

# CALTECH NEWS

## Students take over the Rose Bowl—scoreboard, that is!

*Legends of Caltech* is sold out in its first printing—and already out of date. Caltech students saw to that on January 2 when they seized control of the Rose Bowl scoreboard during the game, printing out pro-Caltech messages and, with 9:26 to go in the 4th quarter, substituting the names of Caltech and MIT for UCLA and Illinois: Caltech 38, MIT 9.

Earlier, the students flashed other messages on the board, including "Go CIT," "DEI," and a matrix picture of an arrow pointing to two beavers—but none of these attracted much attention on the part of sports announcers or persons in the crowd. Later, the pranksters planned to substitute "1984 Beaver Bowl" for "1984 Rose Bowl," but were stymied when the scoreboard was turned off with four minutes left in the game.

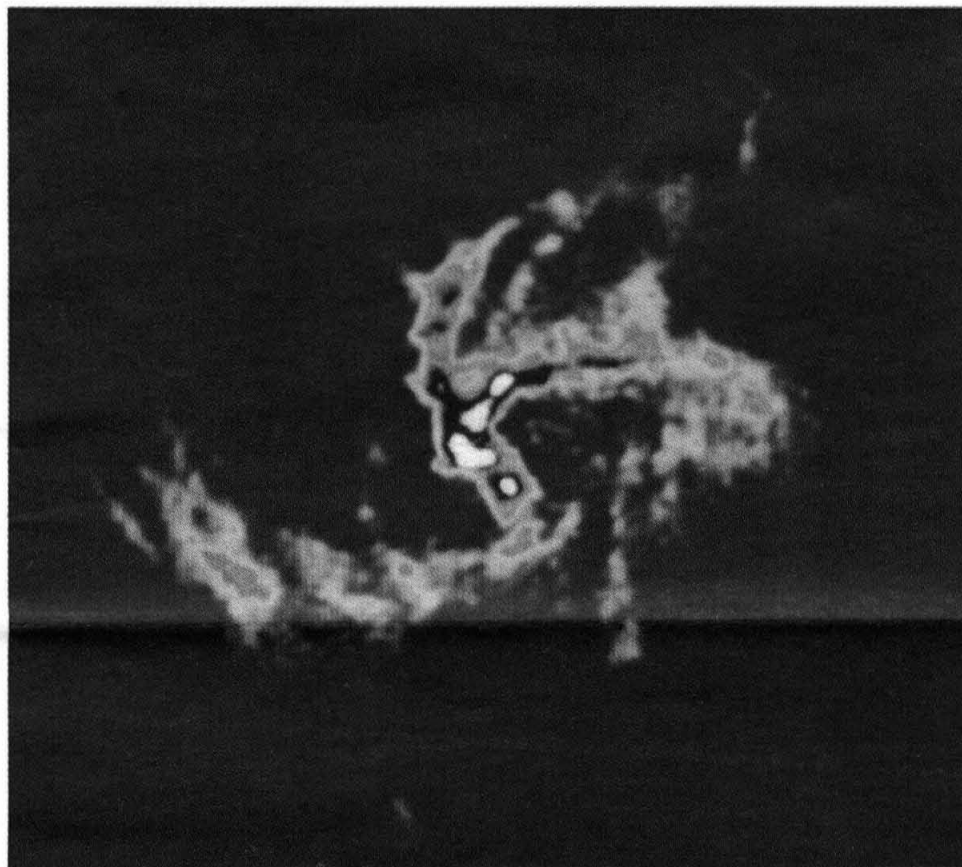
Ted Williams, a senior in applied physics from Lloyd House, and Dan Kegel, a senior in engineering from Blacker House, were leaders of the project. They began work on it 15 months ago with plans to use it in the 1983 Super Bowl, but were not done in time.

The technology consisted of a microprocessor unit planted in the control system of the scoreboard, and linked to another microprocessor by radio. The students operated the scoreboard from a hill overlooking the Rose Bowl, some two miles away.

They would have liked to be inside, but lacked tickets to the game.

Jim Muldoon, media director of the Rose Bowl game, said the students' prank blew the circuitry on the system, plunging it into darkness

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*This computer picture of the galactic center was made from a radio map by K. Y. Lo and Mark J. Claussen of Caltech. The picture shows spiral arms of gas, perhaps representing matter plunging into a black hole.*

## Caltech astronomers obtain highest-resolution photo of galaxy nucleus

By scanning radio waves emanating from the center of our galaxy, two Caltech astronomers have produced the highest resolution picture yet obtained of the galactic nucleus. The picture clearly shows spiral arms of gas, perhaps representing matter in the act of plunging into a gigantic black hole that scientists theorize resides there.

Assistant Professor of Radio Astronomy K. Y. Lo and Research Fellow Mark J. Claussen, who published their results in the December 15 issue of *Nature*, made their map by scanning the galactic center at a wavelength of six centimeters.

They used the Very Large Array (VLA) in New Mexico. The VLA is a facility of the National Radio Astronomy Observatory, which is operated by the Associated Universities, Inc., under contract with NSF.

The resulting map, which covered the central three parsecs (about ten light years) of the galaxy, showed three spiral arms of ionized gas radiating outward from the center. The arms appear to be composed of a series of large clumps of matter, strung out in space. The map reveals the details of the spiral arms for the first time.

"Although the general velocities of gas around the galactic center have been known for several years, this new map allows us to make more sense out of them," said Lo. The most natural interpretation is that we are seeing gas falling into a deep gravitational potential in the center. Many

astronomers have theorized that matter is flowing into a black hole with the mass of millions of suns, and that this flow is the source of power for the energetic events in the center of the galaxy.

"If these theories are correct, then this picture represents the first time that we are actually seeing matter falling into a black hole. Our galactic center presents the best view of such an event that we will have, because the nearest external galactic center is about 70 times farther away than our own."

While their current observations allow them to map the ionized gas in the galactic center, Lo said he and his colleagues will have to make observations at shorter wavelengths to map the structure of the neutral gas that is there.

"This information will help us understand more about the origin of the gas falling into the galactic center," he said. "We plan to study the center as soon as possible with Caltech's new millimeter-wave interferometric array."

The array of telescopes at the Institute's Owens Valley Radio Observatory consists of three high-precision dishes capable of detailed mapping of the millimeter-wave-length emissions from molecules in space. Even better pictures of the galactic center will be obtainable with the Very Long Baseline Array, a national array of ten radio telescopes that has been proposed as a major effort in radio astronomy over the next decade. The VLBA will allow pictures of the center with 100 times better resolution than was previously possible.

Our galaxy, the Milky Way, is a spiral-shaped disk of a hundred trillion stars, some 100,000 light years across and 2,000 light years thick. Our solar system lies about 30,000 light years from the center.

## Students take over the Rose Bowl

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during the final four minutes of the game. But Williams said this couldn't have happened because the microprocessor installed in the bowl was still operating and accepting instructions.

In developing the prank, the perpetrators entered the Rose Bowl several times to splice a microprocessor into the Rose Bowl system and handle other technological details. Lee Sampson, press box supervisor, said Rose Bowl officials do not know how the students obtained a copy of the only computer program that operated the scoreboard.

Kegel submitted elaborate plans for the project for class credit in Electrical Engineering 91, "Experimental Projects in Electronic Circuits," taught by Stanley H. Bacon, lecturer in electrical engineering. He titled the project "Bulletin Board Control," and Bacon was under the illusion that it involved remote control systems for bulletin boards used in stock trading.

He only learned of the project's true purpose a few minutes before the game, when Kegel called him and asked him to be sure to watch it.

In 1982 and 1983, students attempted to bury balloons in the Rose Bowl field that would rise, inflate, and carry away streamers boosting Caltech. They were foiled in both instances by Rose Bowl security forces. Thus, not since January 2, 1961, had Caltech made it to the Rose Bowl. That year, students took control of the Washington Huskies' card show. Los Angeles *Times* columnist Jack Smith recalled that prank in his January 2 column this year, writing, "I suppose it can't ever happen again. Security is so good these days. But don't count on it." The Tech students didn't count on it.

## Pasadena takes students to court

As *Caltech News* went to press, the Pasadena city prosecutor's office had filed charges of trespassing and malicious mischief against Dan Kegel and Ted Williams for their role in the January 2 Rose Bowl prank. The students were scheduled to appear in court on January 31.

## Technology and shoelaces: the Los Angeles Times looks at Bowl fete

*This editorial from the Los Angeles Times on January 4 is reprinted with permission. Copyright 1984.*

Monday's bowl games were by and large showcases for the underdogs, including the underest dogs of all, athletically speaking—Pasadena's Caltech.

By the third quarter of the Rose Bowl game the attention of tens of thousands of fans had begun to wander. Some fans themselves, in fact, began to wander. Illinois rooters, after a brief frenzied but futile third-quarter effort to rally their team, seemed to find their kneecaps or their shoelaces more interesting than the game, to judge from the downward cast of so many heads. Even some UCLA fans were beginning to feel uncomfortably inhospitable, particularly those sandwiched—as we were—among loyal Illini who had traveled so far to watch their favored champions make up for 20 years of failure to head west for the oldest of bowl games.

Enter Caltech—through the air, of course—manipulating the Rose Bowl scoreboard with a microprocessor transmitting signals from a radio installed two miles away. Along a panel at the bottom of the scoreboard customarily reserved for such superfluous messages as T-O-U-C-H-D-O-W-N after each score there appeared the word CALTECH.

Whatever satisfaction the moment gave the Caltech students, it broke the very thick ice that had developed as UCLA's score soared and Illinois's clung stubbornly to 3. Local fans could explain it all to the baffled visitors, who were then able to ignore both the game and their shoelaces.

The scoreboard message got more elaborate as time passed until Rose Bowl officials, unable to fathom events technically and unwilling to gamble on what each succeeding message might be, pulled the plug on the scoreboard.

Thus a sophisticated prank not only performed a social service but also gave cause to hope that technology of the future may not be quite as grim as that of the present.

## Gordon Moore named to Caltech Board of Trustees

Gordon E. Moore (PhD '54), chairman and chief executive officer of Intel Corporation and a pioneer in the semiconductor industry, has been named to the Board of Trustees of Caltech, Chairman of the Board R. Stanton Avery has announced.

