

CALTECH NEWS

Reagan's strategic arms decisions sound, Percy tells Associates

President Reagan's strategic weapons decisions are not only sound, but they also provide new opportunities for genuine arms limitations, Senator Charles H. Percy told an audience of Caltech Associates and their guests at the annual black tie dinner.

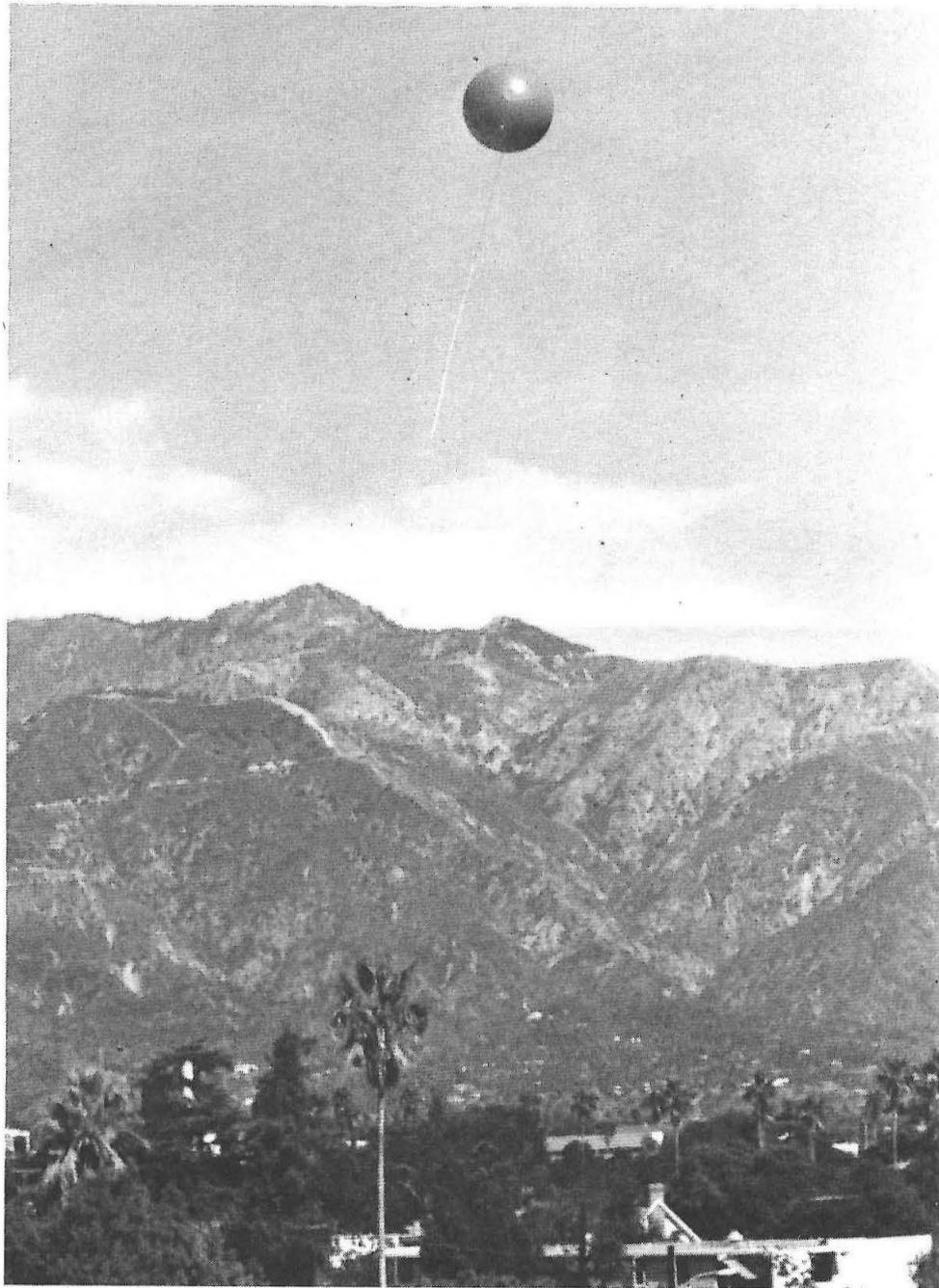
Speaking at the Athenaeum to an audience of about 500, Percy, who is chairman of the Senate Foreign Relations Committee, expressed his strong support for President Reagan's recent strategic weapons decisions. Key components in the administration's arms package call for building 100 B-1 bombers and for at least delaying the building of a rail network in the area that would house MX missiles. Percy said he chose the black tie dinner as the occasion for a major foreign policy address because of the influence that his audience could have on governmental decision makers.

He told The Associates that the time is at hand both to establish strategic credibility and to use SALT to make sure that this credibility is *never* used.

A key premise of the senator's talk was that neither the Soviet Union nor the U.S. could withstand a nuclear attack or win such a war by a preemptive first strike. Commenting on the conclusion that a nuclear war *could* be either won or survived by either side, he said, "The devastation from even a theoretically limited Soviet strike would inflict a scale of death and destruction unparalleled in the history of the world."

The Senator maintained that the President's plan moves the U.S. in a

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Caltech celebrates 90 years

Fifteen hundred orange balloons inscribed "Caltech is $\sqrt{8100}$ " wafted up from the quadrangle as the Caltech Jazz Band played "Happy Birthday to You" and the Institute celebrated 90 years. (Not participating in the balloon release were members of the three-year-old set from the Child Educational Center, who held on tight to their balloons the entire time.)

The date was November 2, 1981—

birthday party on the quad on November 2 for students, faculty, and staff, entitled "A Mustering of the Throops."

The Men's and Women's Glee Clubs joined the Caltech Jazz Band in providing music, and David W. Morrisroe (vice president for business and finance, and treasurer) acted as master of ceremonies. Jeff Throop, Pasadena businessman and a descendent of founder Amos G. Throop, helped to cut a giant birthday cake.

ASCIT President Sue VandeWoude reminded the assembled group that 90 years of Caltech has meant 8,800 Saga (food service) meals and more than 5,000 Physics 1 assignments, and James J. Morgan (vice president for student affairs and acting dean of graduate studies) noted that in 1891, Einstein was 12 and doing poorly in grammar school. "We've changed a great deal since Throop was founded, and we'll have changed more by our 100th," said Morgan. "Come along and find out."

Extra balloons and helium tanks to fill them were available in Winnett Lounge after the balloon release, and students' voices rose an octave as they experimented with the vocal-chord-shrinking properties of helium. Occasional balloons continued to drift upward throughout the afternoon, and some of the olive trees along the quadrangle appeared to be filled with giant oranges.

Two days later the Institute held a reception and luncheon for Pasadena community leaders with Board of Trustees Chairman R. Stanton Avery as master of ceremonies.

On display at the luncheon was a collection of medals won by Caltech faculty members over the years, including the Nobel Prize won by Robert A. Millikan and the first National Medal of Science, won by Theodore von Kármán. Plans were announced for a special traveling photo exhibit of Caltech history, and a birthday dinner in the spring in the Athenaeum.

All in all, it was a birthday celebration that Amos G. Throop—who at age 80 invested \$100,000 to start a university—would surely have loved.

The sign on the laboratory door read, "gone fishin'" and it meant just what it said. The laboratory's eminent occupant, Roger W. Sperry, was on a fishing and camping trip with Mrs. Sperry in Baja California via four-wheel drive, and thus he avoided the initial avalanche of publicity that descends on a new Nobel laureate.

Sperry, 68, shared the Nobel Prize for Physiology or Medicine for his research demonstrating that the right and left hemispheres of the human brain have different, and sometimes virtually independent, functions.

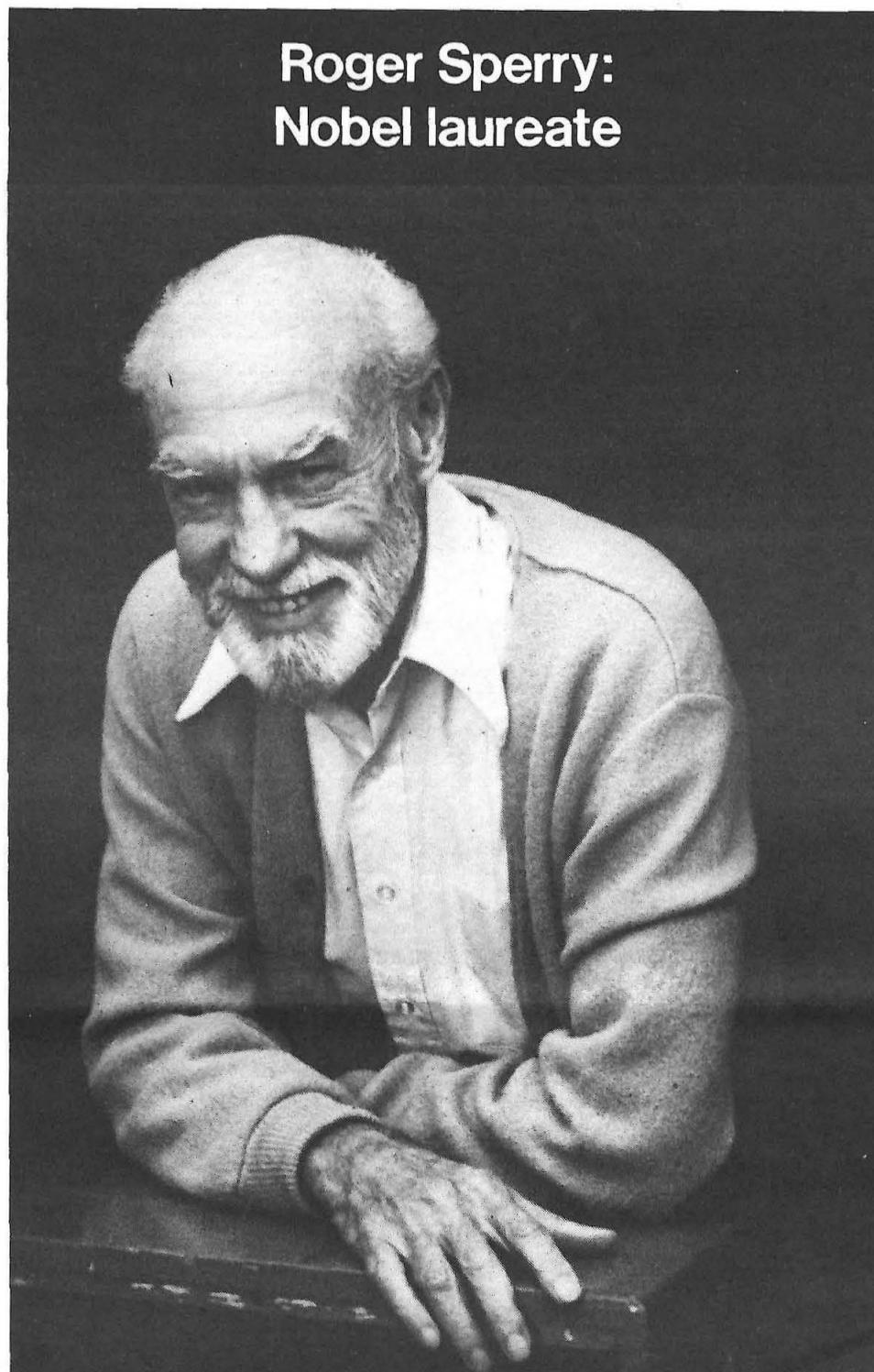
At a press conference following announcement of the award, Sperry's colleague, Charles Hamilton (senior research associate in biology), noted that Sperry might be "anywhere within a thousand-mile area. We don't even know whether he knows that he's won."

Actually the Sperrys were camped alone on a beach about 18 miles from La Paz when they turned on the radio to learn that Sperry had won the prize and that Anwar Sadat was dead. A hurricane had left them stranded on the beach a couple of days earlier and roads were still not passable to ordinary vehicles.

"We had to hear the news a second time to be sure we heard right and then, of course, we were tremendously elated and overwhelmed," says Sperry. "I knew I'd been nominated many years earlier but had given up hope some years ago." They returned to Pasadena a week later.

