electro-Optics Society.

1966

HENRY G. (GERRY) SCHWARTZ, JR., PhD, of St. Louis, has been named president of Sverdrup Civil, Inc., in St. Louis, one of the four operating companies that make up Sverdrup Corporation. After receiving his doctorate, he devoted a further year at Caltech to studying methods of recycling water for NASA. He considered a career in aerospace, but decided to "worry about earth before I worry about space." Instead he entered the environmental section of Sverdrup & Parcel as a senior engineer, and has spent over 25 years in the engineering and management of projects involving water, wastewater, air-pollution control, and hazardous-waste management.

CHIU-SEN WANG, PhD, of Taipei, Taiwan, has been elected president of the Chinese Association for Aerosol Research, which was formed in Taiwan in February. Wang is a professor with the Institute of Public Health, College of Medicine, Taiwan University.

1969

GEORGE FOX, MS '74, PhD '79, of Pasadena, California, writes that his 17-year-old son Michael will be a freshman at Caltech this fall.

DAVE PERASSO, of San Jose, California, writes, "I am happy to announce that Lisa Ratto and I have formed a folk-music duo with the imaginative name 'Lisa and Dave.' We sing a wide variety of music from all over the world and are beginning to get gigs on a semiregular basis. I sing and play the guitar (something I learned while at Caltech), banjo, and Autoharp. My other activities include being president of my neighborhood association, which is trying to deal with deteriorating housing, drug problems, and declining city services. I have a wife and two teenagers—both of whom love computers and athletics."

1971

SANDRA WINICUR, PhD, of South Bend, Indiana, has received the 1992 Indiana University South Bend Distinguished Teaching Award and a 1992 All-Indiana University Teaching Award.

1972

BRUCE A. WADDINGTON has been promoted to senior vice president of engineering at FileNet Corp. He has been with FileNet since June 1986, most recently as vice president of workstation and communication software, and he has been a key architect and development leader for the company's software products. He is currently enrolled in the executive MBA program at Claremont Graduate School.

1981

ALAN T. STONE, MS, PhD '83, a faculty member in the department of geography and environmental engineering at the Johns Hopkins University, has been promoted to the rank of professor, with tenure. According to Johns Hopkins, Stone is widely acknowledged to be one of the best teachers in his department and has also established an international reputation as a leader in research on environmental and aquatic chemistry. He joined the Hopkins faculty in 1983 as an assistant professor and was promoted to associate professor in 1989.

1982

ROGER HELKEY was awarded his doctorate in June by the University of California at Santa Barbara. In August, he and his wife, Martha, and his two young sons, "Daniel (2) and Christopher (0.3), will all be moving to Japan for a year, where Roger will be doing postdoctoral research at the University of Tokyo."

1984

MARK D. LINDSAY writes, "We are proud to announce the birth of our baby girl, Melody Rose, on Halloween 1991. She is now a rambunctious toddler, and likes to 'read' physics texts. We have moved to Belmont, Massachusetts, where I am an astrophysicist with the Smithsonian Center for Astrophysics."

1986

SHIRLEY WHITMORE SHERRILL, MS, and Michael Gene Sherrill were married in December 1992. Shirley is a senior analyst for ARCO Products Co., in Anaheim, California, and her husband is a captain in the United States Marine Corps, where he is a fighter pilot flying F-18s. The couple lives in Corona, California.

1987

JONATHAN BROWN and his wife, Melissa, are pleased to announce the birth of their son, Simeon Gilkes Brown, on May 31. "P.S.," they add. "Congratulations Cinsy and John!" The family lives in Murrieta, California.

1989

BILL HEALEY, PhD, writes that he passed the Washington, D.C., bar in September, after graduating from the UCLA school of law. He has joined the D.C. office of the Boston firm Hale & Dorr as an associate in their intellectual-property department, and he and his wife, Lynn, are expecting their third child in October.

1990

JOEL D. BLUM, PhD, an assistant professor with Dartmouth's earth sciences department, has been named by President Clinton to receive the 1993 Presidential Faculty Fellow Award. The annual award was presented this year to 15 scientists and 15 engineers, to recognize the nation's most outstanding young faculty members for excellence in scientific or engineering research and teaching. Each awardee receives from the National Science Foundation a five-year, \$500,000 grant for the pursuit of self-designed, innovative research and teaching projects; the fellows also serve as advisers to the U.S. government and otherwise represent the nation's college and university faculties. Blum joined Dartmouth's faculty right after receiving his doctorate. His research has focused on the development of new techniques for helping scientists better understand geochemical and environmental processes that occur on the earth's surface and in its interior. Most recently, he has gained attention from the international scientific community for research work that has yielded new clues about environmental changes that led to the extinction of the dinosaurs as well as many other life forms 65 million years ago. He was named a Sloan Research Fellow in 1992 by the Alfred P. Sloan Foundation, and he sits on the editorial board of the journal *Geology*.