Moore is the co-founder of the Intel Corporation and of the Fairchild Semiconductor Corporation, which became the Semiconductor Division of the Fairchild Camera and Instrument Corporation. As director of research and development of Fairchild during the late 1950s and 1960s, he supervised much of the work on which today's semiconductor industry is based.

At Intel, he led in creating many of the semiconductor memories and microprocessors that are now mainstays of the computer industry.

In 1975, Moore was recipient of Caltech's Distinguished Alumni Award, the Institute's highest honor to a graduate. In 1975, he endowed the Gordon and Betty Moore Professorship at Caltech. Carver Mead, an innovator in development of techniques for design of complex integrated circuits, is the Moore Professor of Computer Science.

## Alumni Fund report

Caltech's Alumni Fund is finding it difficult to surpass the pace of last year's record-setting drive. Through December 31, 1983, 3,313 donors had contributed \$754,339 — 452 donors and \$89,343 less than that received by the same time in 1982.

Harry J. Moore, vice-chairman of the Irvine Challenge Campaign, says that the full support of all alumni is needed, not only to close the gap, but to exceed last year's performance.

(This year's goals are to raise \$1,850,000 from 8,250 donors.)

According to Moore, "If you supported Caltech last year, it is essential that you continue, or even increase that support in 1983-84. If you didn't make a contribution last year, I urge you to make a gift this year, and to take advantage of the Irvine Challenge." (The Irvine Foundation will match increases in total Fund contributions for each of three consecutive years, beginning in 1982-83.)

Moore said that a special mail campaign will proceed over the next few months, and that beginning on February 16, more than 400 volunteers will participate in the annual telephone campaign. This campaign will last until the end of April, with calls being made over 32 nights from 15 different locations.

## Lee Weingarten Alumni Association executive director

Lee S. Weingarten has been appointed executive director of the Alumni Association. She succeeds Phyllis Jelinek, who retired from that position after the birth of her daughter, Christine. She will have responsibility for managing alumni activities — including Seminar Day, travel programs, chapter meetings, class reunions, and student recruitment support program — and will direct alumni office operations.

Weingarten has been with the University of Southern California for seven years as director of student programs and was coordinator of student affairs at California State University, Long Beach.

She is a graduate of the University of Oregon and has done advanced study at Cal State Long Beach and at USC.

## Student critically injured in Noyes explosion

Two Caltech graduate students in Noyes Chemical Laboratory were injured about 8:40 p.m. on January 4. When *Caltech News* went to press, Ramsay A. Bittar, a second-year graduate student from Madison, Wisconsin, remained in critical condition and in a coma after severing a carotid artery when glass from an exploding flask pierced his neck. Allan Van Asselt, a third-year student from McPherson, Kansas, was treated for superficial facial cuts and released. The students were working on an organic synthesis reaction when a five-liter flask exploded. The explosion was primarily confined to the fume hood. There was no fire.

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### EDITORIAL STAFF

*Executive editor:* Winifred Veronda  
*Staff associates:* Heidi Aspaturian, Phyllis Brewster, Diane Davis and Neil Saccamano

*Photographer:* Robert Paz

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## James Bonner recalls Nobel laureate Barbara McClintock: Caltech's first woman postdoc

by Winifred Veronda



This photograph of McClintock and colleagues at Ithaca in 1929 is from *Maize for Biological Research*, published in 1982 by the Plant Molecular Biology Association, and was provided by James Bonner.

When Barbara McClintock won the 1983 Nobel Prize in physiology or medicine, most people had forgotten that she was a postdoctoral fellow in Caltech's Division of Biology from 1931 to 1933. Here, as part of a new division put together by the great geneticist Thomas Hunt Morgan, she was the Institute's first woman postdoc.

James F. Bonner, professor of biology, emeritus, recalls those days, and how, as a graduate student, he had a laboratory close to McClintock's on the third floor of the first unit of the Kerckhoff biology laboratory.

"She and I worked at night as well as during the day, and we had long discussions about genetics and life and everything else during the evenings," Bonner said. "For the most part, we talked about corn genetics, drosophila, other geneticists." McClintock also confided during those conversations that she had met only two men worth having as husbands — both of them geneticists — and that since neither was available, she planned to remain single.

McClintock had come to Caltech after a "colonizing party" headed by Morgan reached the Institute in 1928. Morgan, whose work led to the modern chromosome theory of heredity, made Caltech the world center for research in genetics — and it would remain so for a long time. "Morgan believed that how the world worked would be discovered through genetics," said Bonner, "and he was substantially correct."

With Morgan came geneticist Sterling Emerson, son of the Emerson who was an outstanding innovator in corn genetics. The senior Emerson sent to Caltech a number of his graduate students. Among these was McClintock, who had earned her PhD at Cornell in 1929.

Another of these was postdoctoral fellow George Wells Beadle, also a PhD from Cornell University, and in 1958, a Nobel Prize winner. Beadle, later to become chairman of Caltech's biology division and president of the University of Chicago, often joined Bonner and McClintock in their conversations.

"George also had a laboratory on the third floor of the first wing of the Kerckhoff laboratory, although he preferred to spend his time hoeing his corn at Caltech's corn farm in Temple City," Bonner observed.

Bonner, who last saw McClintock about four years ago, remembers her in 1930 as "small and slight, looking much as she looks today. She worked hard, she worked during the day and during the evening, and she tended to be quiet. She had a wry, dry sense of humor. She smiled rather than laughed."

Bonner doesn't recall her involvement with hobbies during those years (other stories have noted her interest in jazz and figure skating and her frequent travels, particularly to Latin America). But as a postdoc at Caltech, she was too busy in the lab for many diversions.

Bonner also remembers her as "frustrated" rather than "mellow," as she was described this fall by a colleague. "We were all frustrated," says Bonner. "Research is 90 percent frustration. The other 10 percent pays for it. Her mellow characteristics may have evolved when she was older."

Well liked by her colleagues, McClintock was part of a friendly, sociable group within the division. The Morgans entertained frequently, and geneticist E. G. Anderson often was host at picnics and parties for his associates, and for trips to the beach, mountains, and desert. "Barbara was very much a part of all this."

McClintock left Caltech in 1933 to accept a postdoctoral fellowship at the University of Freiburg in Germany. She would return twice to the Institute — as a visiting professor in 1946 and 1954.

After her studies in Germany, she conducted research at Cornell for a

year and then, from 1936 to 1941, was assistant professor at the University of Missouri. After that she returned to the Carnegie Institution's Cold Spring Harbor and remained there.

She made some significant discoveries early in her career, when she began to try to explain why some kernels in an ear of corn have a different color than others. By the late 1940s, she had made what proved to be one of the greatest discoveries in modern genetics. She discovered that control elements of the color genes were moving from place to place.

She published her findings and her explanations in the early 1950s. The reaction was disbelief — sometimes quiet, sometimes scornful. But she kept on with her research with corn, during a time when the mainstream in her field was flowing in another direction.

Bonner feels that one of her problems was that, although she could communicate beautifully on a one-to-one basis, McClintock was not gifted at explaining her ideas through writing or teaching. "She taught at the University of Missouri and gave it up after five years," says Bonner. "She didn't find it an interesting thing to do." But she spent a tremendous amount of time with individuals who could benefit from her work. "She prefers a more Socratic method of education, primarily one-on-one," said another colleague.

Meanwhile, as McClintock quietly continued her research, in the 1960s other biologists began to find "jumping genes," or transposable elements, as they are now called, in a number of other organisms. Biologists began to listen to her more carefully, and to appreciate what she had been saying all along. Then they began giving her awards.

"About three or four years ago, as people were finding transposable elements in people, yeast, corn, many things, I began to see references to Barbara's work," said Bonner. "Then I made a bet with myself that she would get the prize."

This fall, he won the bet.



## Simplicity, elegance, fiendish ingeniousness: trademark of Caltech pranks

From the time the first Model T was taken apart and reassembled in running order in the room of an absent classmate, to 1975 when Caltech students, with the help of a computer, set the fast food world on its ear by winning 20 percent of the prizes in a \$1.1 million McDonald's sweepstake contest — five decades of pranks by Techers are chronicled and preserved for posterity in the Alumni Association's new publication, *Legends of Caltech*.

The authors: the prank perpetrators themselves, in most cases, or colleagues close to the actual culprits. The editors: Willard A. Dodge, Jr. (BS '44, MS '47), Reuben B. Moulton (BS '57), Harrison W. Sigworth (BS '44), and Adrian C. (Chip) Smith, Jr. (BS '70).

*Legends* had its genesis as alumni in the San Francisco area reminisced at a luncheon meeting about their student days. Reminiscences turned to pranks, and several alumni decided that the pranks should be recorded before they were lost to memory. With the support of the Alumni Association, they publicized their intention in *Caltech News*, promising free copies to contributors.

The response — including accounts of well-known classics and of little-known gems — surprised the editors, in terms of both quantity and quality. They organized the book's contents into three sections, according to the methodology most frequently employed: 1920-1945 — vacuum tubes, mechanical devices, manpower, and nerve; 1946-1969 — transistors; 1970-1981 — printed circuits and powerful computers.

Within the groupings, the editors say they found a common theme. They say that the pranks were unique and fiendishly ingenious, sometime with an unusual twist or kicker; they never injured persons or damaged property (permanently); and they taught someone a tongue-in-cheek lesson or accomplished an



Not everyone was pleased when Page House students took on McDonald's restaurants by crashing the fast-food chain's sweepstakes in 1975 with multiple computer-generated entries. This McDonald's manager was among the unhappy ones.

outstanding, if not always useful, "first."

Says Moulton, "The technology got more sophisticated as the years went by, but the same mentality and sense of humor prevailed. The pranks were simple and elegant, and they often incorporated an ingredient that only the perpetrators could appreciate."

A case in point is the undisputed classic of Caltech pranks: the 1961 Rose Bowl hoax. Caltech students had burglarized the room containing the University of Washington's card stunts, and at halftime the cards for the 12th stunt flashed a Caltech Beaver rather than a Washington Husky. The next trick spelled "Washington" backwards, and the next capped the show by spelling "Caltech" for national television.

Students had also made a few minor changes in the first 11 stunts, Moulton notes, and those were for the Techers alone to savor. For example, one card stunt incorporated a picture of an Erlenmeyer flask with sharp corners. The Caltech students rounded the corners to make them even more realistic. "In effect," says Moulton, "Tech enhanced Washington's stunts at no extra charge."