The other half of the prize went to David H. Hubel, 55, and Torsten N. Wiesel, 57, of Harvard for studies of the complex manner in which the brain processes visual information. The total award came to \$180,000, and Sperry received half of this.

In 1941 Sperry and his doctoral sponsor, biologist Paul A. Weiss, disproved the belief that neurons in the growing nervous system form connections nonselectively through trial and error. Sperry showed that growing nerve fibers become chemically "labeled" early in development and form connections with each other by recognizing complementary labels on their surfaces.



Roger Sperry: Nobel laureate

Then Sperry began studying the function of the corpus callosum, the small connection between the right and left halves of the brain. In the 1960s he discovered that the two hemispheres of the brain can work independently of one another when the connections between the hemispheres are cut. His research also revealed that the two hemispheres differ in function: the left hemisphere is devoted to speech and language, and is highly mathematical and analytical, while the right hemisphere

specializes in the ability to visualize and to manipulate three-dimensional objects.

Sperry came to Caltech in 1954 as the Hixon Professor of Psychobiology. He is recipient of honors and awards numbering in the dozens. His most recent include the 1979 Lasker Basic Medical Research Award (\$15,000) and the 1979 Wolf Prize in Medicine (\$33,000), both for his work in hemispheric specialization. He is a long-time member of the National Academy of Sciences.

Born in Hartford, Connecticut, Sperry received his BA and MA from Oberlin College and his PhD from the University of Chicago. He was a Fellow in Biology at Harvard University, a research associate at Yerkes Laboratories, an associate professor at the University of Chicago, and chief of the section on developmental neurology at the University of Chicago before coming to Caltech.

Of the significance of his work, Sperry says, "From a general standpoint I think our findings can be said to have enhanced public awareness of the importance of nonverbal intellect and its significance in education. It has also changed neurological concepts of the functional relations of the two halves of the brain, overthrowing the old doctrine of one-sided dominance in favor of the idea of a two-sided complementary specialization.

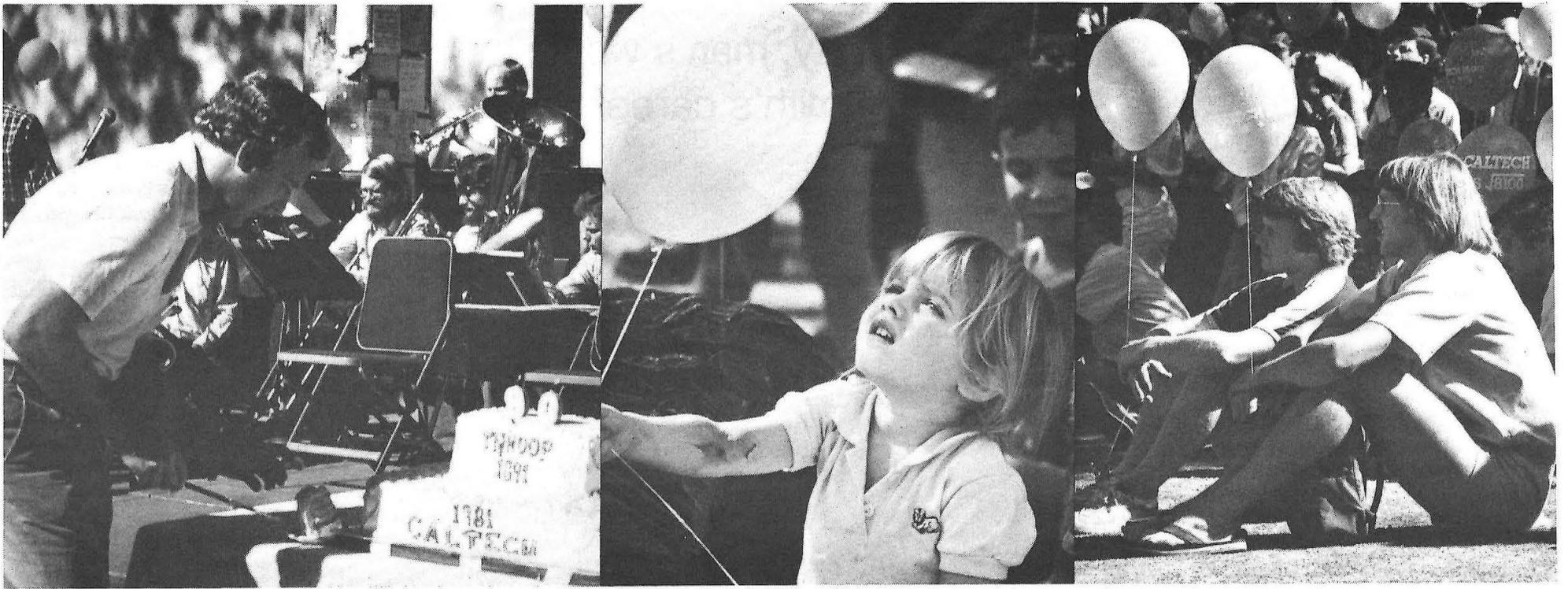
"One of the most important things to come out of our work, from my own standpoint, is a modified concept of consciousness and its fundamental relation to brain activity. Referred to as the 'consciousness revolution,' the change essentially involves a shift from the traditional view of science that consciousness is noncausal to the current view that our inner experience has actual causal influence in brain processing. This in turn is found to have endless humanistic implications for philosophy, religion, and human values."

Engineering faculty shortage prompts Exxon grant program

Caltech is one of 66 beneficiaries under a \$15 million Exxon Educational Foundation program to help deal with a critical nationwide shortage of engineering faculty members at the college and university level.

Caltech has received three Exxon teaching fellowships under the program—in chemical engineering and mechanical engineering, and in the Division of Geological and Planetary Sciences. The fellowships provide full tuition and fees and an annual stipend.

The program of direct grants by the Exxon Foundation comes amid growing national concern over universities' inability to persuade students to forego the high salary offers of industry in favor of pursuing doctorates and becoming professors. (Students earning bachelor's degrees in chemical engineering, for instance, can start work at salaries that rival those of many of their college professors.)



Jeff Throop, a descendent of the founder of Throop University, cuts the Institute's birthday cake, in ceremonies on the quad, at left. Center: Special appreciation for one of the balloons commemorating the event is expressed by a representative of the Child Educational Center. Right: Students listen to music by the Caltech Jazz Band.

Caltech, Gulf join in earthquake prediction research

Scientists at Caltech and at Gulf Science and Technology Company are joining in a project to monitor, on a consistent basis, several kinds of gases that emanate from the ground near earthquake faults. Their object will be to determine whether the gases—hydrogen, helium, carbon dioxide, and methane—can be used in predicting earthquakes. A second aim is to test a controversial theory that huge amounts of methane, trapped during the formation of the earth, may still exist far below the surface.

(Gulf Science and Technology Company is a subsidiary of Gulf Oil Corporation.)

Caltech Professor of Physics Thomas A. Tombrello heads the project, along with Senior Scientist Jonathan D. Melvin, Visiting Associate in Physics Mark H. Shapiro, and Victor T. Jones, who is director of physical geochemistry and minerals for Gulf Science and Technology.

In evaluating earthquake prediction possibilities, scientists theorize that the increased strain on rocks before an earthquake may open up tiny cracks, allowing gases trapped in the rock to escape in larger amounts than normal. Evidence of such increase has been reported before earthquakes by researchers in the U.S., China, and the Soviet Union. Most studies have centered on radon

gas, a radioactive decay product of crustal uranium, but other crustal gases may also show an increase before earthquakes, scientists theorize.

"The radon data may be complemented by information from gases such as helium or hydrogen," Shapiro said. "Several factors control the behavior of these gases. For instance, since radon has a short radioactive half-life, it reflects the stress in a relatively small volume of rock. But helium is inert and stable. So increases in it may reflect changes in rock stress at greater distances."

For the last ten months, a Gulf-supplied gas chromatograph has been in use near Pacoima, California, measuring hydrogen and helium. The chromatograph is an instrument that separates and detects gases by flushing them through a special separatory column. It was modified to be operated by a portable computer at the site. The computer gathers data from the chromatograph and transmits it via telephone lines to a central computer at Caltech.

The Caltech researchers for the last four years, have been using such automated systems to monitor radon and thoron gases in boreholes at several sites throughout southern California—among them Fort Tejon, Pasadena, Lake Hughes, Santa Anita, Stone Canyon Reservoir, Big Dalton Canyon, Lytle Creek, Pacoima, and Sky Forest. Several other instruments will be added over the next few months.

The gas chromatograph showed one hydrogen peak before a magnitude 5.6 earthquake near Westmorland, California, last April. But there

were no short term changes in radon or helium or other gases during this period, and other sites showed no effects.

Caltech and Gulf researchers have begun installation of computerized gas chromatographs at two other sites: Caltech's Kresge Laboratory site in Pasadena, and another site still to be determined. These sites will monitor methane and carbon dioxide, as well as hydrogen and helium.

The second goal of the studies will be to monitor emissions of methane and other gases from the ground, in order to test a theory held by Thomas Gold of Cornell University. Gold believes that massive amounts of methane lie at 15,000 to 30,000 feet beneath the earth's surface. According to Gold, this methane did not arise from the usual process of hydrocarbon formation via the decomposition of buried organic matter. Rather, he believes that the hydrocarbons were trapped deep within the earth at its birth, and that minute amounts of the gas may be constantly escaping, particularly along the earthquake faults.

The presence of other deep-earth gases (such as an isotope of helium found only in the mantle) will tell the researchers the depth of origin of the gases they are monitoring.

Most earth scientists don't accept Gold's theory. They argue that heat and pressure deep within the earth would transform any methane there into graphite. And previous Gulf

studies have found almost no methane escaping along the San Andreas Fault.

Gulf researchers first became interested in the possibility of using soil gases to predict earthquakes when a truck-mounted chromatograph they were using showed increased amounts of soil gases whenever the truck crossed an earthquake fault. Their sampling was being carried out as part of an exploration program for oil and gas. The Gulf scientists contacted Caltech, and a joint program was begun.

Vol. 15, No. 8 December 1981

Issued seven times a year (Oct., Dec., Feb., April, June, July, and Aug.) 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.

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USPC 085-640

By Winifred Veronda

Jay Smith III felt it was a little brassy of a toy company to come to the campus to interview graduating Caltech engineers, but he went to the interview anyway. That was in 1963 when he was completing his MS degree in mechanical engineering, and he accepted a job with TRW—not Mattel. Here he analyzed the launch system complex for the Titan and Minuteman missiles and the Lunar Module Descent Engine testing program.

But Mattel remembered Smith, and three years later the company offered him a job again. This time he accepted, and his career as a mover and shaker in the toy industry got under way.

Today Smith is head of his own consulting firm, Smith Engineering Co., in Santa Monica, a think tank for inventing, designing, and licensing concepts for electronic toys and games. Last year the company garnered over a million in sales and royalties, a 50 percent increase over the previous year.