David Peat, for many years a theoretical physicist with the National Research Council of Canada, is writing a biography of his late colleague, physicist David Boehm, who died in 1992, and would like to hear from *Caltech News* readers who knew Boehm during his time at Caltech in the late 1930s. Peat can be reached at 613/730-1998, or at 90 Fentiman Ave./Ottawa, Ontario, Canada K1S0T8

OBITUARIES

1922

CHARLES W. VARNEY, JR., on March 9. He is survived by a daughter, Virginia Hirsch, and a son, William. He was president of the Alumni Association 1945-1946.

1930

GALEN B. SCHUBAUER, MS, of Mitchellville, Maryland, on November 24, 1992. He is survived by his wife, Marian.

1932

JAMES L. HOARD, PhD, of Ithaca, New York, on April 10; he was 87. Emeritus professor of chemistry at Cornell University, he was a specialist in crystalline and molecular structures. He was a student in the Caltech laboratory of Linus Pauling, who said of him: "Lynn Hoard was one of my first graduate students. He was a talented and dedicated researcher who contributed significantly to our knowledge of the structural chemistry of coordination complexes, certain elements such as boron, and the structure of regions of hemoglobins where oxygen molecules are bonded to iron." At Caltech, Hoard pioneered the use of X-ray diffraction in the study of crystal structures. His early work on inorganic systems led to his participation in the Manhattan Project and his investigation of important uranium compounds. Over the years he studied binary compounds of boron, and he led the way in uncovering the basic structure of the element itself. He also undertook to systematize the crystal chemistry of high-coordination-number metallo-organic complexes. In his later years, he studied metalloporphyrins and the mechanism by which oxygen is taken up and released by hemoglobin. He was a member of a number of organizations, including Phi Beta Kappa, the National Academy of Sciences, the American Chemical Society, the American Physical Society, and Sigma Xi. He was a Guggenheim Fellow in 1947, 1960, and 1966. He is survived by Florence, his wife of 58 years; his sons Thomas, Laurence, and David; and five grandchildren.

1933

RALPH R. HULTGREN, PhD, of Berkeley, California, on April 29. He is survived by his wife.

1934

WILLIAM T. RASSIEUR, MS, of Rancho Santa Fe, California, on May 14. His studies at Caltech were a continuation of postgraduate instruction in aeronautical engineering he had begun as a naval officer. A naval aviator, he served three years of fleet aviation assignments after graduating, then in 1937 was assigned to the engineering division of the Bureau of Aeronautics in the Navy Department. In 1940 he became commander of Patrol Squadron 14, based in San Diego, and in November 1941 was assigned to the USS *Curtiss*. He was serving as executive officer when the Japanese attacked Pearl Harbor, and for his performance during the attack was awarded the Bronze Star Medal; he also received the Purple Heart. During the war, he commanded the Patuxent River, Maryland, naval air station, and then the aircraft carrier *Sargent Bay*; for his service with the latter he received the Legion of Merit, with Combat Distinguishing Device. After serving in numerous postwar positions, including assistant director of the Navy Strategic Planning Group of the Joint Staff, and Commander, Middle East Force, Rassieur was named Commander, Naval Air Bases of the 14th Naval District, Barbers Point, Oahu, Hawaii. He retired in 1952 with the rank of rear admiral. Other awards include the Victory Medal (in both world wars), the Asiatic-Pacific Area Campaign Medal (five engagement stars), and the Philippines Liberation Medal (two engagement stars). He is survived by his wife, Iris; a son, William; two granddaughters; and four great-grandchildren.

1938

DAVID K. BEAVON, of Oakdale, California, on May 12; he was 75. A chemical engineer and a leading inventor of pollution controls for petroleum refineries and natural-gas plants, he held 40 U.S. patents. His many awards included the American Institute of Chemical Engineers' 1980 Chemical Engineering Practice Award and *Chemical Engineering's* 1980 Personal Achievement Award. Perhaps his best-known processes are the Beavon Sulfur Removal Process and the BSR/Selectox Process, which enable petroleum refineries and natural-gas plants to minimize pollution of the air by sulfur. He retired in 1982 after 17 years with the Ralph M. Parsons Company. He is survived by his wife, Cherie; three sons; five daughters; five grandchildren; and one great-grandchild.