Also gratifying to the Tech students was the knowledge that stunt number 15, which would have concluded the show with a picture of an American

flag, was unaltered, had Washington chosen to go on with it. But the card section fell into confusion after flashing "Caltech," and the band and cheerleaders marched off the field.

Another of Moulton's favorite stunts never received media attention, but he likes it for its low-key simplicity and elegance. A woman friend of a Caltech student worked on campus as a secretary and complained about the long wait for the light to change at a busy California Boulevard intersection. The light clearly favored traffic on California, which borders the Institute, at the expense of those wanting to cross it. Students sympathetic to the secretary's plight devised a solution.

At 2 a.m. one morning, they used a screwdriver to reverse the plastic covers on the light so that the green lens was on the top and the red lens on the bottom. The next day, traffic on California Boulevard was backed up for miles in both directions, until the Pasadena police came to change the signal to flashing yellow.

But the best part came when Pasadena city electricians arrived to fix the light. As students looked on with delight, the electricians disassembled the light mechanisms, laid them on the lawn, and scratched their heads. They didn't notice for several hours that the problem could be solved by putting the red lens back on top and the green lens on the bottom.

One of Chip Smith's favorite pranks is a simple and little-known one — attractive to Smith because of the visual image it evokes. The prank was directed at the late Professor of Geology Richard Jahns, who had acquired quite a reputation as a practical joker. Determined to get back at him, students jacked up the

rear wheel of his jeep and wound a rope around the wheel, attaching a box to the rope. When the professor started his engine, the box moved toward him, seeming to travel of its own volition, until it hit the front of his jeep.

Smith himself pulled off a prank when he and some of his friends managed to remove the cement parking lot marker, complete with stenciled name, of a campus employee who irritated them. They reprinted a group of seven spaces in the lot, widened each space to reduce the total to six spaces, and reinstalled the concrete markers without including that of the offending employee.

A noteworthy aspect of the pranks, even those that involved moving an F-84 aircraft, a cannon, or the cornerstone of a neighboring college, has been the care taken to ensure that no permanent damage was done.

Kenneth Veronda, the headmaster at Southwestern Academy in nearby San Marino, recalls watching on Halloween night in 1972 as some 90 Caltech students, in a caper pre-arranged with a nucleus of Fleming House leaders, attached ropes to a 1.7-ton cannon and dragged it from the Southwestern lawn two and a half miles up a hill to the Caltech campus. Several of the undergraduates carefully swept the street after the cannon's wooden wheels rolled past.

Some observers bewail a lull in pranks among the present generation of students. Even President Marvin L. Goldberger reminded those assembled for 1983 commencement that Caltech could not rest forever on the laurels of 1961. It may be that students are channeling more of their energies into Ditch Day, that yearly ritual that has been termed the "superbowl of tomfoolery."

But most Caltech prank watchers are convinced that, over the long run, the tendency for students to concoct elegant, intricate pranks at any time of the year will remain constant because the pranks meet an important need.

Harrison Sigworth, who graduated from Caltech in 1944, followed his son's progress toward a Caltech degree in 1974, and observed the same blend of humor at work as when he was an undergraduate.

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## Quest for a self-sufficient life on the land leads this alumnus to northern Arizona Indian country

by Winifred Veronda

About ten miles from the 2 Bar 3 Saloon, Hay, and Feed Store, and 25 miles northeast of Flagstaff, just south of Saddle Crater in a three-story house that's half underground, looking across the red, sage-covered lands of northeastern Arizona toward the San Francisco Peaks, Douglas Calley (BS '51) is proving that there is life without telephones — but not without computers.

The Calleys and their three sleek cats moved in 1974 to the rain-scarce volcanic-cinder-covered site, living there on weekends and during the summers. A teacher by profession, Calley taught mathematics for 20 years at the Verde Valley School, a private boarding school near Sedona, and then was an electrical engineering instructor at Northern Arizona University. He now teaches high school mathematics and electronics at Tuba City on the Navajo Reservation.

The son of a Carmel potter, Calley grew up amid Monterey pines on a slope just beyond the Pacific Ocean, and from his father acquired a deep appreciation for life on the land. His high school French teacher interested him in Caltech, where he majored in physics and lived for one of his four years in Dabney House "to see what it would be like."

After he graduated, his work took him to a private school in the Santa Barbara area and then on to Arizona and opportunities there for environmental self-sufficiency. The Calleys, whose family now included three sons, lived during the week in faculty housing at the Verde Valley School, but on weekends Calley built an A-frame on lands he purchased north of Flagstaff on the slopes of the peaks. "I had grown up," he says, "believing that a home is a place you own."

The evolution of that home was interrupted when the family went to Europe, where Calley taught for two years at an international school in Germany. Back in Arizona they sold the A-frame, opting for a 40-acre site that had once been part of Santa Fe Railroad holdings. Except for Indians who must have passed through in generations past, the land evaded human touch. "I disturbed the first cinder," says Calley with pride.

The Calleys' nearest neighbor (except for the coyotes, antelopes, and deer) is a German writer who lives in a hogan, after the Navajo fashion, and writes for a European audience about Indian life in the American southwest. The German recently termed the environment inside the Calleys' home, filled with electronics projects in various stages of completion, as "harmonious chaos." Three miles east of the property, the Navajo Reservation begins its 10,000-square-mile sweep through northern Arizona, Utah, and New Mexico.

Rainfall is at a premium in northeastern Arizona (12 inches fall a year), and all of it is carefully preserved to provide the entire water supply for the household. Every drop is stored, as it runs from the roof, in a six-foot-deep, concrete-lined cistern beneath the house. "So far, we've had all the water we need for personal use and for our greenhouse," says Calley, "but we don't waste any."

Calley, who constructed the home with his sons (Mrs. Calley began to

suffer from multiple sclerosis in 1959), used dry-stacked block. For extra coolness during the summer, he built it half underground. A wood-burning stove gives extra warmth during the winter.

Across the southern exposure, the Calleys erected a greenhouse with three windows in the ground floor and two at basement level. "Even with snow on the ground, the heat pours in all day," Calley says. Visitors to the home, when temperatures outside reached a high of 35, and 40-mile winds whipped around the structure, found temperatures inside the greenhouse a pleasant 70 degrees. Tomatoes, strawberries, potatoes, collards, turnips — all grow there, oblivious to the outside cold, and some found their way into the lunch that Calley served.

At one point, Calley thought it might be nice to have a telephone on the premises, and he contacted Mountain Bell for information. No, there would be no extra charge for the hookup, he was told, and the technicians would be out the next week. But on the morning of the anticipated installation, he received a call. There had been a mistake, and bringing a phone and lines into the home would cost \$28,000. Calley decided to do without the convenience.

But do without a computer? That is another matter. To provide power, Calley developed three wind-operating units (two homemade and one a commercial model), which store

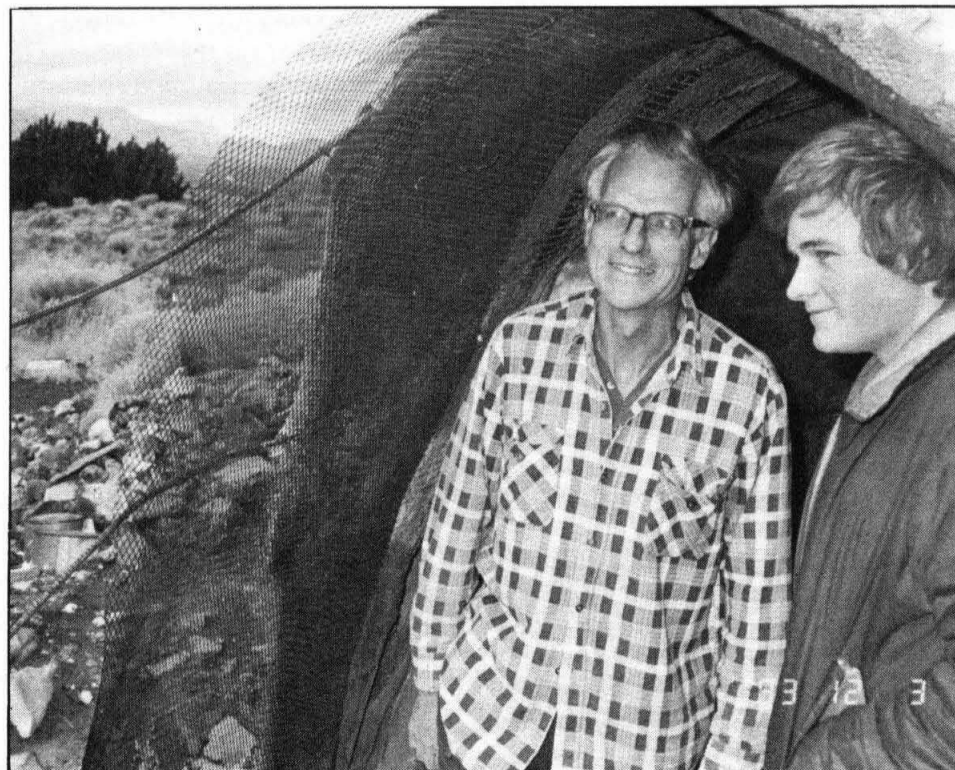
power in wet-cell batteries until needed. These provide a good power source for the computer, a small television, a pump at the kitchen sink, and lighting. A photovoltaic unit gives 12-, 20- and 110-volt power for shop, tool, and other equipment in basement workrooms and three outbuildings. A compost toilet takes care of basic plumbing needs.

The three Calley sons, who worked with their father on the land as they were growing up, have moved on to independent lives. John, a graduate of Beloit College, works in the computer science industry in Wisconsin; Jens is a cook and kitchen manager in a Flagstaff restaurant and plans to open his own spot; and David, at home summers, vacations, and frequently on weekends, is a student at Northern Arizona University, where he majors in physics and art.

As a sculptor, one of David Calley's goals is to express the principles of physics in his artistic creations. He has put his talent to work on the Calley land, sculpturing a small house, abstract in shape, out of concrete and mesh.

Calley is pleased to take visitors on a tour of his self-sufficient home site, and his directions are easy to follow. "Come out Leupp Road from Flagstaff to milepost 439, take the first (dirt) road east, stay on the south side of Saddle Crater, and you'll find us," he says.