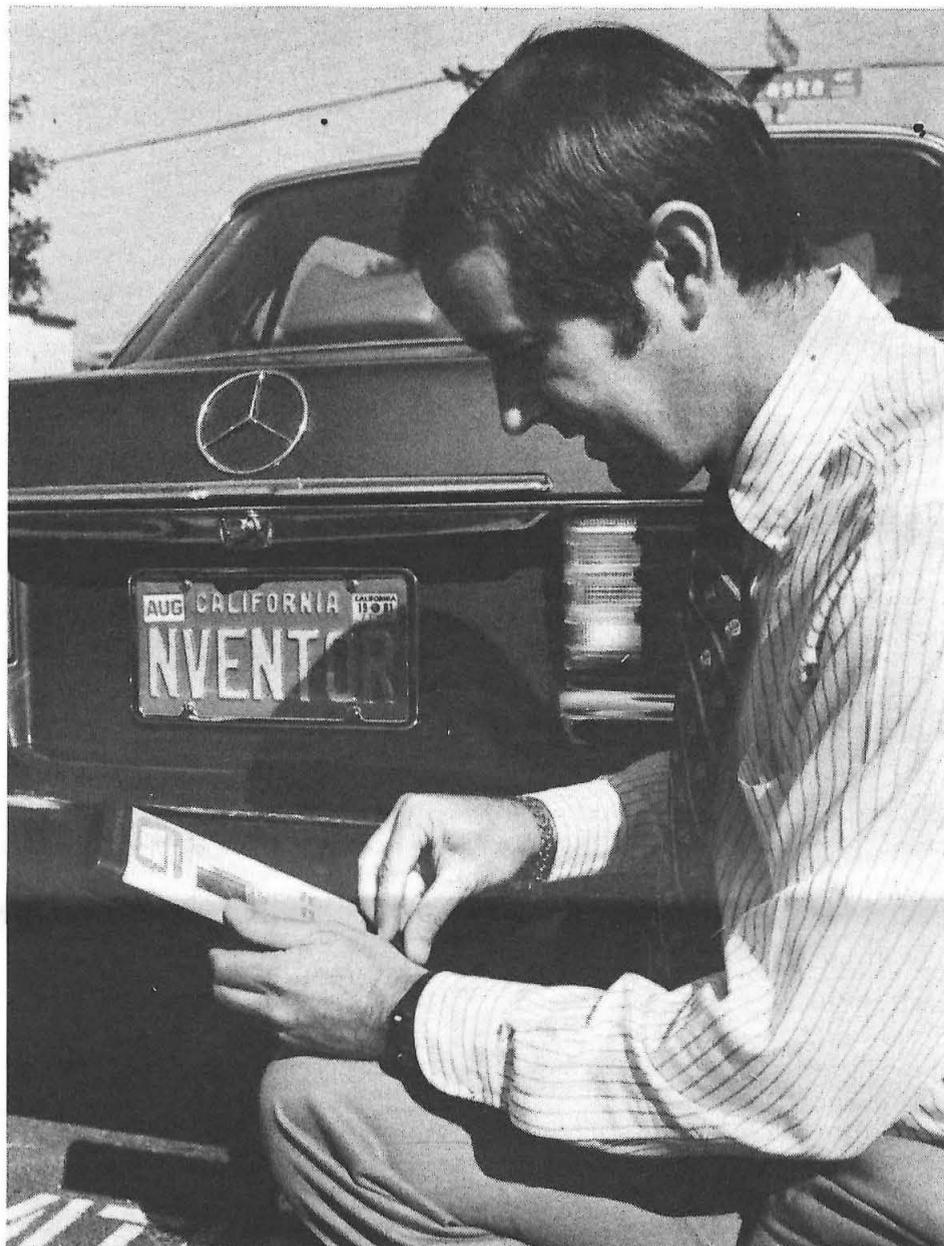
Three of the firm's major creations are Microvision, the programmable electronic game system of Milton Bradley; the AFX Data Race Computer Center of Aurora, a fully programmable racing computer that times laps, programs three races, and has the cars stop for refueling; and Playskool's Star Rider, a vehicle that young children can sit on and operate while on trips to outer space.

The company has also developed Blockbuster, where the player tries to knock down a simulated block wall on the screen, and the Sound Gizmo, a hand-held synthesizer that can produce sounds simulating gunshots, helicopters, sirens, and a variety of other noises guaranteed to drive parents and teachers to distraction.

To create these toys, Smith employs 18 bright and unconventional engineers who work in an atmosphere that has been described as "one of controlled craziness," and "more Animal House than IBM." Shooting rubber bands at fellow employees from a specifically designed launching device is a popular tension outlet, and a visitor to the company is not necessarily excluded from target practice.

Fights generally break out spontaneously; a shout goes up and everybody runs for ammunition.

Child's play, man's work: Jay Smith's career



Inventing electronic toys for children of all ages is great fun for a man who's still a bit of a kid at heart.

Each worker has his own private stock—a box of 1,000 rubber bands that is always kept close at hand. Most of the workers become uncannily skillful with their missiles, and can hit the bullseye of a dart board at 60 feet.

"These are creative people who don't operate well under a 9-to-5 structure," says Smith. "They have to relax and get their minds free. I strive for a balance between faith and tolerance. If I say a job has to be ready two weeks from midnight, then I expect it to be ready, but I don't care how the employees schedule their hours in the meantime. Everyone here is encouraged to keep loose hours and loose minds."

As he muses about the free-wheeling on-the-job atmosphere that he

encourages, Smith expresses regret about his lack of opportunity to participate in pranks at Caltech at the undergraduate level. "I would have been a great student of pranks," he says wistfully.

But Smith came to Caltech as a graduate student after earning a BS degree in mechanical engineering at Virginia Polytechnic Institute, and he was restricted to some modest antics while living at Marks House.

He recalls that a favorite trick was to shave a brush with an electric razor and sprinkle the shavings over someone's sheets; another was to put a washer inside a doorknob where the handle fits into a spring-loaded plunger, causing the knob to free-wheel and trapping the occupant of the room inside. Smith says that one graduate student who was not well liked stayed locked in his room all night before someone let him out.

Howard Oringer (MS '63), a contemporary of Smith in Marks House,

remembers the toy tycoon as "a wild and crazy man—the Steve Martin of Caltech.

"He enjoyed life and he loved pranks, but they were good natured, never malicious," says Oringer. "An excellent engineer, he had the spirit of a child in a man's body. He's doing exactly the kind of work he ought to be doing."

Oringer, today the president of the Telecommunications Division of California Microwave, remembers how he and Smith became involved in Pasadena Tournament of Roses activities by passing Smith's white convertible off as an official Tournament car (all of them being white convertibles at that time) and how Smith used to get Caltech President Lee DuBridge involved in Marks House football games as the president passed by on his way home.

Smith believes his years in Marks House may have played an important role in his career by reawakening dormant qualities that are essential for success in the toy industry. "You have to have a bit of the kid in you to succeed in this business," he says. "The trait in me went into hibernation and some of the good times at Caltech helped to bring it out again."

As a kid, Smith had been very gadget oriented. "I was a terror with Erector Sets and Tinker Toys," he comments. He also loved science fairs and took first place with such creations as an automatic transmission and a remote controlled toy car.

But his creativity wasn't limited to science fair projects; it spilled over into his room at home with abundance. For example, in his room where he slept in the top bunk, he liked to eat apples and listen to the radio before going to sleep. So he designed a built-in radio with a timer shutoff, and a trash disposal system to get rid of the apple cores.

Smith thinks about qualities like these, and their importance in the toy industry, when he is interviewing prospective new employees. "First of all," he says, "I look for people with top technical skills, and an appreciation for the fact that these creations must be made, sold, and assembled, and that cute, fun, and appealing are not enough. Then I home in on the candidates that have a sense of humor and who are still kids at heart.

"I look for people who built their own gadgets or worked on cars or

scientific projects as teenagers; an interest in theory isn't enough. And I look for a sense of adventure and a wide range of interests—someone who goes skydiving, for example, or wants to travel around the world. Of course, fondness for other people is essential. And on top of these characteristics, the person has to be dedicated."

The people who have met these qualifications and gone to work for Smith Engineering are involved in one of the hottest industries of our era. Last Christmas, for example, more than 700 million dollars was spent on electronic toys, and the sales volume will continue to climb.

The popularity of electronic toys is growing for several reasons, according to Smith, some of them psychological. For example, electronic toys don't gloat if they beat you, and don't sulk or get mad if they lose. They can be turned off if they cause frustration; the owner is in complete control. In addition, the toys are imbued with a space-age modernity.

These characteristics have opened up vast new markets—teenagers, for example, not to mention their parents. Smith notes that market research has shown the average age of the person playing with the Star Trek Phaser to be 30.

While his employees are busy creating concepts for toys that will go on the shelves in a year or so, Smith muses about about the toys of the future. "We're going to see more and more toys using digitally synthesized speech," he says, "toys that will understand what you say and talk back, and toys that can be trained to obey their owner and no one else. We'll see toys that can evaluate play patterns and adapt themselves to hit at their opponent's strengths and weaknesses, and dolls that respond to love and anger. These emotions might be expressed through voice tone and whether the doll is held gently and in a comfortable position. If the owner becomes angry, the doll might cry or get a tummy ache."

Toys with dramatically improved displays in 3-D and color, and toys that run off electric watch batteries that last up to a year are also on the horizon.

Smith says he thinks of his work as a hobby because it provides such a satisfying creative outlet, but he also likes to ski and bicycle and to fool around with cars. He's owned a Cobra (a car with an English body and a Ford V8 engine), a restored English car called the Princess, a Porsche, and most recently a Mercedes 6.9 limited production model with the license plate "NVENTOR." If he could have picked an alternate career he would have liked to be a race car driver.

His home is in Pacific Palisades where he lives with his wife, Susan, and their two children, Spencer and Stephanie, whom he sometimes uses as toy testers. Mrs. Smith also gets involved occasionally—as she did when Smith roused her out of bed one night at 3 a.m. to run a three-legged race with him, using a pillowcase. This early morning exercise provided data for developing a game simulating aspects of a three-legged race.

Although Smith's major interest continues to be in toy design, he looks toward wider horizons. For example, he plans to become heavily involved in the medical instruments field, and, through liquid crystal display, to play a role in such fields as the design of automobile components and household appliances.

There was a time in the early 1970s when Smith found the toy field not challenging enough to satisfy his interest, but that era has long past. Technology is continuing to open up new possibilities in toy design and the market is insatiable. A toy's average life is three years, and this means that every year a third of all electronic toys have to be new. For a fine engineer who is still a kid at heart, who could ask for more?

Industrial Associates schedule four winter conferences

Caltech's Industrial Associates has scheduled four conferences in the coming months for members and non-members. The conferences are free to members; there is a fee for non-members. Interested persons may contact Pamela Hillman at 356-6599 for more information.

The conferences and their dates: February 3-5, Power Electronics; February 17-19, Research Directors' Conference; March 3-5, Reaction Mechanisms of Heterogeneous Catalysis; June 13-17, World Hydrogen Energy Conference IV.

THE WAY IT WAS

With this issue, Caltech News introduces a new column on the history of the Institute. Focusing on Caltech's 90th anniversary, the initial column commences 90 years ago and moves ahead 30 years at a leap.

1891

"The Throop University, founded by Hon A. G. Throop, will be opened to students November 2, 1891," announces the new institution's first publication, now officially known as "Circular #1." "The Wooster Block, a commodious and elegant structure, has been leased for the temporary accommodation of the institution. The building contains rooms sufficient to meet all needs, both for classrooms and dormitories. In its construction, in regard to sanitary requirements, it is well nigh perfect . . .

"... The rates of tuition will be, for any of the college courses, 20 dollars per term, while in the preparatory department fifteen dollars will be charged. Board may be obtained at rates varying from three to six dollars per week, according to quality and accommodation."

The fine progress of the new institution is noted in the Pasadena *Star* a year later. The *Star* reports that Pasadena citizens turn out to honor Mr. Throop and to hear him discuss his university—a manual training institution second to none. University

President C. H. Keyes delivers the principal address, tracing the school's heritage via industrial education for women, Keyes notes that "statistics show that women of England today are two inches taller on the average than 25 years ago, the reason being found in the exchange of the embroidery needle for gymnastic apparatus . . ."

1921

Headlines in the August 18 Pasadena *Star-News* proclaim Caltech's academic success on the national scene: "TECH FRESHMEN ARE FIRST IN MENTAL TEST; SCORE HIGHEST PERCENTAGE IN ENGINEERING EXAMS OF 38 SCHOOLS; SHOWS CALIFORNIA INSTITUTE HAS BRAINIEST LOT OF TECHNICAL PUPILS.

"Score another triumph for the California Institute of Technology. The freshman class of the local institution stands first in a test for engineering mentality recently conducted by Professor L. L. Thurston of Carnegie Institute for the Society for the Promotion of Engineering Education in 38 engineering schools throughout the United States . . . Six test studies were used—arithmetic, algebra, geometry, physics, technical information of a general character, and psychology."