1948

JAMES C. ELMS, of Newport Beach, California, on May 7; he was 76. After graduating from Caltech, he received his MA in physics from UCLA in 1950. During his career as an electronics and aerospace executive, he was department manager for armament systems, Division of Autonetics, North American Aviation Company, Downey, California (1950-57); assistant chief engineer, Martin Company, Denver (1957-59); executive vice president, Crosley Division, AVCO Corporation, Cincinnati (1959-60); general operations manager, Aeronutronic Division, Ford Motor Company, Newport Beach, California (1960-63); deputy director, Manned Spacecraft Center, NASA, Houston (1963-64); deputy associate administrator for manned spaceflight, NASA Headquarters, Washington, D.C. (1965-66); director, electronics research center, NASA, Cambridge, Massachusetts (1966-70). He was also, during 1964-65, corporate vice president and general manager, division of space and information systems, Raytheon, Sudbury, Massachusetts, and he was first director, Transportation Systems Center, Department of Transportation, Cambridge, 1970-74. He held patents in instrumentation, computers, radars, and mechanisms, and he was the recipient of a NASA special award in 1964, the Exceptional Service Medal in 1969, the Outstanding Leadership Medal in 1970, and the Department of Transportation's Meritorious Service Award, which was presented by the Secretary of Transportation in 1974. He was a fellow of the Institute of Electrical and Electronics Engineers and the American Institute of Aeronautics and Astronautics, and a member of the National Academy of Engineering. He was also a life member of the Associates of Caltech. He was listed in *Who's Who in the World*. During World War II, he served as a captain in the U.S. Army Air Forces. He is survived by his wife, Patricia; a son, Christopher Michael; and three daughters, Suzanne, Francesca, and Deborah. A memorial fund has been established at Caltech. Those wishing to contribute should write to the James C. Elms Memorial Fund, Caltech, 1201 East California Boulevard, 105-40, Pasadena CA 91125.

1949

C. HARRIS ADAMS, of Culver City, California, on April 2. He was the founder and president of Adams Maxwell Division and Coast Magnetics. He enjoyed hiking, sports, and traveling. He was a pilot, and his particular love was flying. He is survived by his wife, Dorothy; three sons; six grandchildren; and one brother.

1951

ANTHONY J. MALANOSKI, of Berlin, Maryland, on April 19. He is survived by his wife, Louise; five sons; and seven daughters.

1965

BARRY W. DINIUS, of San Jose, California, on April 24, 1992. He is survived by his wife.

Edward Posner

1933 - 1993

Edward Posner, visiting professor of electrical engineering at Caltech and JPL's chief technologist for the office of telecommunications and data acquisition, was struck by a truck and killed on the morning of June 15, as he bicycled from Caltech to JPL. He was 59.

A memorial service honoring the late Caltech professor will be held on campus September 28, at 2:00 p.m. in Dabney Lounge.

Posner earned his BA in physics and his MS and PhD in mathematics at the University of Chicago in 1952, 1953, and 1957 respectively. He taught mathematics at the University of Wisconsin and at Harvey Mudd College before joining JPL as a technologist in 1961. He became chief technologist in 1982. He taught at Caltech as a lecturer in electrical engineering from 1970 to 1977, was appointed a visiting associate professor in 1977, and had been a visiting professor since 1978.

Posner's specialty was information and communication theory. His work at JPL on coding theory and data compression made it possible to increase by several orders of magnitude the volume of data returned from spacecraft via the Deep Space Network. His campus research interests included communication network design, and automatic switching systems for such applications as cellular telephones.

The Caltech electrical engineer was one of the founders of research into neural networks—computers whose design and functions are loosely modeled on those of biological brains—on campus and at JPL in the early 1980s. He was instrumental in the creation of Caltech's interdisciplinary graduate-study program in Computation and Neural Systems, the first program of its kind in the world.

In addition to his research interests, Posner was deeply involved in Caltech educational activities, and was in particular a dedicated supporter of Caltech's SURF (Summer Undergraduate Research Fellowship) program. Since 1984, he had sponsored 13 SURF students, not counting three who had just started this summer's work, and since 1990 he had been a member of the SURF administrative committee. In 1986, he cofounded the SURFSAT satellite program, which has thus far involved 46 SURF students in a project to design and construct a small communications satellite to support the research objectives of NASA's Deep Space Network. Posner had also been a member of Caltech's Freshman Admissions Committee since 1991 and had served since 1990 on the President's Fund Committee, which funds innovative research by Caltech faculty and students at JPL. He had recently begun to work with the Institute's dean of graduate education to organize a new



educational program dedicated to increasing the number of under-represented minorities in engineering.

Posner was a fellow of the Institute of Electrical and Electronics Engineers; chairman of the Neural Information Processing Systems Foundation; and a member of the American Institute of Aeronautics and Astronautics, the American Association for the Advancement of Science, the Society for Industrial and Applied Mathematics, the International Neural Network Society, and the World Space Foundation. He was a charter member of the Planetary Society and served on the editorial boards of several scientific and engineering journals.

The family has asked that contributions in Posner's memory be sent to Caltech's Development Office to support the Institute's SURF Program, with the eventual aim of establishing an Edward C. Posner SURF Fellowship Fund. The Fellowship would annually support an under-represented minority student working on a research project in a field related to Posner's own professional interests.

Those interested in making a contribution to the Edward C. Posner SURF Fellowship Fund should contact the Director of Special Gifts, Caltech 105-40, Pasadena, CA 91125, 818/395-6285.



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. Third class postage paid at Pasadena, California.
Postmaster: Send address changes to:
Caltech News
Caltech 1-71
Pasadena, CA 91125.

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And a bunch of vets—of a different stripe—converge on campus, as the class of '43 celebrates its 50th reunion. **Page 6**

The Alumni Association's new president, Bill Whitney '51, talks about the role alumni play in keeping the Association, and the Institute, strong. **Page 9**

OBITUARIES