If you're lucky, the invitation may include a chunk of hearty Calley bread, made from his own recipe and full of raw peanuts and raisins, and a mug of tea — all to be enjoyed to the accompaniment of high-desert winds whipping around corners, the snap of burning wood, and through the crisp air, 35 miles to the west, a spectacular view of the San Francisco Peaks, their snow sparkling in the winter sunshine. The visit is well worth the drive.



Douglas Calley with his son, David, at the entrance to a small structure created by David on the Calley land out of concrete and mesh.



Employees willing to work all day and night and through the next day to meet a deadline . . . factory workers hired for life . . . company uniforms for everyone, including the bosses . . . work days that begin with calisthenics . . . weekly quality control meetings involving product designers, assemblers, sales personnel . . .

Two Caltech students who spent a summer working in a Japanese factory discovered these and other contrasts to the routines of U.S. workers, and they were impressed with what they found about the effectiveness of Japanese management techniques.

This was part of what Kaname Kitsuda (MS '33, MS '35), president of Kitsuda Engineering Co., had in mind when he contacted the Caltech Alumni Association last winter. Kitsuda offered two students the opportunity to spend the summer as employees at his company, Kitsuda Engineering Company, in Hiratsuka, about 60 miles from Tokyo. He would pay their airfare and lodging, as well as a salary.

Donald Fossgreen, a senior majoring in electrical engineering and computer science, and Manuel Acevedo-Ruiz, a junior majoring in engineering, were selected from 16 applicants to an ad in the *California Tech*.

Speaking no Japanese, they left to spend three months working in an environment where almost no one spoke English.

Fortunately, the lack of a mutual language didn't prove to be a problem. "We learned there are five or six ways to communicate that don't involve speech," Fossgreen said.

At the factory in Hiratsuka, which manufactures specialty steel parts, Fossgreen and Acevedo-Ruiz traded off on assignments.

Fossgreen spent the first several weeks working with a robot that welded the ends of axles for Datsuns, assembling parts and putting them into a jig, afterward inspecting them and reprogramming the robot.

Meanwhile, Acevedo-Ruiz worked in the tool shop, making new die sets for transfer presses and machining

new parts. Then the two switched roles. Both favored the latter assignment.

"Every day, when we weren't working with the robot, we did something new and different," said Acevedo-Ruiz. "We machined new parts, and we worked with actual blueprints. We got a chance to design things, build them, and see them work. Neither of us had had this experience before, and it was really satisfying."

In Hiratsuka, Fossgreen and Acevedo-Ruiz lived in an apartment building with other company employees. Their rooms were in quarters for unmarried males, with kitchen and shower facilities four flights down. "We always put our shoes on and took them off when we went downstairs, or in and out of our rooms," said Fossgreen. "Sometimes we put them on and took them off 20 times a day."

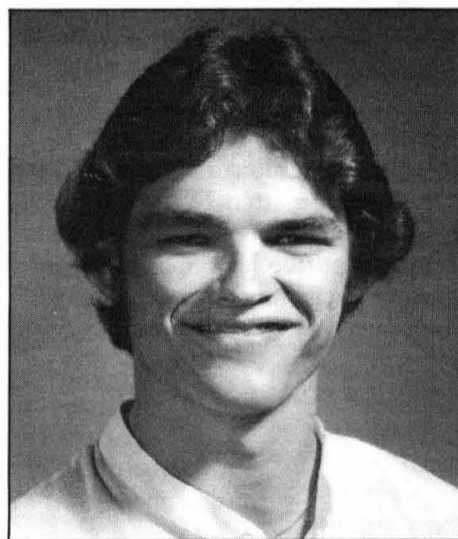
Each Friday, Fossgreen and Acevedo-Ruiz were part of a quality control circle to evaluate a part made at the factory and determine how it could be made better or stronger. Everyone involved in its creation or use spent an hour in this process,



Manny Acevedo-Ruiz

## A Japanese alumnus does his bit for the U.S. balance of trade

by Winifred Veronda



Don Fossgreen

In the factory the students observed the dedication of the workers to the company and their willingness to work overtime when a normal work week involved eight-hour days, five or six days a week. "Overtime in Japan is more or less expected," Fossgreen said.

"Sometimes the employees would work all night and through the next day without a break, or they would work on Sundays. They didn't like it very much, but they were willing to do it. In a way, they were proud they had been asked. They're hired by a company for life, and this makes a difference."

conducted entirely in Japanese. (Through hand waving, body language, drawing pictures and diagrams and speaking a few words in Japanese, Fossgreen and Acevedo-Ruiz made their impact in the sessions.)

Both were rewarded through a company system that pays bonuses to workers who contribute ideas for making parts more effectively, simply, or economically. Fossgreen contributed ten ideas that were accepted by the management, and Acevedo-Ruiz, seven.

Work days beginning with calisthenics and company uniforms — identical except for minor distinguishing features that marked supervisors — were other workplace novelties for Fossgreen and Acevedo-Ruiz to observe.

In their spare time — limited, after a six-day week — Fossgreen and Acevedo-Ruiz spent three hours a week teaching English to workers in the factory and exploring the area.

They were impressed by a fine public transportation system (clean subways, bullet trains traveling at 200 kilometers an hour), little gardens blended with buildings ("They take a rock, some moss, a little bush, and a pond, and they create a place of beauty. Here we would just fill up the spot with cement."), no guns (even the police don't carry any) and no concern about being mugged, low unemployment but much makework — people cleaning escalator rails and pushing elevator buttons — and crowded Tokyo streets. ("We were taller than most of the people. We'd walk down a street with a rug of black hair all around us.")

Best of all, they found friendly people. "They treated us as special," said Fossgreen. "They were always willing to go out of their way to help us. If we asked for directions, four of them would walk us there. We'd find ourselves walking along with our own little entourage."

Both came away impressed — with the people, the culture, and the business management methods. "I plan to work for a company for a few years and then start my own," Fossgreen said, "and I want to run a company like Mr. Kitsuda's. I'll draw on my experience at his factory to make the employees feel they're a part of the company."

"The people really like working there. They work hard. They like— their bosses. They're treated with respect, up and down the line."

Said Acevedo-Ruiz, "The supervisors are always polite. If they criticize someone, they do it very tactfully."

Before Fossgreen starts his own company, he has another goal: to spend a year in France, studying ballet or mime. A serious ballet student, he practices 15 hours a week. On campus he has been active in drama programs and has taken leading roles in two student musicals. Acevedo-Ruiz, whose family came to the United States from Spain six years ago, plans to earn an MS degree, spend a year in France working and becoming proficient in French, and then return to Spain.

Meanwhile, other Caltech students will be traveling to Japan to spend a summer working in Mr. Kitsuda's factory; the alumnus is extending his internship to two students each year. In this way, elements of Japanese business management may find their way up and into U.S. businesses as young Caltech alumni become entrepreneurs — and in this way, Mr. Kitsuda may make a notable contribution to the U.S. balance of trade.



## Hawaii trip offers alumni a bonus: a 6.7 quake

When Robert Sharp (The Sharp Professor of Geology, emeritus) takes a group of alumni on a field trip, he characteristically gives them a little something extra. Thus no one should have been surprised when the expedition to volcano country on the island of Hawaii, November 13-18, featured a 6.7 earthquake.

The Caltech group (38 people, including alumni and their guests) had arrived the evening before the quake at Volcano House on the rim of the Kilauea Crater, after spending the previous night at the Hilo Hawaiian. Many were still in bed at 6:14 a.m.

One who was not was Curt Schulze (BS '56, MS '57), who had gone out at 5:30 a.m. to hike along the trail bordering the crater. Two miles from Volcano House, Schulze was about ten feet from the railing of a crater overlook when he thought he had been hit by a gust of wind. "I decided I must be nervous," he said. "I grabbed a tree and the tree was nervous too. I ran into a parking area, away from the overlook. I could hear boulders falling. I looked toward the crater and saw four rock avalanches heading for it. I could hear lots of rocks crashing down to my left. I ran about 300 yards to see the source of the noise but decided not to go any further. The center portion of the railing, and part of the overlook platform looking toward Kilauea Iki, had collapsed."

Schulze, who had left Volcano House without awakening Mrs. Schulze, decided that he should get back as quickly as possible to let her know he was safe. "The entire trail seemed to have a crack down the middle," he said.

The trail lay five feet from the edge of the crater, where there was a 200-foot drop. Beside the trail, he saw separations up to a foot wide and eight to ten feet deep.

Schulze says he wasn't afraid when the quake hit, although he "quickly became hyperactive."

"If a crack — even a little one — had begun to open up beside me, it would have been a different matter," he said. "Fortunately, at the time of the quake, I was probably in the most secure place of any on my walk."

Back at the hotel, David Rathje (BS '51) was shaving when he felt the quake. Thinking it "a little earthquake," he grabbed the edge of the basin to steady himself. But by now

the basin was shaking so vigorously that he feared it might collapse.

The group quickly gathered in the hotel lobby, eager to go investigate the damage. The hotel staff served everyone the same breakfast so they could get outside more quickly to begin an exploration. Permission had been obtained from rangers for the group to walk along the trails and to go into some areas now closed to the general public.

The quake changed the group's itinerary, eliminating walks inside the calderas of Kilauea and Kilauea Iki, and an exploration of Mauna Ulu, a new lava shield. They substituted other activities, among them an assessment of earthquake damage to roads and buildings, and a drive to the Kona side of the island on the final day.

"Considering the strength of the quake," said Rathje, "we were surprised at how little damage was done to roads and buildings and how few and relatively minor the injuries were."

Overall, members expressed satisfaction with their unique experience. Commented Rathje, "It was nice to have the trip include something unplanned."

Said Schulze, "We asked the rangers to put on a show for us. We couldn't complain if what they gave us surpassed our expectations."

## Ingeniousness, elegance: trademark of pranks

*Continued from page 4*

"Caltech encourages and promotes ingenuity and innovation, and the small size of its student body contributes to cross-fertilization of ideas," says Sigworth. "Meanwhile, the academic pressures are tremendous. The encouragement of original thinking, combined with the grind, gives students the need to release their energies in an innovative way. As long as there are free spirits among undergraduates at Caltech, you'll get this kind of outlet."