1951

Edwin S. McMillan, Caltech professor of physics, is co-winner of the 1951 Nobel Prize for Chemistry, the fourth Caltech scientist to be awarded the honor. McMillan shares the Nobel award with a colleague at the University of California, Glen T. Seaborg, professor of chemistry, for the joint discovery of six new radioactive elements used in the development of atomic energy.

The November *Engineering & Science* magazine reports on trophies in the campus houses and terms Fleming House the most trophy minded of all. Fleming has a trophy for the best lover and for the worst, for the saddest story of the month, and for academic persistence—the latter awarded to a member who leaves school and comes back. But the most prestigious is the Brass Spittoon, a challenge trophy between alleys since 1935. *E & S* relates that one of the alleys recently won possession of the Spittoon via a contest christened Asinine Baseball, played with raw eggs. The game consumed four dozen eggs, not counting practice balls.

Celebrating 80 DuBridge years



President Emeritus Lee A. DuBridge was turning 80 and friends from the Caltech community celebrated with a birthday dinner in the Aethnaeum—complete with the traditional cake.



By Diane Davis

True or false? Caltech has played in the Rose Bowl more than any other four-year college. That, sports fans, happens to be true. None of those games were played on January 1, accompanied by a 200-piece marching band and card stunts (well, maybe one card stunt), but Caltech's Rose Bowl record stands alone in the annals of football history.

So does its scoring record. Wal-lechinsky and Wallace's *People's Almanac* of 1978 names Caltech as the "Worst College Team (all-time)." But despite the Beavers' reputation, stemming from lack of numbers, weight, experience, and winning games, they have shown an extra measure of fighting spirit and "grit per pound."

Athletics at the Institute have always had to fall back on those qualities. Here academic standards

C-A-L-I-F-O-R-N-I-A
I-N-S-T-I-T-U-T-E
O-F T-E-C-H-N-O-L-O-G-Y!
(17 times with rising fervor)

prevail over athletic recruiting, and time demanded by scholastic work takes precedence over practice sessions, so the few hard-working players who turn out for sports have almost consistently faced tougher competition.

Who tops the list of Rose Bowl competitors? You guessed it: the Beavers!

Caltech's football team, which, at the close of the 1980-81 season, had rolled up a cumulative record of 114 wins, 339 losses, and 17 ties since Throop Polytechnic first lost to USC in 1893, has faced special problems. Not only do Caltech teams have to contend with schools that can recruit and attract more athletically inclined students, but they compete with teams that field enough men to substitute fresh players throughout the game. Since the decades-old free-substitution rule, a small squad could not hope to keep up with larger teams. Exhaustion quickly overtakes men who must play both offense and defense throughout most, or all, of the game.

Coach "Fox" Stanton's 1931 "wonder team," however, stands out as the exception. That year the team won the conference title, beating every other school represented. One of those games was played with the same 11 men throughout, another with only one substitution. Stanton, who coached from 1921 until 1942 with a "mind over matter" philoso-

Rah Rah Rah
Rye Rye Rye
Throop Polytechnic
T. P. I.!

phy, was given credit for producing teams of hard-working players. He acknowledged in the *Big T* the year before winning the conference title that "Play is the answer, no matter who wins. The combative instinct is satisfied, and that is the reward."

The rewards through the twenties were also more often in the form of victory than has been the case in recent decades. But after the rapid decline following 1931, play against major schools (Stanford, UCLA, the University of Arizona) was suspended, and eventually even competition with varsity teams from the Beavers' own league. It seems that high IQ is no match for brawn. (The joke about Caltech players having a higher IQ, which averages about 140,

than weight isn't too far from the truth.) Caltech coaches derive some comfort from their players' ability to quickly pick up new strategy, but this isn't a deterrent to injury.

Post-1931 history hasn't been entirely bleak, however. 1957 proved a winning season, with 4 wins and 3 losses, and in 1973 the team finished 3-3-0. Unofficially, credit can be claimed for the perfect 4-0 season of 1944. The Navy V-12 program was housed on the Caltech campus at that

However, a notable exception in Caltech's struggle to compete with larger schools has always been in individual sports and in sports in which other teams did not recruit. In swimming, diving, and track events the Beavers have boasted outstanding athletes, some earning national and international recognition. Phil Conley took his javelin to the Olympic team in 1956; he was preceded by pole vaulter Glenn Graham in 1928. Swimmers Henry DeWitt and Greg



The Throop Polytechnic Institute basketball team of 1912-13 strikes a proud pose.

time, and toughened Navy men petitioned Millikan to let them resume the football competition that had been put aside when the war began. The defense that year gave up no points to any other team; but then, even major schools had to form squads from a greatly reduced number of males on campus.

While football was getting its start at Throop, other sports were also represented. To baseball, basketball, track, and tennis were gradually

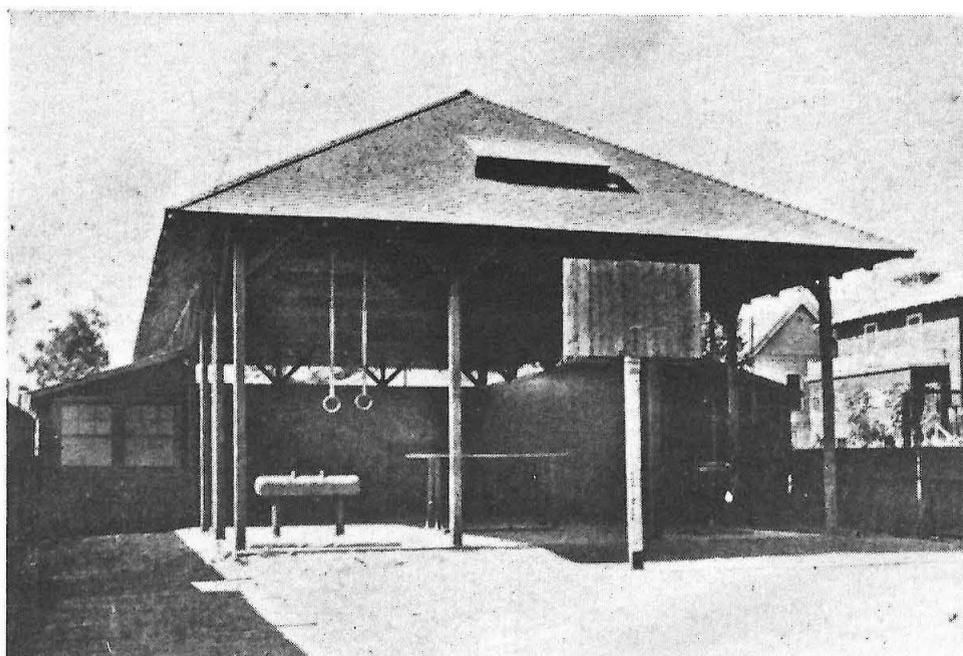
Motors, Bridges, Bevel Gears
CIT Engineers
Tech Rah!

added swimming, wrestling, boxing, cross country, water polo, soccer, hockey, and various other sports.

Baseball and basketball fared no better than football in the win columns, although each can claim at least one conference title—baseball in 1918 and 1931, and basketball in 1953-54.

Wright, in 1966-67 and 1968-69, respectively, participated in national competition, and DeWitt was inaugurated into the NAIA Hall of Fame in 1977. This year, after two days of practice, the water polo team finished fourth out of six in the invitational tournament at Washington and Lee University in Virginia (see article on p. 7).

Since women were admitted to the Institute in 1970, they have participated in sports in greater percentages than their male allies. Swimming, soccer, and volleyball have been popular, and in 1980, diver Lynn Hildemann took part in national competition.



Throop Polytechnic Institute's athletic facility in 1906.

It's not just the records, good or bad, that make athletics special at Caltech. The opportunity to try something new, to play an intercollegiate sport that a student may never have participated in before, is an advantage not found in the PAC 10, or at PCC, for that matter. According to athletic director Warren Emery, "The coaches are dedicated to the fundamental principle that athletics exist for the benefit of the student, rather than to build the ego of the coach or the alumni or the community. College athletics do not exist to build public relations, but for the effect the student can get out of it."

John Humphrey, who has played football at Tech for three years and is a team captain this year, acknowledges that the coaches' attitudes make playing for Caltech a good experience. And compared with playing for a stronger team, he says, "It's at least as much fun to play here. It's fun to win, but it's fun to play, and here everyone gets a chance." Team members seem to feel good about their efforts on the field, win or lose, as long as they have played a good, competitive game.

Though the Beavers now use their own field, an occasional good, competitive game still takes place in the Rose Bowl—that is, if the competition (unlike Tijuana Tech in 1979) shows up. In that stadium, in number-of-games, Caltech remains unchallenged.

*Cosine, Tangent, Secant, Sine
Logarithm, Logarithm, Hyperbolic
Sine
Three Point One Four One Five
Nine
Slide Rule, Slide Rule
TECH TECH TECH!*

Enthusiasm outstrips won-lost records: Techers love athletics

Caltech's athletic teams may not have been noted for winning championships, but this doesn't lessen enthusiasm on campus for athletic activities. Last academic year, 85.8 percent of the students took part in organized intercollegiate, intramural, or instructional athletic programs.

During the year, 199 men and 23 women undergraduates competed in 12 intercollegiate sports (baseball, basketball, men's and women's cross country, men's and women's fencing, football, golf, soccer, men's and women's swimming, tennis, track, water polo, and wrestling). Swimming drew the most participants—37.

Almost half the undergraduates (796) competed in at least one of the intramural sports (basketball, football, softball, swimming, tennis, track, and volleyball). Football, with 170 competitors, was most popular, closely followed by softball, which pulled 162 students.

Club sports attracted 100 participants in cricket, hockey, sailing, men's and women's soccer, swimming, women's volleyball, and women's water polo. (Club sport teams either provide competition in a sport not offered at the intercollegiate level, or serve as a first step toward organizing an intercollegiate team.) New clubs have been organized over the last year in women's soccer, volleyball, and water polo.

The graduate student intramural program, which includes graduates, faculty, staff, and a few undergraduates, attracted 652 participants in basketball, touch football, softball, and volleyball. Almost half of these (300) chose softball.

All of this—along with instructional programs—makes for a busy athletic facility and a busy coaching staff. Four full-time, nine part-time, and two volunteer instructors provide the direction for all the output of energy.

Caltech water polo team downs MIT in East Coast tourney

"Double banzai right, pinochle left, vector raindrop!"

As water polo coach Clint Dodd called out instructions like these, the Caltech team moved ahead to a 17-9 victory over MIT in the first athletic contest ever held between these two competitors in science and technology (so far as anyone can remember).

The game was Caltech's final match in the annual Fall Classic water polo tournament in Lexington, Virginia, hosted by Washington and Lee University, and the Caltech team finished fourth out of six after entering the event with only two days' practice. Two 1980-81 All-Americans—Matt Wette and Don Hendrix—were among the players.

In all the events Tech played a good game, giving the winners a tussle. The Beavers defeated Johns Hopkins 14-4, and lost to tournament power Slippery Rock State College 20-15, to Washington and Lee 11-9, and to the University of Kentucky 12-11.

"We had MIT in the second quarter and then they rallied," says team member Bill Polson. "I thought to myself, 'Oh, no! We can't lose this game or we'll have to hang our heads for the rest of the year!' But by the third quarter we realized we were going to win, and from then on it was fun."

Polson says that even more important than beating MIT was the team's performance in the tournament as a whole. "We walked in with only two days' practice, looked at the competition, and realized that we had a chance to win the tournament," he says. "I believe we would have won, if we'd had as much time to practice together as our opponents had." (Most had three weeks.)

Poulson adds that Caltech students' ability to master material in a hurry served the team well as members learned intricate plays like the "double banzai right, pinochle left" maneuver that "looked like mashed potatoes" from the sidelines but yielded points in the water.

The invitation to participate in the tournament was proffered Coach Dodd last spring when two Caltech swimmers participated in NCAA Division 3 Nationals at Oberlin College. "A lot of people would be surprised at our strength in water sports," Dodd says. (Last year, Caltech's swim team ranked 26th nationally among Division 3 schools.)

There was no money in the athletic department budget for a trip to the east coast, and team members Matt Wette and Joe McIntyre took the lead in raising the necessary funds. The Alumni Association and the Caltech President's Office made major contributions; other donors included the Master of Student Houses, Vice President for Student Affairs, and Dean of Students offices, and Barton Beek, a Caltech Associate who was a member of the 1941 Caltech water polo team.

Coach Dodd says he would like Caltech to be able to play in a similar tournament every four years. "That way, every water polo player could take part once while he's at Tech," Dodd says.

Meanwhile, the team came back with new and ambitious goals for itself: to win the SCIAC conference this season, to be ranked among the top 20 water polo teams in the nation in all divisions, and to have more of its members named All Americans. As *Caltech News* went to press, the water-polo-team record stood at 12-6 (3-2 in conference play) with five games remaining. Leading Tech were Claremont-Mudd and Occidental, each with 4-1 records in conference competition. Since the Beavers were scheduled to meet the front-runners in repeat contests, Caltech still was a contender for the championship.

Percy supports Reagan's strategic weapons decisions

Continued from page 1

stabilizing direction where arms control is concerned because it emphasizes bombers and cruise missiles—systems that reach their targets too slowly to be regarded as a possible "first strike" threat.

He noted that the administration's weapons package could be implemented in full under the terms of either SALT I or II, even if the unratified SALT II treaty were put back into force and extended until 1989. He said the U.S. will not now "turn back the clock" and ratify SALT II, but he said he strongly supports the administration policy of continuing to respect existing SALT agreements so long as the Soviets do the same.

Percy made it clear that he believes that the U.S. must make an effort to get renewed arms limitation negotiations under way. He said apparent unwillingness to undertake such negotiations has been damaging to our relationships with allies in western Europe.

The senator defended the President's decision to place MX missiles in reinforced silos that are now in use for less-advanced weapons. He described the existing shelters as being three times more blast resistant than the ones to be built under the proposed rail-track system.

He said placement of the MX missiles in the existing silos would significantly narrow the Soviets' margin for error in missile accuracy and more than triple the number of warheads available on each missile that survived a Soviet attack. In the long run, he argued that the U.S. should be prepared to stick with the Reagan-proposed MX deployment plan if other basing options (such as ABM or long-endurance MX-launching aircraft) prove too costly and unsound.

Percy said that by going ahead with the B-1 bomber, the U.S. will gain time needed to develop the advanced "stealth" bomber in a more prudent manner. He challenged critics who have said that the B-1 would not be able to penetrate Soviet defenses in attack. Percy said that U.S. retaliation to a Soviet first-strike attempt would leave the Soviet air defense network in a shambles by the time U.S. bombers arrived.



Under a canopy beside the Athenaeum patio, Senator Charles Percy speaks to The Associates about President Reagan's strategic weapons policies.



Mrs. Marvin L. Goldberger with Senator Percy and Hannah G. Bradley as Abel Ramirez (manager of the Athenaeum) pours wine.



Elise Mudd Marvin (left) with Mr. and Mrs. Reginald Spear (center) and Henry Keck.



Members of the media, attracted by Senator Percy's foreign policy views, are seated at a dinner. Above: a cameraman joins members of Senator Percy's audience. O. Beckman, and Mr. and Mrs. Ross McCollum.

A festive dinner



Mr. and Mrs. John Shephard.



Mrs. Louis Vincenti (left) with Mrs. Kenneth Rhodes.



...policy address, were much in evidence at The Associates' dinner.
...ence. From left—Dr. and Mrs. Lee A. DuBridge, Dr. and Mrs. Arnold



Medals won by Caltech faculty members over the years—including Robert A. Millikan's Nobel Prize—were on display on the Athenaeum patio and were a focus of attention during the social hour. Above left—Dr. and Mrs. Henry Lee; above right—Mr. and Mrs. John Pashgian.

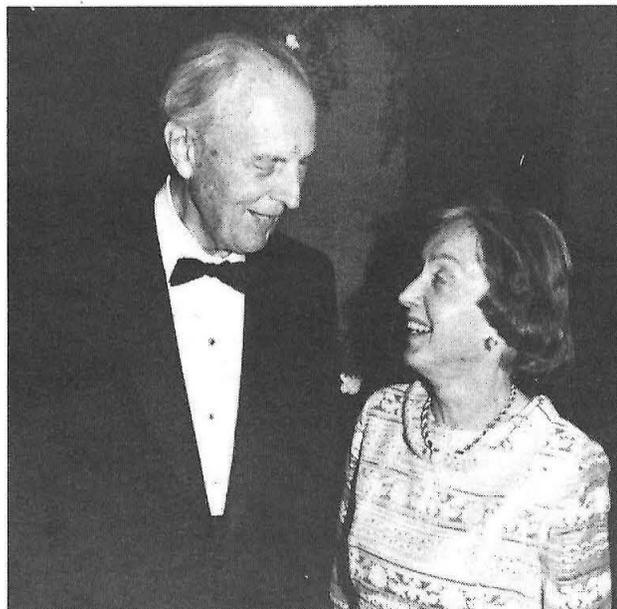
Party at the Athenaeum



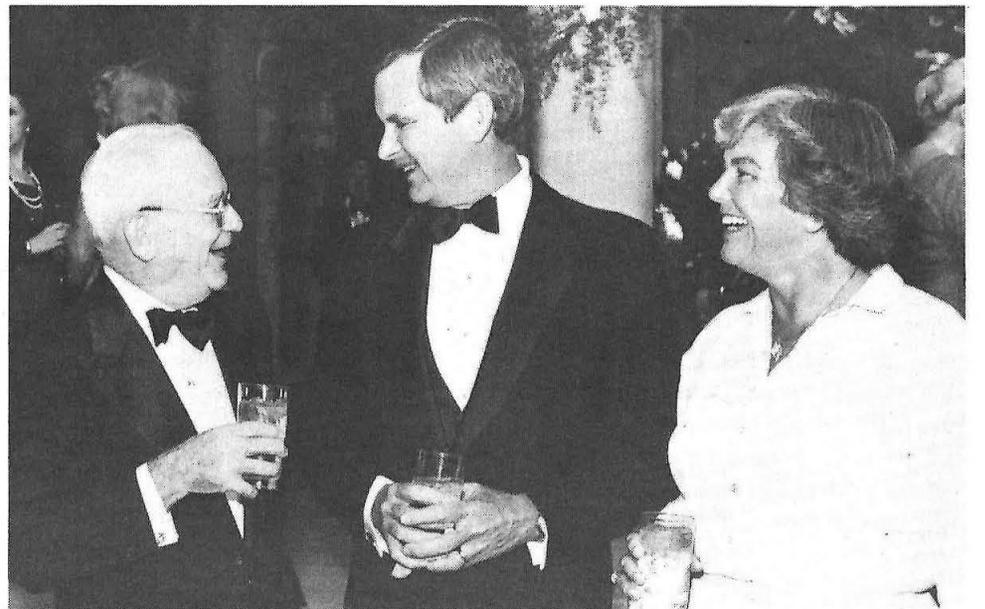
Caltech President Marvin L. Goldberger with Mrs. Willard E. Brown



Mr. and Mrs. James E. Brown (center) with Mr. and Mrs. Craig Norton.



Wellslake D. Morse and his guest, Marjorie Willmans.



Samuel P. Krown (left) with Mr. and Mrs. C. H. Holladay, Jr.

LETTERS

Alumnus recalls how Throop Club began

Sam Johnson (BS '33, MS '34) responds to the May Caltech News story of the Dugout (and its fireplace) as he describes the formation of the Throop Club:

"Your *Caltech News* story of the construction of the fireplace in the Dugout lounge, which housed the Throop Club for many years, brings back memories of the formation of the Non-Resident Club, later renamed Throop Club.

The Non-Resident Club was formed in 1931, and the name change to Throop Club occurred in 1934.

Consequently, the Throop Club did not result from 1934 Dugout lounge renovation gifts, as reported in the May 1981 *Caltech News*. Instead it originated from strenuous efforts in 1931 of undergraduates living off-campus to create an organized social environment for themselves, and to participate in intramural sports. This was when the Institute was completely absorbed with getting the new student living halls—which housed about 65 percent of the undergraduates—off to a proper start.

After the fraternities were eliminated, a group of ex-fraternity undergraduates who were living off campus wrote a founding charter and attempted to create a new non-housed fraternity of off-campus selected students. The project was strongly rebuffed when presented to Dr. Millikan and Dr. Munro, and the promoters were warned that they could be expelled if the plan were implemented.

But in subsequent negotiations, it was acknowledged by administration representatives that the students still living off campus should have a meeting place, an organization for intramural athletics, and social opportunities comparable to those for students in the living halls. This acknowledgement was greatly aided by continuing front-page crusading editorials in the weekly *California Tech* about the plight of students who could not be housed in the living

halls. In one editorial by Tom Terrill, these students were called "disenfranchised serfs in a new caste system at Caltech."

A final agreement was reached in late 1931 between the faculty administration and an augmented group of non-resident students. The agreement stated that in return for the group's helping to organize a non-resident club, the Institute would provide and fix up the Dugout lounge for the club headquarters. More important, the Institute would collect mandatory dues from all non-resident students at quarterly registration time, and turn them over to club officers.

The dues collection power gave the Institute the ability to control activities when deemed necessary, as was illustrated after the first major social event of the new Non-Resident Club took place. This was an unchaperoned costume dance at a large barn near the Santa Anita Race Track. Tickets were sold to the entire student body.

Refreshments included bowls of mixes for alcoholic drinks, and these were augmented from hip pocket flasks carried in this prohibition era. Reports of the drinking disturbed Dr. Millikan and the faculty, who strongly supported the prohibition law for Caltech events. They mandated that future social events of the club be on campus, and be properly chaperoned.

To accomplish this, the Institute was generous in providing a radio

with good speaker equipment and comfortable seating capacity for the lounge. Music for the dancing was supplied by big-band radio broadcasts. When an orchestra was hired for more formal dances, Dabney Lounge and its olive grove lawn were made available.

With these social capabilities, plus a well-organized intramural sports program that dominated such athletic events in its early history, the Non-Resident Club was thus established to provide the amenities of on-campus life to students not housed in the living halls.

Two Hertz Fellows study at Caltech

Richard A. Ikeda and Brian Paul Von Herzen are studying at Caltech this fall under new Fannie and John Hertz Foundation fellowship awards for the 1981-82 academic year.

Ikeda is in his third year of doctoral work in organic chemistry at the Institute, but is a new awardee of the Hertz program. He earned his bachelor's degree from UC Berkeley in 1979. Von Herzen is in his first year of doctoral studies in planetary science. He is a 1980 graduate of Princeton and has been working for a year in private industry.

The Hertz Foundation was established by the late Fannie and John Hertz to aid in the education of highly capable students, particularly in applied sciences.

New baseball, tennis coaches join athletics staff

Two new coaches—in baseball and tennis—and a new trainer joined the Caltech athletic department this fall. (Baseball coach Ed Preisler and tennis coach John Lamb retired last spring.)

Scott Laurence, Caltech's new baseball coach, earned his MA degree in education in 1980 and his AB degree in history and economics in 1979—both from Stanford. An injury brought his baseball career at Stanford to an end after a year and a half, and he went on to coach there for three years—as head junior varsity coach and as outfield varsity coach.

Under his tutelage, the junior varsity team tied for the league championship and went on the next year to win the league championship. Last year he taught history and coached baseball in Hayward, California.

Laurence anticipates a competitive 1982 season, with nine returning players and some new freshmen who show strong promise—if they can be persuaded to come out for the team.

Tennis coach Michael Jackson earned a BS degree from Whittier College in 1967, an MS degree from Claremont Graduate School in Asian history in 1971, and an MS degree from the University of Southern California in counseling and psychology in 1981. A tennis pro with the US Professional Tennis Association, he has been in charge of Caltech's summer tennis program since 1969. He has been coach of the freshman tennis team at Pomona College and of the tennis teams at Mayfield School and Flintridge Sacred Heart Academy, and of the girls' tennis team at South Pasadena High School.

At Caltech he will be a half-time faculty member, coaching the tennis team and teaching tennis classes in the physical education program, and continuing to direct Caltech's summer tennis program.