## Legends of Caltech

*Legends of Caltech, a collection of the best of Caltech pranks contributed by alumni and published by the Alumni Association, is available for purchase. Order now.*

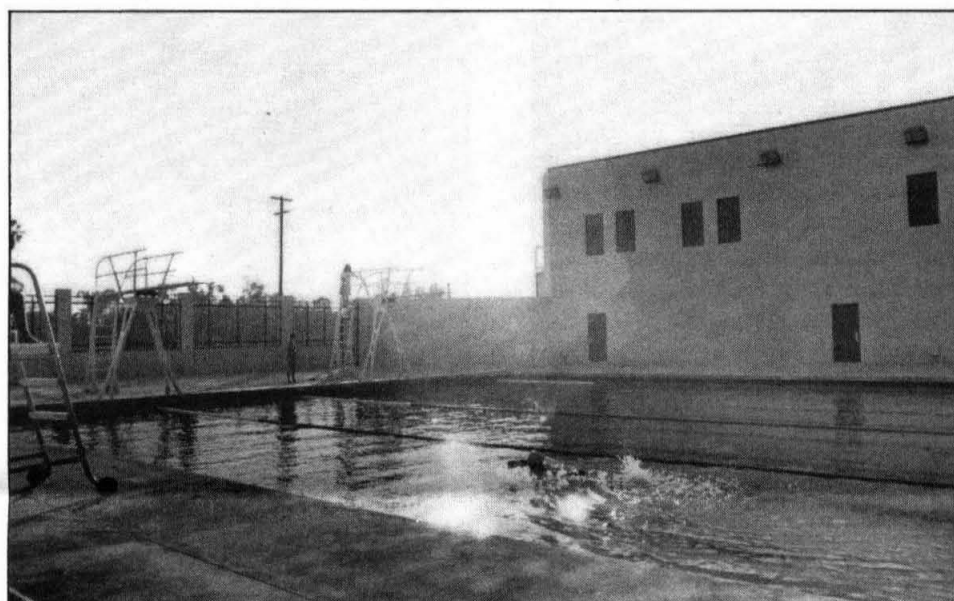
Please send me \_\_\_\_\_ copies of Legends of Caltech at \$9.00 each.

Name \_\_\_\_\_

Address \_\_\_\_\_

Mail your check or money order, made payable to the Caltech Alumni Association, to:  
Caltech Alumni Association  
Mail Code 1-97  
California Institute of Technology  
Pasadena, CA 91125

## Students take plunge as new pool opens



A regulation water polo pool with a required safe depth for three-meter diving is one of the athletic facilities constructed with a \$700,000 grant from the Carl F Braun Trust and the Braun Foundation. Additional facilities include a women's locker room and weight training room in a new building immediately west of the pool. The pool, adjacent to and west of the Alumni Swimming Pool, is helping to relieve crowded conditions for campus swimmers.

## Red Door Cafe: on-campus oasis



A quiet, comfortable spot on campus for graduate students to relax and meet one another — this was the initial concept behind the Red Door Cafe, which opened recently in Winnett Center. Now patronized by undergraduates as well as by graduate students — and on occasion by faculty and staff — the cafe is open three weekday evenings and three weekday afternoons, serving coffee, tea, and light snacks. It is funded by the Alumni Association, the Caltech administration, and the Graduate Student Council, and has been attracting up to 50 people each time it opens its doors.



## [The Way It Was]

1937

Caltech receives an anonymous gift of \$750,000 to endow the Division of the Humanities, according to the *Pasadena Post* on March 22. The gift is the largest single grant Caltech has received during the past six years. No conditions accompany it, except that it be used to strengthen work at the Institute in literature, history, economics, foreign language, philosophy, and other humanities courses. Plans are under way, according to the *Post*, to bring to Pasadena as visiting professors some of the outstanding humanistic scholars of the East, giving students the opportunity for interaction with these distinguished men.

Four geologists and three expert riverboatmen are making their way through the Grand Canyon in row boats and will stop off at various points to study the world's oldest rocks, reports the *Star-News* on October 19. Heading the expedition are Drs. Ian Campbell and John H. Maxon of the Caltech geological staff. Among those accompanying the group is Robert Sharp, Caltech geologist, now of Harvard University.

1947

Hazing of freshmen results in injuries to two Caltech students when they accidentally fall and roll 300 feet down a steep mountainside on the Angeles Crest Highway, reports the *Star News* on April 27. The students were injured after their intended "victim" tried to save one of the upperclassmen who was sliding down the slope. The hazing cycle started when upperclassmen poured buckets of water on freshmen from an upstairs window, and frosh retaliated by taking an upperclassman to a spot miles from Pasadena and letting him out there. Upperclassmen then took a freshman up the Angeles Crest Highway and were preparing to tie him to a tree when they slid over a bank. The administration states that such hazing will be eliminated.

Housing for married students with children is again a major problem at Caltech as the opening of school approaches, the *Independent* reports on September 14. Most of the students faced with the problem are veterans. Enrollment is expected to equal that of last year, when the average was more than 1,350 students each term.



William Fowler (left) and John D. Roberts (right) are honored in 1956 through election to the National Academy of Sciences, bringing the number of NAS members on the Caltech faculty to 28.

"We quit playing when our luck began to change and we failed to win a bet in more than 100 consecutive rolls," says Roy Walforo, a graduate of the University of Chicago who, with Albert Hibbs, a graduate of CIT and Chicago, played a Reno roulette system for several days. According to Hibbs, their wins amounted to between \$7,500 and \$8,000, says the *Los Angeles Times* on November 21.

Within the next 15 years, bathtubs may become obsolete as they are replaced by shower stalls, predicts industrial designer Henry Dreyfuss in the December 12 *Star News*. To an overflow crowd at Caltech, Dreyfuss discusses future trends in the industrial design profession. Seats will be installed in showers to make them more comfortable.

1956

William A. Fowler, professor of physics, and John D. Roberts, professor of organic chemistry, have been elected to the National Academy of Sciences, bringing Caltech staff membership in the Academy to 28, according to *Engineering & Science* magazine in May.

Caltech is one of five major educational institutions chosen to form a new agency, the Institute for Defense Analyses, to conduct scientific research on military problems, accord-

ing to *E&S* in June. The others: Case Institute of Technology, MIT, Stanford, and Tulane.

The Norman W. Church Laboratory of Chemical Biology, a major addition to Caltech research facilities, will be officially dedicated on November 15, according to November *E&S*. The new lab accommodates the



Institute's rapidly expanding research in areas where chemistry and biology overlap in relation to medicine.

Student tuition will be raised from \$750 to \$900 a year beginning in September 1957, according to *E&S*.

The Caltech community goes 52 percent for Eisenhower, 43 percent for Stevenson, and 5 percent undecided in a pre-election poll conducted in cooperation with the Caltech Y by Dr. James Davies's course in political parties and pressure groups. Undergraduates favor Eisenhower 63 percent, to 32 percent for Stevenson, while faculty vote 22 percent for Eisenhower and 76 percent for Stevenson.

Caltech undergraduates donate \$1,000 to help Hungarian students who have fled Austria to escape reprisal for their part in the Hungarian revolt against Russian domination, reports *E&S* in November.

## Fred W. Morris: thousandth person to join Associates

"We need a million dollars," said Robert A. Millikan to industrialist Henry M. Robinson in 1924 as the two looked out across the remains of another leveled orange grove, and contemplated the fast-growing nature of Caltech's southern California environment — and of Caltech's need to grow along with it. "Do you think we could find a hundred men in southern California willing to put in \$1,000 a year for ten years to push this enterprise along?"

"Yes, I think we can," Robinson responded, "and we haven't any time to lose."

Millikan and Robinson found those hundred people, who became the initial members of The Associates of the California Institute of Technology, and over the years, the organization grew in a way that would have surprised its founders. In November, the organization reached a special milestone: Fred W. Morris, Jr., joined as a member of the President's Circle, bringing the number of members to 1,000.

Morris, who graduated from Caltech in 1944 with a BS degree in electrical engineering, is the founder and chief executive of his own telecommunications firm, Tele-Sciences Associates in Portola Valley. The firm provides management consulting services in electronics and computer sciences with emphasis in telecommunications. His Bay Area residence is symptomatic of yet another change from the days of Robinson and Millikan: As Caltech's reputation spread, so did the geographic make-up of the membership. Members now come not only from southern California, as the founders initially envisioned, but from Wyoming, Minnesota, Washington state, Illinois, North Carolina, Washington, D. C., New York, Switzerland, West Germany, and numerous other locations.



## Football team posts 7-1 record: best in Tech history

Could the *People's Almanac* be wrong?

What David Wallechinsky and Irving Wallace have described as college football's "all time" worst team seems to have come full circle: The 1983 edition of Caltech's "Battling Beavers" set several records while posting a 7-1 total. That's 7 wins, topping the won-lost record of Coach "Fox" Stanton's 6-2-1 "wonder team" of 1931, and that of the Tech-ers of 1944, who were 4-0, with a significant number of Navy men who were here for the V-12 program on the team. Thus the record stands as the best in Caltech's 91-year football history.

The National Collegiate Football Club Association ranked the Beavers fifth in its final list, one notch above playoff-bound MIT. Meanwhile, Coach Lin Parker witnessed his 18th victory at Tech — only one victory behind the number for Bert LaBrucherie. (Stanton's 11 seasons, from 1921 to 1931, yielded 54 wins.) Caltech's 91-year total now shows 121 wins, 340 losses, and 17 ties.

Highlighting the schedule were a come-from-behind win over La Verne, 20-14, the University of Baja California, 15-7, and Edwards Air Force Base, 45-12. The Edwards score was the seventh highest ever posted by a Tech football team. Sharing the limelight was the Beaver defense, which ranked third in the NCFCA, and held opponents to 6.3 points per game. Nationally, Caltech led the way with 25 team interceptions.

Andre Johnson was nominated for All-American honors, with 14 interceptions, as was George Kailiwai, with 10 picks. On the offensive side, Jonathan Brown led the NCFCA's national charges in three categories: scoring 12 touchdowns and 72 points, achieving a 122.4-yard-per-game rushing average, and setting a Caltech record of 238 yards, running against Edwards Air Force Base.

Of the 46 men and one woman who began the season, 38 celebrated the record-breaking year with a

dinner at the Alumni House. Winning football awards were four-year letterman Steve Martin and three-year footballers Phil Scott, Daren Casey, and Keith Holt. The captains' awards went to Scott, Casey, and Rick Roberts. Larry Sverdrup was singled out as "most improved" and newcomer George Kailiwai was named "Rookie of the Year." Jonathan Brown was the "Outstanding Offensive Player." The Irv Noren Trophy for "Outstanding Back" was voted to Andre Johnson, while the Max West Trophy for "Outstanding Lineplay" went to freshman Mike Burl. The coveted Wheaton Trophy for "Leadership and All-Around Excellence" was awarded to Phil Scott.