James Beazell, Caltech's new trainer, earned his BA degree from San Francisco State in pre-physical therapy in 1979, and his MS degree in physical therapy from USC in 1981. At San Francisco State he worked as assistant trainer in the undergraduate physical education program, and while he studied at USC he was trainer for the Los Angeles rugby team.

A gift of chess



Two Caltech chess players initiate a gift to the Institute by Mr. and Mrs. Rodney Allen, contributing members of The Caltech Associates. The set is one of ten whose wooden pieces were carved by a Yugoslavian artist. Student players are Greg Kavounas (left) and John Mahony (right). Allen (center) monitors the action.

Phil Reynolds: Still in the right place, he heads the Alumni Association

By Winifred Veronda

"A halfback who was always at the right place at the right time." That's how a former teammate describes Philip L. Reynolds, a two-year member of Caltech's last football team to boast a winning season.

Since the 1957-58 season concluded (with a victory over Occidental College in the Rose Bowl), Reynolds has earned two degrees from Caltech (BS '58, MS '59) and a law degree from Harvard (1965), and he's built a successful legal career as a partner with Latham and Watkins in Los Angeles. Still in the right place at the right time, he's hard at work this year on programs for the Alumni Association as its 1981-82 president.

A native of Glendale and a fourth-generation Californian, Reynolds attended Glendale High School and commuted from home during his first year and a half at Caltech because of a shortage of rooms in the student houses. Initially active in Throop Club for off-campus students, he moved into Ricketts House during his sophomore year. Brake-drum riots were still popular and Ricketts students were still called "Rowdies," although by this time, says Reynolds, "we were actually pretty civilized."

Fellow Ricketts House resident Dick Van Kirk (BS '58) remembers Reynolds as "well rounded socially, politically, and athletically—one of the most normal members of the Caltech community. Unlike some of us, he always had dates, and yet with all this, he managed to keep his grades up." Reynolds was noted in those days for a "wry sense of humor," and he still is.

After completing his MS degree in chemical engineering, he went to work for Aerojet-General in Sacramento on rocket fuel, and then, three years later, he opted for a career change. In 1962, a year after his marriage to Elizabeth Porter, he entered Harvard Law School. "It was a wonderful experience," he says, "and hard—but nothing is harder than Caltech. The discipline required to

succeed here is tremendous. If you can make it through Tech, then you can make it through anything."

When he entered Harvard, Reynolds planned to specialize in patent



law, but before graduation he decided to go into general practice instead. Eager to move back to southern California, he joined Latham and Watkins (he is a real estate expert), and after two years in Santa Monica, he and Mrs. Reynolds moved to Glendale. Today they and their four children (ages 10, 12, 14, and 16) live four miles from where Reynolds grew up.

In Glendale he is active in St. Mark's Episcopal Church as a member of the vestry, and with the Boy Scouts (his 12-year-old son is a member), and he coaches his daughter's American Youth Soccer Organization soccer team.

Reynolds became a member of the Seminar Day Committee eight years ago and in 1977 he was asked to join the Alumni Association Board of Directors. As president this year he is working to strengthen the Association's placement activities. Under his leadership, the Board set a goal of developing a network of alumni throughout the country who can help students find summer jobs or temporary positions when they take leaves from the Institute—and who can also help alumni who want to make career changes.

Reynolds also stresses the Association's continuing role this year in student recruitment. In several cities throughout the country, alumni are talking with high school counselors and with science and mathematics teachers to orient them to Caltech and its programs, and to assist them in counseling bright high school students who are interested in applying here. The alumni are also available to talk with students interested in applying to the Institute. In this work, the alumni work closely with the Caltech Admissions Office.

Under Reynolds's leadership this year, the Alumni Association is boosting its travel programs and plans to schedule two trips a year with faculty members as guides. Robert Sharp led a second excursion to Hawaii's volcano country in November, and will lead a trip to Yosemite in May. Next year's destinations may include Oaxaca, Mexico, and Yellowstone National Park.

Meanwhile, the Association continues its drive for new members as it

studies ways to make its program useful and relevant for the broadest spectrum of alumni. Now at 48 percent, the membership percentage is one of the highest for any alumni association in the country, but Reynolds is setting his sights even higher.

In analyzing the Alumni Association's role, Reynolds stresses the growing importance of the Alumni House as a center for campus functions. "The Alumni House is a tremendous facility and it's proving to be everything we had hoped," he says. "Students come for career counseling, and they're gaining much more insight into the Association and what it does than was possible before. The Trustees, The Associates, and the Alumni Fund have all used it for functions. The house is giving us an identity and focal point throughout the Caltech community, and this is due to our alumni and their generosity."

In all of its programs, Reynolds emphasizes the Association's primary role as a service organization as distinct from the Alumni Fund, and with no fund-raising objectives. "Service to alumni and to the Institute is our only purpose," he stresses.

Reynolds is excited about the Alumni Association and its activities this year. "We have an excellent board and a fine staff, and our program level has never been higher," he says.

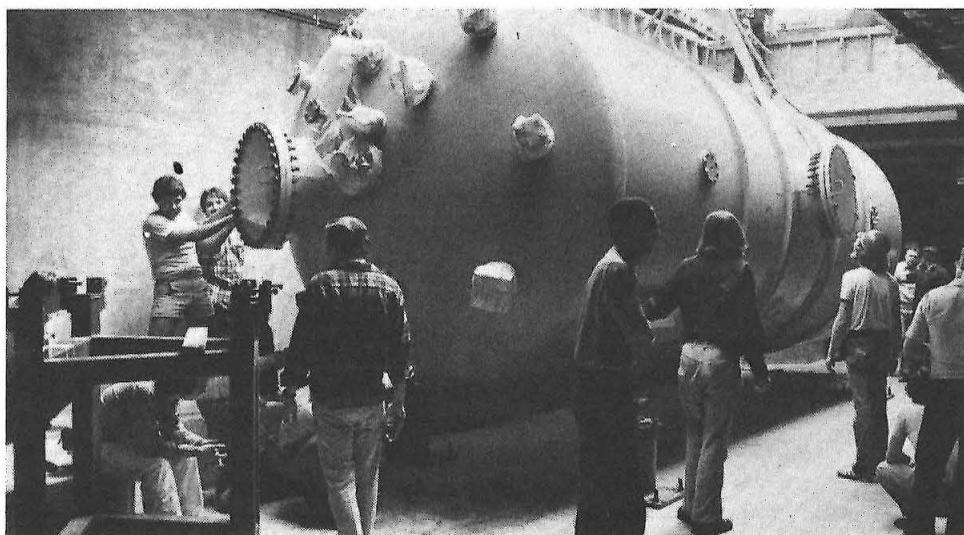
And these programs are getting a big boost from an ex-halfback who has a knack for being at the right place at the right time. Fortunately for alumni, he's in the right place this year.

Copies of Caltech's Throop Hall can still be purchased

A few remaining copies of The Friends of Caltech Libraries' limited edition book, *Caltech's Throop Hall*, can still be purchased through Millikan Library. The book tells the history of Throop Hall in 62 photographs and a text by Alice Stone, a writer specializing in Pasadena history, and Judith Goodstein, the Caltech archivist; the designer is Elva Marshall. All profits go to the Caltech libraries.

Copies are \$7.50 plus \$1.50 for postage and handling on mail orders and, for California residents, \$45 per copy for sales tax. Mail orders can be placed by sending a check to the Friends of Caltech Libraries, Pasadena, California 91125. Copies can be obtained in person at the Millikan Library basement photocopy room.

New particle accelerator is in residence



A new high-current, high-stability particle accelerator for basic and applied nuclear studies is lowered to its underground location beside the Kellogg Radiation Laboratory. The accelerator was custom designed by experimental physicists at Caltech, and is the only one of its kind in the world. It will be used for both basic and applied nuclear studies—of the nuclear reactions that occur in the sun and other stars, for biomedical research on trace elements in cells, for studies on the effects of radiation damage in materials, and for many other important projects.

OF SPECIAL INTEREST TO ALUMNI

Sharp to lead alumni in exploring Yosemite Valley

Following in the grand tradition of treks to Hawaii volcano country and the Grand Canyon, Caltech geologist Robert P. Sharp will lead alumni this spring on a five-day trip to Yosemite Valley. The dates are June 8-12.

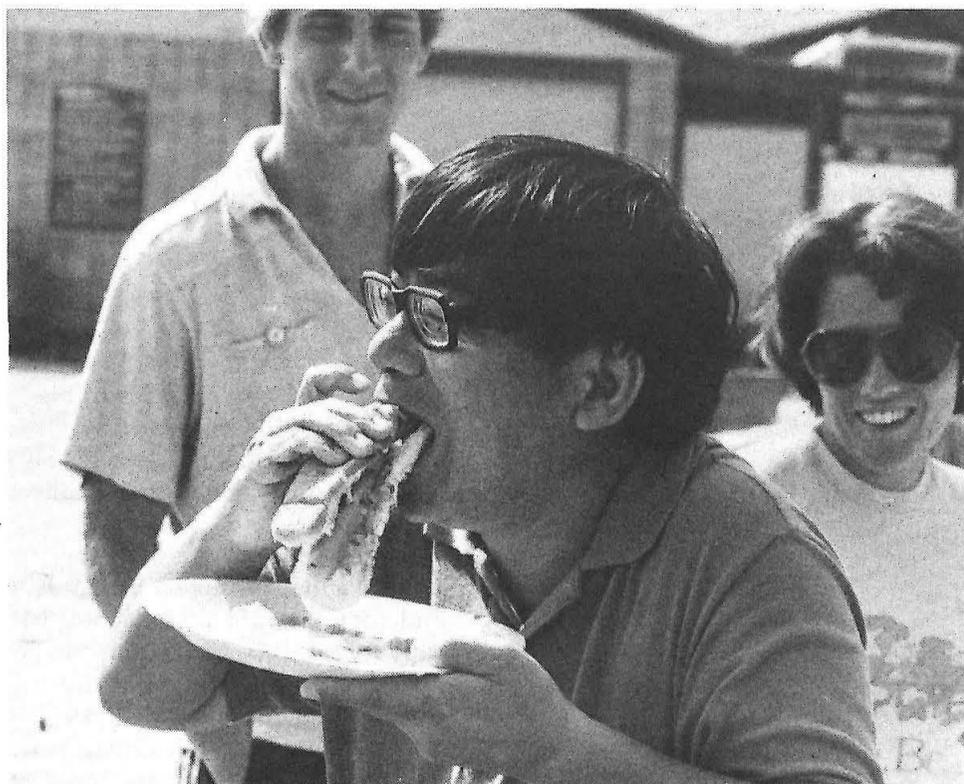
The group will travel on day 1 across the western wedge of the Mojave Desert through the El Paso Range via Red Rock Canyon into Indian Wells Valley and on to Lone Pine, and through the Alabama Hills and Owens Valley to Bishop for the first night. Day 2 will feature the Owens River Gorge, the Long Valley caldera, Convict Lake, the Inyo-Mono craters chain, Mono Lake Basin and Mono Lake, and the June Lake-Giant Lake loop, with overnight at June Lake.

The alumni on day 3 will cross the Sierra Nevada and enter the Yosemite Valley via the Tioga Pass route; on day 4 they will explore the valley and hike up the Merced River to the top of Nevada Falls and on to Glacier Point (the latter hike for sturdier members). They will return on day 5 via the San Joaquin Valley across the Tehachapi Mountains, and into Los Angeles.

Persons interested in advance registration or additional information may contact the Alumni Association.

The Alumni Association is planning a trip to Oaxaco, Mexico, in the fall of 1982, with a faculty member as guide. Dates have not yet been set.

Freshman Camp food passes the taste test



Complaining about the food at Freshman Camp is a time-honored tradition, but Master of Student Houses Sunney Chan has no complaints as he prepares to dig deep into a hearty bit of camp fare.

ALUMNI ACTIVITIES

Friday, January 1

Rose Parade Special. 7:30-9:30 a.m., continental breakfast in the Athenaeum; 9-11:15 a.m., walk to Colorado Boulevard to view the 93rd annual Tournament of Roses from reserved grandstand seats; 12 noon, buffet lunch in the Athenaeum. For those with tickets to the game, a box lunch and bus transportation to the Rose Bowl will be provided. Price: \$33.50 with lunch at the Athenaeum; \$39.00 with box lunches and Rose Bowl transportation (tickets to game not included).

Friday, January 15

San Francisco chapter meeting. Peter K. Haff, senior research associate in physics, will speak on "Singing Sands of the Mojave Desert." Additional details will be announced.

Tuesday, March 2

Salt Lake City chapter meeting, the Hotel Utah, Main at South Temple. Reception, 6:30 p.m.; dinner, 7 p.m.. Robert P. Sharp (the Sharp Professor of Geology, emeritus) will speak on "Martian Geology: A Second Look from the Viking Landers."

Thursday, March 4

New Mexico chapter meeting, Bishops Lodge, Santa Fe. Robert P. Sharp will speak on "Martian Geology: A Second Look from the Viking Landers." Additional details will be announced.

Fridays, March 5 and 12

Alumni wine tastings, the Athenaeum. 8 p.m., champagne tasting; 8:30 p.m., presentations by winery owners; 9:30 p.m., wine tastings. Wineries to be featured: Clos du Val, Spring Mountain, Landmark, Sebastiani.

Want to help recruit new students?

The Alumni Association is continuing its program of contacting high schools and talking to interested students about a Caltech education, encouraging them to apply for admission. If you would like to assist, get in touch with the Alumni Office or Stirling L. Huntley, director of admissions and associate dean of graduate studies.

ALUMNI ASSOCIATION BALANCE SHEET

ALUMNI ASSOCIATION
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

BALANCE SHEET

June 30, 1981

ASSETS

| | |
|---|---------------------|
| Cash on Hand and in Bank | \$ 1,225.33 |
| Investments: | |
| C.I.T. Consolidated Portfolio | 595,387.30 |
| Money Market Funds | 87,567.03 |
| Investment Income Receivable | 13,000.00 |
| Other Receivables | 5,725.43 |
| Postage Deposit and Deferred Expenses | 668.14 |
| <u>Total Assets</u> | <u>\$703,573.23</u> |

LIABILITIES, RESERVES AND SURPLUS

| | |
|--|---------------------|
| Accounts Payable | \$ 30,642.81 |
| Deferred Income: | |
| Annual Membership Dues paid in advance | 27,913.00 |
| Investment Income from C.I.T. Consolidated Portfolio | 33,000.00 |
| Life Membership Reserve | 610,340.00 |
| Reserve for Directory | 9,673.28 |
| Surplus (Deficit) | (7,995.86) |
| <u>Total Liabilities, Reserves and Surplus</u> | <u>\$703,573.23</u> |

COMPARATIVE STATEMENT OF INCOME, EXPENSES AND SURPLUS For The Year Ended June 30, 1981

INCOME

| | |
|---|---------------------|
| Dues of Annual Members | \$ 63,059.17 |
| Investment Income: | |
| C.I.T. Consolidated Portfolio | 32,773.48 |
| Money Market Funds and Savings Accounts | 6,284.89 |
| Annual Seminar | 20,275.75 |
| Program and Social Functions | 24,282.94 |
| Class Reunions | 21,417.00 |
| Area and Chapter Meetings | 8,674.31 |
| <u>Total Income</u> | <u>\$176,767.60</u> |

EXPENSES

| | |
|--|---------------------|
| Publications | \$ 12,000.00 |
| Annual Seminar | 19,025.11 |
| Program and Social Functions | 25,472.73 |
| Class Reunions | 28,116.04 |
| Area and Chapter Meetings | 12,794.42 |
| Student Programs | 14,005.90 |
| Institute Secondary School Relations | 1,036.25 |
| Administration | 46,932.66 |
| Membership | 6,856.96 |
| Directory | 7,000.00 |
| <u>Total Expenses</u> | <u>\$173,240.07</u> |

| | |
|--|---------------------|
| Excess of Income Over Expenses | \$3,527.53 |
| Surplus (Deficit), June 30, 1980 | (11,523.39) |
| Surplus (Deficit), June 30, 1981 | <u>\$(7,995.86)</u> |

AUDITOR'S REPORT

Board of Directors
Alumni Association
California Institute of Technology

I have examined the balance sheet of the Alumni Association, California Institute of Technology as of June 30, 1981, and the related statement of income, expenses and surplus for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as I considered necessary in the circumstances.

In my opinion, the accompanying balance sheet and statement of income, expenses and surplus present fairly the financial position of the Alumni Association, California Institute of Technology at June 30, 1981, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Calvin A. Ames
Certified Public Accountant

October 27, 1981

Obituaries

1918

NEVIN R. SHADE on July 30 in Long Beach, California. He had been retired from Mobil Oil since 1951, having worked for that firm in the Los Angeles area office as a geophysical engineer for 32 years. Until the last few years he had spent an active retirement, hunting and fishing in California and Canada. He leaves three children, eleven grandchildren, and six great-grandchildren.

1924

EDWARD D. LOWNES on August 11. He was president of Lownes Construction Company in South Pasadena until his retirement in 1974. At that time he moved to San Clemente with his wife, Geraldine, who survives him.

1928

ROBERT I. COULTER on September 1. He was retired from the 3M Company, in St. Paul, Minnesota, where he was a patent counsel from 1937-67. During that time he obtained the patent on Scotch tape, as well as on masking and surgical tape. Coulter was a director of the General Church of the New Jerusalem and was one of the founders of the Midwestern Academy of the New Church (Swedenborgian) in Glenview, Illinois. He and his wife, Betty, who survives him, retired to South Laguna, California, in 1969. Memorial contributions may be sent to the South Coast Medical Center Foundation, 31872 Coast Highway, South Laguna, California 92647.

KENNETH M. FENWICK on May 16 of cancer. In a letter from his son Douglas, we learn, "After graduation from Caltech as a civil engineer, he first worked on the layout of the then-new UCLA Westwood campus. During the 1930s he went to work for the California Division of Highways; his employment with them lasted until his retirement some 30 years later. In the early part of his highway engineering career, he enjoyed several resident engineer jobs on major highway projects, most notably the Pyramid Cut section of the Ridge Route (Highway 99) over the Tehachapi Mountains. In the later years he relocated to headquarters in Sacramento and worked hydraulic problems. His highway engineering career was interrupted during the war years when he entered the Navy Civil Engineer Corps and performed a wide variety of construction projects at the naval bases of Key West and Pearl Harbor. He left the Navy at war's end with the rank of Commander." He is survived by his wife, Darolyn, and a daughter, Laura, in addition to his son, and by two granddaughters.

RUSSELL J. LOVE on August 25 of a heart attack. He was dean emeritus of Cogswell College in San Francisco, where he first taught thermodynamics beginning in the late 1950s. In World War II he was engaged at the Naval Ordnance Test Station in Pasadena and attended the Armed Forces Industrial College. He was the author of many technical papers and was among the first to raise the question of air pollution control in the Los Angeles basin. He is survived by his wife, Alicia, a son and a daughter, and three grandchildren.

1929

HARRY J. KEELING, MS '30, on August 14. He was the owner of Harry J. Keeling Consulting Engineers, in Los Angeles. He is survived by his wife, Katherine, two daughters, and three grandchildren.

1931

NORMAN R. GUNDERSON, MS '32, on September 29 of a heart attack. He had retired as owner of Gunderson Instrument Company, in Pasadena, in February. His wife, Amelia, survives him.

C. EDWIN KUYKENDALL on August 20. He was employed by the California State Highway Department as a designing engineer in the freeway designing department for 35 years, and had been living in South Pasadena. He is survived by his aunt, Edna Mungor Goldman of Phoenix, and several cousins.

1932

CHESTER E. WILSON, MS '33, PhD '35, on July 2 after a stroke on June 7. Retired in 1974, he had been supervisor of products research for Union Oil Company of California, in Brea. He leaves his wife, Helen.

1935

FREDERIC C. KING, JR., on August 29 of a heart attack. He was employed by Mobil Oil Corporation for 35 years as an engineer, building refineries in Singapore, Japan, and West Germany. He and his wife, Corinne, who survives him, moved to Boca Raton, Florida, after his retirement.

1937

LÉON HOROVITZ on July 24, 1980, of cancer. He had been project manager for the Hospital Council of Southern California, and lived in Ojai, California, with his wife, who survives him.

1938

ALTON L. PABST, Ex, on June 18 in Punta Gorda, Florida, of a cerebral hemorrhage. He was a consulting engineer with Seaman International in Sarasota, proving himself an innovator in cable stress structural design. He had previously lived in Santa Maria, California. While at Caltech, Pabst was president of the Throop Club in 1936-37. His wife, Belva, survives him, and she writes that she is learning to pilot the boat that she and Pabst took out often. He also leaves four daughters.

1943

COL. WILLIAM L. NESLEY, MS, on September 5 of cancer, at his home in Alexandria, Virginia. From 1973 until January 1980 he had served as executive vice

president of Coakley and Williams, Inc., a commercial building and development firm. He had served 25 years in the Air Force and had been stationed for much of that time as a meteorologist in the Pacific, Europe, and the United States. He retired from the military in 1967, last serving with the Defense Intelligence Agency. Survivors include his wife, Wilma Glen, a son, and a daughter.

1944

THEODORE B. PARKER, MS, in January 1981. He had been a manager of engineering at General Electric in Evendale, Ohio.

1946

JACK L. JENSEN in December 1980 after a lengthy illness. He was the founder and principal owner of Jensen Marine Corporation, in Costa Mesa, California, a company that manufactured the CAL line of fiberglass sailboats. In 1966 he sold Jensen Marine to Bangor Punta, remaining as president until 1972, when he retired and began cruising on his Cal-46 Satori. In 1979, already ill, he finished circumnavigating the world. He is survived by a daughter, Kristin, and a son, Kurt.

1948

JOHN F. THURLOW, PhD, on August 22 at his home in Gorham, Maine. A chemist, he founded Gorham Laboratories, a consulting firm, in 1955, and served as its president until his death. He is survived by his mother, of Portland and his wife, Marian Pohl Thurlow.

1952

EDGAR PRICE, MS, on July 18 of a cerebral tumor, at his home in Sacramento, California. A U.S. Reclamation Bureau engineer, he held top positions in federal and state water and conservation projects before he retired in 1979. At that time he was special assistant to the director of the Mid-Pacific Region in Sacramento. He had worked on the state's San Luis project and served on an interagency task force to develop a state and federal drainage plan for the San Joaquin Valley. He earned the Department of the Interior's Meritorious Service Award for outstanding contributions in conservation planning. Price was a retired Air Force lieutenant colonel. He is survived by his wife, Constance, and a son, Craig.

1974

ERIC SCHMIDT, MS, on September 14. He was thrown from his motorcycle after hitting a bump on wet pavement. He was a member of the technical staff at Battelle Columbus Laboratories in Ohio. Schmidt had been slated to receive, on September 16, an award from Battelle for his part in developing a sampling device to remove fibers larger than 15 microns, for which he received a patent.

1979

PETER YOUNG, PhD, on September 6, in Pasadena. Assistant professor of astronomy, he had recently won recognition for work in measuring the size of the universe. According to Caltech professor Peter Goldreich, the work Young and his colleagues had done in quasar absorption lines was the most exciting work done in optical astronomy in the last five years.

Personals

1928

ARNOLD O. BECKMAN, PhD, founder and chairman of Beckman Instruments, Inc., and chairman emeritus of the Caltech Board of Trustees, received the Hoover Medal from the American Association of Engineering Societies at an awards banquet in September. The medal, which honors an engineer for "great, unselfish, non-technical services to his fellow man," was presented jointly by the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Mining, Metallurgical and Petroleum Engineers, and the Institute of Electrical and Electronic Engineers. Beckman was also honored by the Instrument Society of America, which presented him the Life Achievement Award, an unprecedented honor from the Society.