### Cross country team in transition

The 1983 cross country team was a team in transition. The loss of All-Conference and All-District seniors Vince Cammarata and Karl Clausing placed the burden on two returning lettermen and a large group of talented freshmen. Seniors Steve Stahl and Bob Kelly led the team, placing

high in most meets. But freshmen John Beck, Darin Acosta, and Mike Jensen were called on for depth. In spite of the youthful team makeup, the Engineers won five dual meets while losing eight, and placed fifth in the SCIAC and sixth in the NAIA District Three championship meet.

Next year, the team will again lose its number one and number two runners as Stahl and Kelly graduate. But 1984 should be very successful, because the team will have a strong contingent of experienced sophomores to rely on.

At the annual cross country awards dinner, Kelly won the "Most Improved Runner" award and Steve Stahl was voted to receive the "Paul Barthel Outstanding Runner" award.

### Women's cross country lacks runners

The women's team suffered the same basic problem that it has faced over the last three years. Many meets were forfeited because Tech could not produce the required five runners. Caltech *had* five runners, but injuries kept them all from being healthy at the same time. The team did win one

dual meet — the one time that five runners were available — and placed sixth in the NAIA District Three championship meet.

As in 1982, Jennifer Haase led team efforts, placing 12th in the SCIAC and ninth in the district. All team members will be back in 1984; thus, a big improvement in the team's fortunes is hoped for.

### Soccer team finishes fifth

The soccer team closed its season with a record of 6 wins and 11 losses, finishing fifth in the league with victories over Occidental, Whittier, and Redlands. Claremont finished first, with an 11-1 record.

Throughout the season, the team was hampered by injury. Ed Felton, sweeper, and Stefan Feuerabendt, center forward, were out for the entire season. Scott Karlin, John Krehbiel, and Manny Acevedo missed several critical games.

Most memorable individual effort came from Tom Remmers, who scored all of Caltech's goals in a close 4-3 win over Whittier. Other outstanding performances were turned in by Terry Barr, Bob Mostert, John Krehbiel, Steve Havstad, and Manny Acevedo.

Acevedo was elected captain for next year, and most valuable player this year. He was selected to the all-conference team by a unanimous vote of the conference coaches.

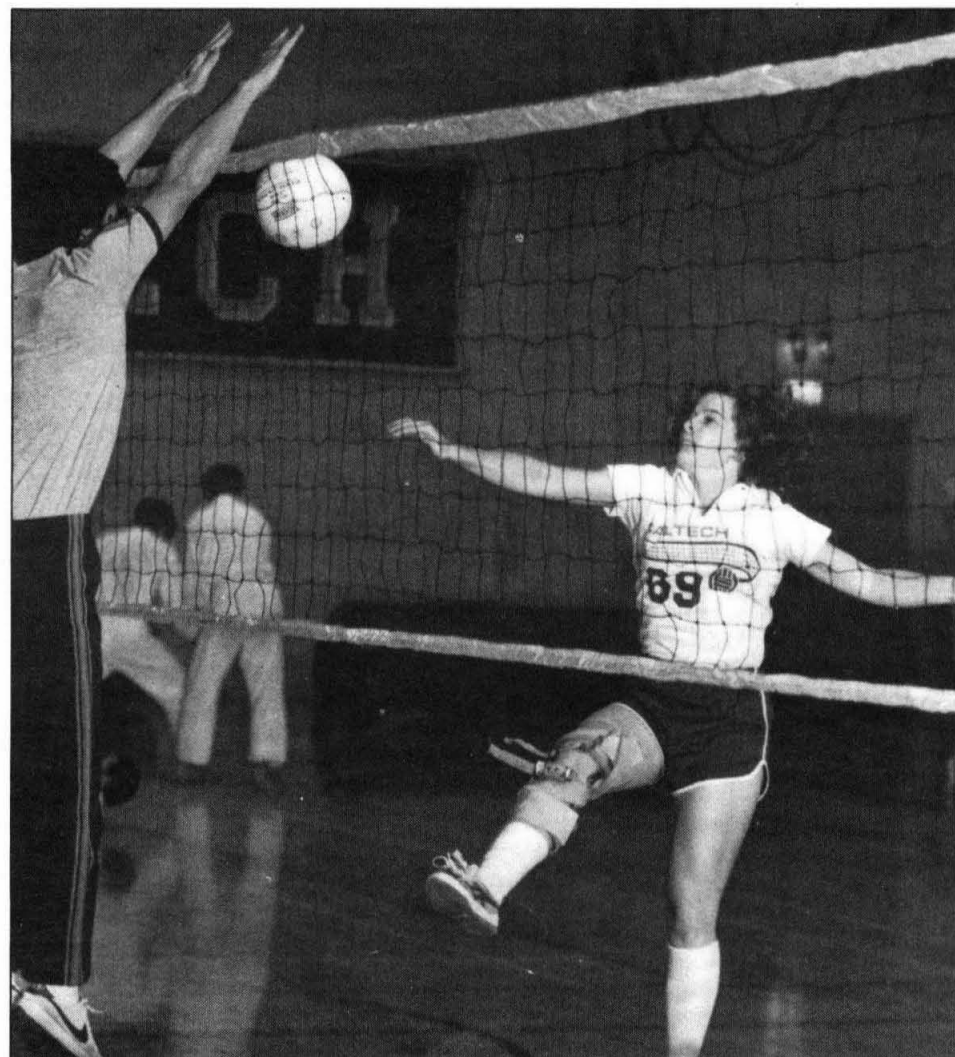
In spite of the loss of a large number of seniors, the nucleus remains for a good team next year — if everyone returns healthy and in good shape.

### Women's volleyball team record: 9-5

The women's volleyball team enjoyed another winning season in 1983. Even though several key players graduated in the spring, Caltech succeeded in maintaining its winning tradition with a solid 9-5 season record.

There were many challenges for the new coach, Becky Valentine.

*Please turn the page*



Sue Fuhs defends in a volleyball contest.



Because several outstanding players had graduated the year before, this was a building year for the eight graduate and three undergraduate students. Sue Fuhs-Huff, Cris Morris, and Chris Tiller exhibited strong leadership throughout the season.

The season highlight was a closely contested second game against Pomona-Pitzer. Caltech met Pomona in the opening game of the season and Pomona blew Caltech off the court, 15-0 and 15-1. But in the second round, Pomona learned to respect the women Techers. Even though Caltech was not victorious, team members played "out of their minds" and demonstrated their capabilities. Their hard work and consistent improvement throughout the season had paid off: Caltech lost to Pomona, 15-9 and 15-10.

### Water polo team rebuilds

The Caltech water polo team finished its "rebuilding year" with a record of five wins and 18 losses, finishing in fifth place in the SCIAC Conference ahead of Redlands. Tech's wins included a 12-11 victory over UC Riverside and a 9-8 success over Cal State Los Angeles — undefeated by Caltech since 1969 and 1968, respectively. In SCIAC play, the Beavers again upset Whittier 6-5, and came from three goals down with two minutes left in the game, to post a 16-15 victory over Riverside. Said Coach Clinton Dodd, "The team improved substantially from the first half of the season when we lost to Whittier and Cal State by more than 10 goals — demonstrating how hard the team worked and how tough we can play to beat those fine teams."

Depleted by the graduation, en masse, of last year's starters, the team was led this year by only one senior, Reed Burkhart. An All-American goalie from last year, Reed was captain of the team, splitting his athletic talents between goal (54 saves) and the field (23 goals). His replacement in the goal was Fred Ferrante, with the aid of Stan Berman.

High scorer in the field was Jim Labrenz, who achieved two six-goal

games, one against UC Riverside. Next year's captain, Dave Watkins, set the tempo with his speed and quickness. Playing center post were Stuart Ray and Hans Hermans, with Steve Loyola and Paul Graven supplying outside shooting.

At the awards dinner, Jim Labrenz was voted by his teammates to receive the Coach's Cup. Most Improved awards went to Ferrante and Dave Watkins. The conference coaches voted Reed Burkhart second team for his field play, and Jim Labrenz received honorable mention.

With a solid core of excellent freshmen, the prospects look bright for next year.

## Letters

Dear Editor:

With reference to your article on page 13, October 1983 issue, regarding Bob Parker and the Spacelab 1 Space Shuttle flight, you omitted my name as a Caltech alumnus in the astronaut program. I was chosen in 1978 as payload specialist astronaut for Spacelab 2, to be launched March 1985, and will fly either on this mission or on the follow-on flight called Sunlab, scheduled for July 1986.

GEORGE W. SIMON, MS '61, PhD '63, senior scientist, Space Physics Division, Department of the Air Force.

*We regret the omission and thank Dr. Simon for calling it to our attention.*

*Naomi Kashiwabara (BS '49) sends this recollection about a Caltech classmate of his era — Reuben Snodgrass — and one rival that Snodgrass could not defeat.*

Dear Editor:

When I entered Caltech as a pimply, skinny freshman in 1937, I was awed by fellow frosh who were not only top students but good athletes. At the high school in near-downtown Los Angeles that I graduated from, varsity athletes were usually industrial arts majors and average or worse students.

One of the better athletes in Caltech in 1941 was Reuben Snodgrass, who had been a wrestling, swimming, and diving star in high school in Oklahoma. He was handsome and well-built and he roomed across the hall from me in Ricketts House. An excellent draftsman — he had professional experience — he helped me (rescued me) in descriptive geometry. He could also pilot an airplane.

I can see Snodgrass now, poised and godlike on the 3-meter diving board at the PJC (now PCC) pool in an interhouse swim meet. (Caltech got its own swimming pool and gymnasium years later.) I can hear him, Victor Sturdevant, and Don Campbell, the trio that reactivated water sports at Tech, standing in the hall outside my room decrying the minor sports status of water polo and swimming. (Minor sports lettermen received circle T's, not big block T's. Swimming became a major sport in 1942 or 1943.)

For years, Snodgrass represented Tech victoriously in diving competition in the SCIAC. In his senior year a rival appeared at Occidental College, a rival whom Snodgrass could not defeat.

The Occidental diver was Sammy Lee, later gold medal platform diving champion in the 1948 and 1952 Olympic Games.

NAOMI KASHIWABARA, BS '49

## Personals

1939

CALVIN A. GONGWER, MS, president of Innerspace Corporation in Covina, California, is the 1983 recipient of the Henry R. Worthington Medal of the American Society of Mechanical Engineers. The award, given annually for achievement in the field of pumping machinery, was presented for Gongwer's insight that inspired a breakthrough in the understanding of the design problems of cavitation and stall in centrifugal impellers.

1940

JAMES E. LuVALLE, PhD, first president of the UCLA Graduate Students Association in 1936-37, has been honored by the university; the future northeast campus student center will be known as the James E. LuValle Commons. He retired in 1982 after a career with Eastman Kodak, and with Smith-Corona, where he held research and administrative positions, and served as director of undergraduate labs for Stanford University's chemistry department.

1946

E. H. CLARK, JR., MS '47, chairman and chief executive officer of Baker International Corporation in Orange, California, has been elected to a one-year term as chairman of the California Chamber of Commerce.

1947

ROBERT S. MacALISTER has been appointed managing director of Hamilton Brothers Oil and Gas Limited, in London, England. He previously worked for Occidental Petroleum Corporation as managing director of Australian operations. He was also president and chairman of the board of Canadian Occidental Petroleum Ltd.

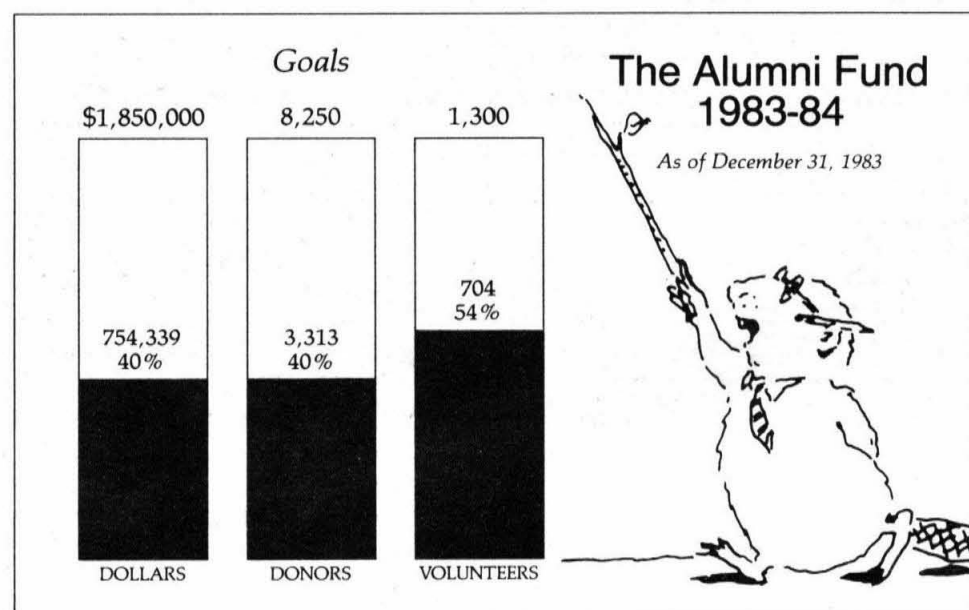
1948

WALTER P. EATHERLY, MS '49, manager of graphite programs in the metals and ceramics division at Oak Ridge National Laboratory, has received the American Carbon Society's 1983 George Skakel Memorial Award. The award cites Eatherly for "development of graphites for use in unique and severe environments, such as very high temperatures for civilian and military aerospace systems and intense irradiation exposures associated with molten salt, high temperature gas-cooled, and pebble-bed nuclear reactors."

1949

ARTHUR O. SPAULDING, MS '58, has received the newly created Public Service Award from the American Institute of Professional Geologists. He is vice president and general manager of the Western Oil and Gas Association in Los Angeles.

## Alumni Fund progress report





1953

GORDON EATON, MS, PhD '57, has been named provost and vice president for academic affairs at Texas A&M University.

1957

MARTIN TANGORA, secretary of the Landmarks Preservation Council of Illinois, was named Preservationist of the Year by the Chicago Coordinating Conference on Landmarks Preservation in May. Tangora, a founder of LCPI in 1971, has secured landmark status for many major Chicago buildings. He was founder and first vice president of the Uptown Historical Society, and has been chairman of the advisory committee to the Commission on Chicago Historical and Architectural Landmarks since 1978.

1961

GEORGE W. SIMON, MS, PhD '63, senior scientist in space physics at the Air Force Geophysics Laboratory at Hanscom Air Force Base, Massachusetts, won the laboratory's annual award for his research on magnetism of the sun and the motions of the solar atmosphere.

1963

ALAN LIPPERT, MS, reports that he is a staff member at the T. J. Watson Research Center at IBM in Yorktown Heights, New York, and is responsible for CAD/CAM activity at the center.

NICHOLAS TURRO, PhD, was one of five scientists to receive a Lawrence Award from the Department of Energy for outstanding contributions to the field of atomic energy. Turro, Schweitzer Professor of Chemistry at Columbia University, was honored for his "pioneering work in mechanisms of organic photochemistry, reactions of energy-rich compounds and for the extension of this study of the chemistry and physics of excited states to systems with restricted geometries, such as micelles."

1966

HENRY G. SCHWARTZ, JR., PhD, has been elected vice president of the Water Pollution Control Federation. He is vice president and corporate principal of Sverdrup Corporation in St. Louis, Missouri.

1970

TH. PAPAZOGLOU writes from Iraklion, Crete, where he is head of the electrical engineering department at the Higher Technical Education Center, "My wife, Vappu, and I are happy to announce the birth of our second child, Michael, on October 24. He comes three and a half years after his sister, Sophia."

1972

PATRICK CLARK, MS, one of five founders of Advanced Countermeasure Systems in Cupertino, California, has been appointed vice president, engineering, of the corporation.

MARK S. WRIGHTON, PhD, the Frederick G. Keyes Professor of Chemistry at MIT, has received the Gregory and Freda Halpern Award in Photochemistry, sponsored by the Polychrome Corporation. Wrighton is best known for his work in photon assistance of electrochemical reactions.

1973

DALE COLLINS, MS '74, has resigned as deputy assistant attorney general in the Antitrust Division of the U.S. Department of Justice and has returned to private legal practice at Shearman & Sterling in New York City. Before serving in the Justice Department, Collins was White House Fellow and special assistant to Vice President Bush.

ROBERT FLAKE writes from Seattle, Washington, "After ten years of living in the country in northwest Washington state and writing poetry and fiction (two books completed), poverty got the better of me. I have gone to work with STEVE SHAIMAN (BS '72) at Cygnet Systems Corp., doing technical writing and programming, just like everyone else I know from Caltech. Also doing consulting for Cygnet are DEAN BALLARD (BS '73) and CRAIG SAN PIETRO (BS '68, MS '69). At this rate, we're going to change the name of the company to Dabney, Inc."

BRUCE REZNICK writes, "In the last year and a half, good news has exploded on me like ketchup onto a hamburger. In reverse chronological order, I was: 1. Promoted to associate professor of mathematics at the University of Illinois at Urbana-Champaign; 2. Named an Arnold O. Beckman Fellow at the UI Center for Advanced Study for the spring '84 semester; 3. Appointed to an Alfred P. Sloan Fellowship; 4. Placed on the questions committee for the William Lowell Putnam Mathematical Competition; 5. Cited by the College of Letters and Sciences for excellence in undergraduate teaching. These made turning 30 much more tolerable! Robin Sabner and I also bought a house. Robin is a computer scientist at Compion Corp., an accomplished musician and equestrienne. We expect to marry some time this decade."

LANG WITHERS, JR., writes, "Everything keeps getting better, most of all following Jesus Christ (don't fail to check him out). Christine Lewis Hayes and I were married in May 1980. Our daughter, Carolyn, was born this past May. She is a real joy to us. Mathematical craftsmanship somehow hasn't lost its appeal, so I am taking courses at the University of Maryland while working three-fourths time as a system engineer in Falls Church, Virginia. Last, I would like to encourage more Lloydies (of whom I am the least) to break their long silence and write in as I have."

1978

DAVID LEIGHTON, MS, a programmer/analyst with Aerojet in Azusa, California, reports, "We are enjoying our Navajo foster daughter, Matilda, for the second year. She is quite a student/athlete. She just started high school and will probably be with us every school year until she graduates from high school."

1979

BOB DOWNS, senior project engineer with General Motors Advance Product Engineering in Warren, Michigan, and his wife, Karen, happily announce the birth of their first child, April Elizabeth, on May 28, 1983.

DAVID WHEELER writes, "I am spending a year in Pullman working with Dr. Sue Ritter at Washington State University. I am continuing my research on the neuroanatomy of body weight and body fluid regulatory systems in the brain."

## Obituaries

1922

GEORGE K. SMITH on July 15 following a year-long illness. He was assistant vice president of Pacific Telephone in San Francisco, in charge of public relations, when he retired in 1962. Smith is survived by two daughters.

ARTHUR M. WHISTLER on September 17 from complications of a stroke suffered two months earlier. After graduating from Caltech he worked briefly for Standard Oil Company of California, then took a job with C F Braun Company, where he eventually became chief engineer. His last job was with Fluor Corporation, where he also became chief engineer. Mathematics was his hobby, and after retirement he received a plaque of commendation from Saddleback College in Mission Viejo, California, for his detailed review of a calculus textbook.

1926

LYMAN SCHEEL, Ex, on July 28, having been in failing health for some time. He had been a consultant in gas machinery for Mycom Corporation in Torrance, California. His wife, Stella, survives him.

1928

HARVEY E. BILLIG, JR., Ex, on September 19, of cancer, at Hollywood Presbyterian Hospital, where he served as a staff member for many years. After receiving his M.D. from Stanford and training in orthopedic surgery, he spent nine years doing neuromuscular physiology research at Caltech. He was a consultant to companies, school districts, and universities for many years, and founded the Billig Clinic for Research in Orthopedics and Rehabilitation. He is survived by his wife, Roberta, two daughters, and a son.

1931

JAMES B. TAYLOR, Ex, on October 3, of a heart attack. For many years he was an electrical engineer in Caltech's buildings and maintenance department. He is survived by a daughter and a son.