1933

BERNHARD PALM reports from Fullerton, California, "After 44 years in the industrial electric motor business as a mechanical engineer, gear designer and engineering administrator, I started Motor Control Corporation in 1977 with my son and two other associates. We designed and manufactured electronic motor controls. In April Westinghouse Electric Corporation purchased our company. Though semi-retired, a consulting contract with the Industrial Control Division of Westinghouse keeps me busy."

1941

GEORGE NICHOLSON, MS, was married to Arlene Davis in La Crescenta, California, last July, and they have settled in Santa Maria. He has been affiliated with Karris, Keich, Russell and Kern, in Los Angeles.

1948

JUSTIN L. BLOOM, has become counselor for scientific and technical affairs with the U.S. Embassy in London. He was previously with the embassy in Tokyo.

1950

THOMAS C. ADAMSON, JR., MS, PhD '54, was awarded a Distinguished Faculty Achievement Award by the University of Michigan for the 1980-81 academic year. He was honored for "distinguished achievement in teaching, research, publication, creative work in the arts, public service, and other activities which bring distinction to the University."

1951

GEORGE C. DACEY, vice president of operations systems and network planning at Bell Laboratories, has been named president of Sandia National Laboratories and vice president of Western Electric. Western Electric, the manufacturing arm of Bell Labs, operates Sandia facilities in Albuquerque, New Mexico, and Livermore, California.

EDWIN E. PYATT has resigned as chairman of the Department of Environmental Engineering Sciences, University of Florida, to return to full-time teaching and research. During spring semester 1982, he will be on sabbatical leave in Singapore and in Venezuela helping to establish environmental engineering programs.

1953

SHELDON RUBIN, MS '54, PhD '56, senior project engineer in the Aerospace Corporation's Vehicle Integrity Subdivision, has earned the company's Trustees' Distinguished Achievement Award. He was honored by the Los Angeles firm for "outstanding innovative engineering techniques contributing to U.S. liquid propelled launch vehicles, offshore oil platforms and explosive shocks."

1954

EDWARD GAUSS, at Alaska's Tanana Valley Fair, won blue ribbons for (1) a giant turnip, (2) a sculpture in cast iron of a moose, and (3) an aluminum recycling plant that ran on willow charcoal. When not doing the aforementioned, Gauss teaches computer science at the University of Alaska in Fairbanks.

1955

LEE HANON, MS '58, has moved to the Dallas-Ft. Worth area, where he joined Vought Corporation as director of missile projects. He was previously with General Dynamics in Pomona, California.

ALVIN TRIVELPIECE, MS, PhD '58, formerly corporate vice-president of Science Applications Inc. of La Jolla, California, has been named director of the Office of Energy Research with the U.S. Department of Energy. Nominated by President Reagan on July 8, he was confirmed by the Senate, and sworn in by Secretary of Energy James B. Edwards in August. He will advise Edwards on technical aspects of energy research and development programs. He will also be responsible for DOE's multipurpose laboratories and energy and nuclear physics and magnetic fusion.

1958

RICHARD FIDDLER was re-elected vice-president of the Sierra Club in May. Fiddler, a resident of Seattle, has served on the club's national board of directors since 1978.

GEORGE D. LEAL, MS, has been elected chief executive officer of Dames & Moore, worldwide engineering and environmental consulting firm, and, from Los Angeles headquarters, will direct operations of the

company's 26 U.S. and 14 overseas offices. Leal joined Dames & Moore in 1965 and has served as managing partner of client services and geographic divisions and as director of utility industry services.

ROBERT E. SCHENTER sends us an update from Richland, Washington: "I am a Fellow Scientist at the Hanford Engineering Development Laboratory and work with FRED MANN (PhD '75) on problems mainly involving use of calculated nuclear data in support of design and operation of fission and fusion reactors systems. We are also working with Caltech on problems related to antineutrino spectra and oscillations. My son Greg is on the Caltech water polo team and will be a junior."

1965

JAMES J. DUDERSTADT, MS, PhD '68, faculty member in the department of nuclear engineering at the University of Michigan since 1969, has become dean of the College of Engineering there.

1967

SUSAN WERNER KIEFFER, MS, PhD '71, a geologist with the U.S. Geological Survey in Flagstaff, Arizona, has been given the Mineralogic Society of America Award for 1980.

1969

JEFFREY C. HECHT writes from Auburndale, Massachusetts, "I've coauthored (with Dick Teresi of *Omni* magazine) a book on lasers and their applications; it's intended for the general public and will be published early next year by Ticknor & Fields, a subsidiary of Houghton Mifflin. With that experience under my belt, I've left *Laser Focus* magazine to devote full time to free-lance writing and consulting. I'll continue writing about lasers and fiber optics, but now I can expand my coverage to such things as fake UFOs, black holes, and anti-snoring devices. And with luck I'll even have time to write more science fiction."

1972

JAMES P. SIMMONS, JR., wafer fabrication supervisor with Hewlett-Packard in Palo Alto, California, reports the birth of his second son, Bradley Matthew, on May 29.

1974

ANITA CRAFTS-LIGHTLY reports from High Wycombe, Bucks, England, "In March of this year I joined Celltech Ltd., Britain's first biotechnology company. Working in the R&D department, I am in charge of the company's scientific information. This has entailed, among other things, building up a library from scratch, which is a pretty daunting task. However, it is great to be involved in some exciting molecular biology again and I am finding my new position very enjoyable."

RENE GANDOLFI has received his DVM from UC Davis, where his wife, Stefanie, just received her JD. He is now with the Berkeley Dog and Cat Hospital.

REX V. GIBBONS, PhD, sends the following: "I am presently a senior geologist with the Newfoundland Department of Mines and Energy. My wife, Marge, is with the Memorial University Branch of the Canadian Imperial Bank of Commerce. On June 18th she gave birth to our first son and third child, a brother for Kim and Emily. If any of our Tech friends should ever get this far from California, we welcome a visit or a phone call. I'm the only Rex Gibbons in the St. John's phone book."

1976

OLE ANDERSON, formerly a computer consultant for Hewlett Packard, has been chosen as the first United Nations volunteer to work in the People's Republic of China. During his two-year stint, he will be a consultant at the Peking Institute. Anderson, from Corvallis, Oregon, is currently living in Ann Arbor, Michigan.

1977

GREGORY P. DUNN, senior engineer with Litton Data Systems in Van Nuys, California, reports that he married Kathleen M. Carroll in February.

JAMES V. TIERNEY III, MS, sends news of the birth of a first child, Bryan Thomas, to him and his wife, Maureen, in June. Tierney is project engineer with the Kennedy Company in Monrovia, California.

1978

DAVID W. THOMPSON, MS, reports, "After graduating from Caltech I spent a year at NASA's Marshall Space Flight Center (Huntsville, Alabama) working on advanced rocket propulsion concepts. From there, I went to Harvard Business School as a Rockwell International Fellow, receiving my MBA earlier this year. I now am special assistant to the president, Missile Systems Group, of Hughes Aircraft Company (Canoga Park, California)."

BARRY WEINGAST, PhD, assistant professor of economics at Washington University in St. Louis, has received the first Barr Award from the Association for Public Policy Analysis and Management. The award recognizes outstanding young scholars in public policy research.

1979

KUNIO YOSHIZUMI, MS, writes, "My wife, Tokiko, and I would like to announce the birth of our baby. Our son, Arata Kei, was born on January 9, 1981. We live in Saitama-ken, Japan. I am a research chemist of the Tokyo Metropolitan Research Institute for Environmental Protection."

1980

KATHERINE H. BARHYDT and LORENZ W. SIGURDSON (MS '80) were married in August, on the Caltech campus. She works at JPL, and he is pursuing his PhD at Caltech.

CHARLOTTE MA, PhD, reports, "My job at the Naval Weapons Center (China Lake) is varied and quite interesting. I am the crystallographer in the chemistry division of the research department and am primarily involved in materials characterization. Last November (1980) Hamil and I had a little baby girl, Aiyasha. She has certainly changed our lives, but all for the better!"

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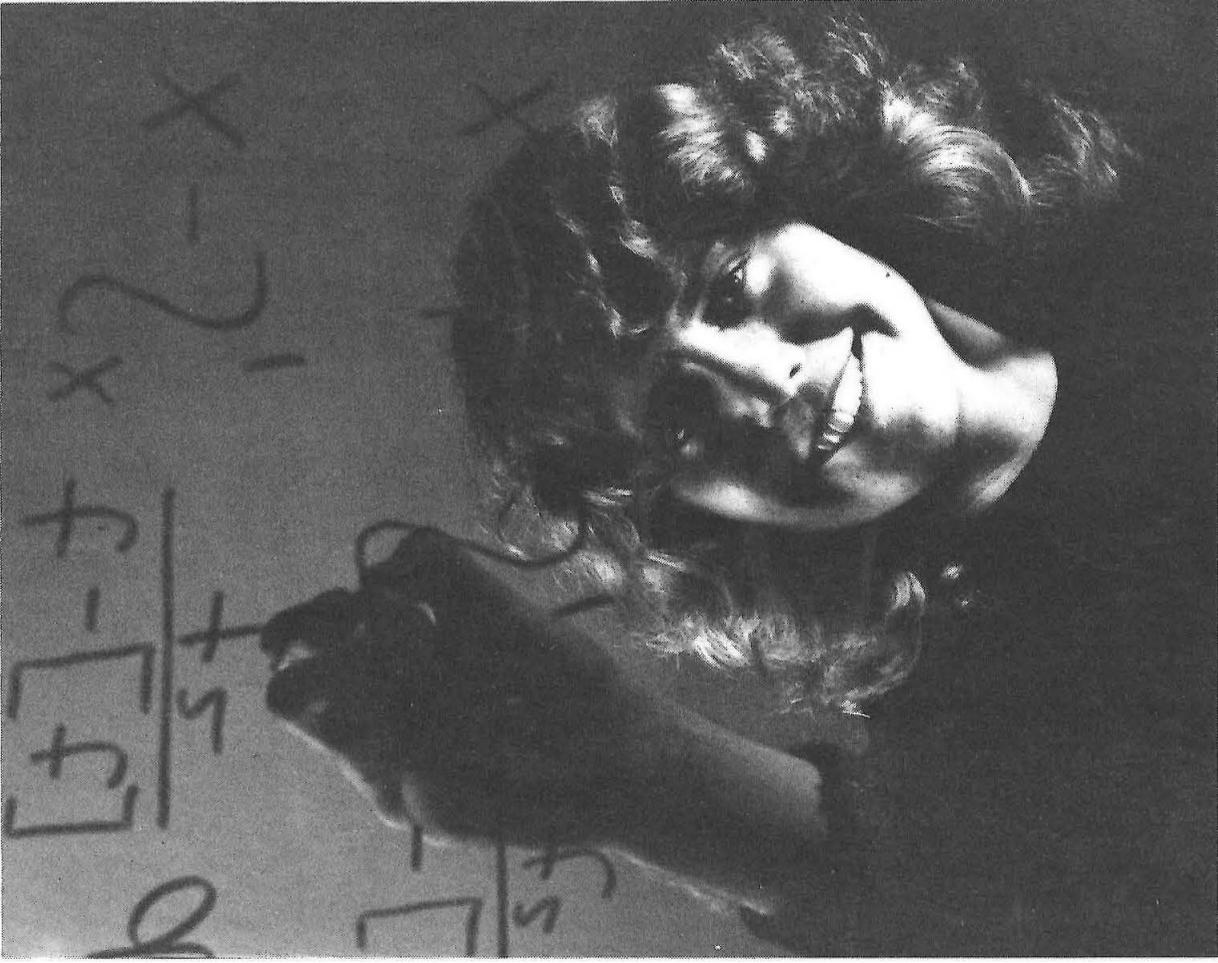
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CALTECH NEWS



Caltech celebrates its 90th birthday.

December 1981



A transparent chalk board makes everything clear—including Lucy France's knowledge of her equations. France is a sophomore majoring in electrical engineering.

CALTECH NEWS

California Institute of Technology
1201 E. California Boulevard
Pasadena, California 91125

Published for Alumni and Friends of the
California Institute of Technology
Volume 15, Number 8, December 1981