1936

THEODORE VERMEULEN, MS '37, on October 29, of leukemia. He was professor of chemical engineering at UC Berkeley, and founder and first chairman of the chemical engineering department there. A leading authority on methods of chemical recovery and purification, Vermeulen was also director of the Water, Thermal and Chemi-

cal Technology Center at the university's Richmond field station, and was active with the energy and environmental division of the Lawrence Radiation Laboratory. He had developed improved water desalination and purification processes and a computer model of pollutant spread adjacent to freeways, and most recently was doing work on new methods for coal liquefaction. In 1971 Vermeulen received the prestigious William H. Walker Award of the American Institute of Chemical Engineers. He is survived by his wife, Mary Dee, and two sons.

1937

DOUGLAS K. ROLLOW in December 1982. He had retired from his position as senior staff engineer at Hughes Aircraft Company in Canoga Park and was living in Oxnard, California.

1939

ANDREW LUCIEN HANNON on November 19. He was president of Hannon Engineering, Inc., which he founded in 1945. He was a member of the board of trustees of Loyola Marymount University and a member of the board of directors of National Electrical Contractors Association, Los Angeles chapter. He is survived by his wife, Alice May, three daughters, and a son.

1941

JOSEPH P. LaSALLE, PhD, on July 7. He was professor emeritus of applied mathematics at Brown University, and had also served on the faculty of the University of Notre Dame.

1947

HERMAN KAHN, MS, on July 7 at his home in Chappaqua, New York, of an apparent heart attack. Founder of the Hudson Institute, the influential "think tank" in Croton-on-Hudson, he advanced the controversial idea that nuclear war could be won and survived. Kahn first gained public attention in 1959 when, while a staff member of the Rand Corporation, he gave a series of lectures at Princeton that led to the publication of his book *On Thermonuclear War*.

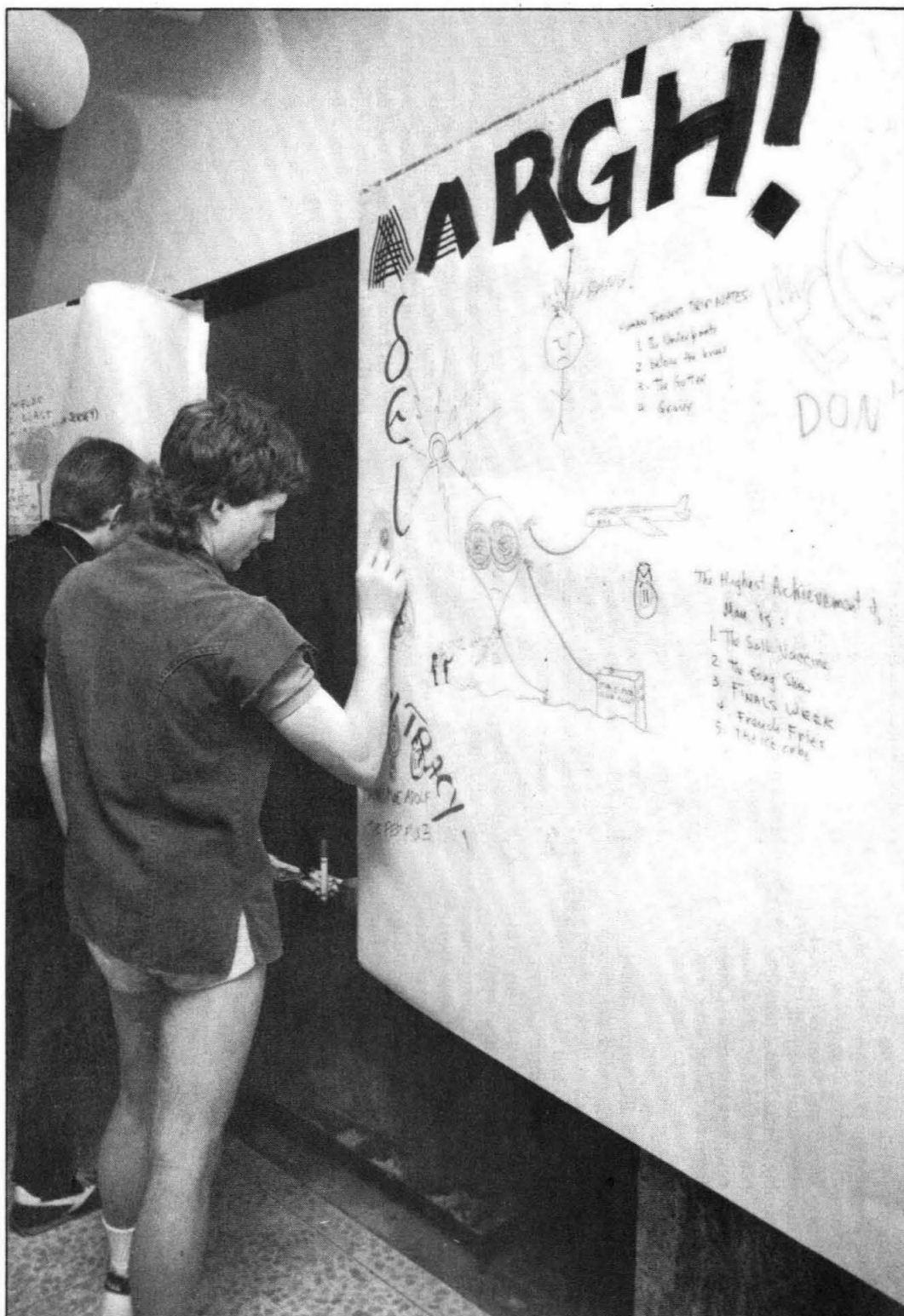
1950

EDWARD F. McDANIEL, MS, on November 15. He had retired as senior reviewer and attorney for the Internal Revenue Service in Dallas.

1951

GEORGE ABELL, MS '52, PhD '57, on October 5, of a heart attack at his home in Encino, California. The author of the most widely used introductory college textbook on astronomy, Abell was an international authority on clusters and superclusters of galaxies, the largest masses of matter visible to astronomers. He compiled the "Abell Catalogue of Clusters of Galaxies," which lists all known galaxies and is used throughout the world. He joined the UCLA faculty in 1956 and was chairman of the astronomy department for seven years.





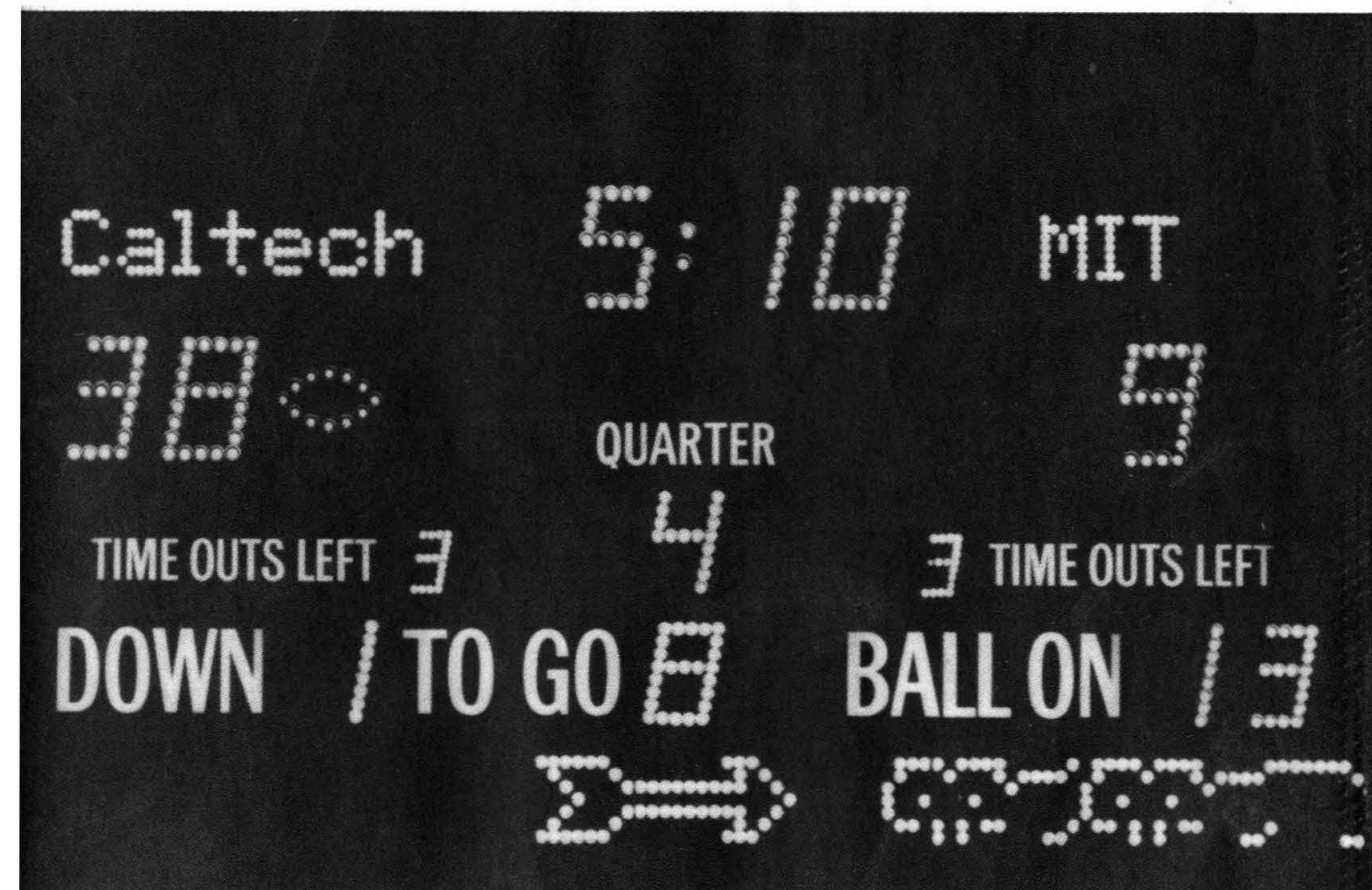
The sentiment expressed at the top of this sheet of doodle paper sums up the sentiments of most of the students who stopped by The Caltech Y for the Y's traditional finals week decompression.

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After 23 years — Caltech goes to the Rose Bowl again!

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