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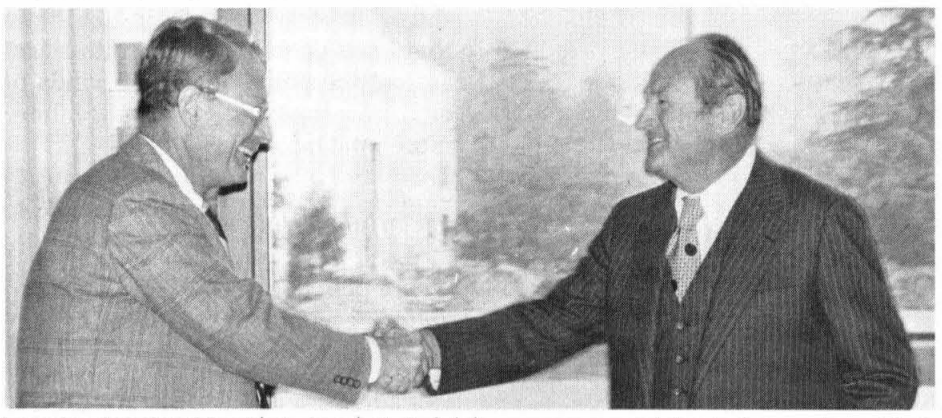
CALTECH NEWS

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

Associates' leaders



Incoming Associates' President, Joseph B. Earl, left, expresses appreciation to last year's president, Howard G. Smits, for his contributions to the organization.

New members of The Associates' Executive Committee, from left: Eric Lidow, second vice president; Collis H. Holladay, treasurer; Henry L. Lee, Jr., secretary; and Joseph B. Earl, president. George D. Jagels, first vice president, was not available for the photograph.

$20.3 million in gifts and pledges

1976: one of Caltech's most successful fund-raising years

Gifts and pledges to Caltech's $130 million "At the Leading Edge . . ." five-year development campaign reached $82,611,000 at the end of 1976 — two years before the campaign's conclusion — according to William H. Corcoran, vice president for Institute relations. The campaign was initiated in January 1974.

Corcoran credited the aggressive efforts of Caltech's trustees and others active in the campaign — plus an improved economy — for one of the Institute's most successful fund raising years. Gifts and pledges during 1976 totaled $20.3 million, he noted.

Several gifts were especially important in making the year a notable one: the $6 million pledge from the Carl F Braun family toward construction of the Braun Laboratories of Cell Biology and Chemistry; $1 million in gifts and pledges from family and friends of the late Norman Chandler, Times-Mirror Company executive, to endow the Norman Chandler Professorship of Cell Biology and Chemistry; and $1.2 million in gifts toward the construction of the Thomas J. Watson, Sr., Engineering Center.

Corcoran also stressed the growth in Caltech's Alumni Fund and its importance to the campaign. Last year almost 4,000 of Caltech's 12,000 alumni contributed more than $577,000. This total exceeded the 1974-75 results — $435,000 — by 33 percent and is the largest amount ever received by the Alumni Fund in a single year.

Another element in last year's fund-raising success was the number of persons who affiliated with The Associates: during the group's 50th anniversary year, 52 new members joined.

While acknowledging the campaign's gains last year, Corcoran emphasized the hard work that must be done during the next two years if the $130 million goal is to be reached. "And," he said, "we must achieve our goal if Caltech is to maintain its leadership in scientific education and research."

The funding of several major projects will receive special attention during the rest of the campaign: $11.4 million to complete the construction and endowment of the Braun Laboratories; $3 million to endow three new medical science professorships; $14 million to endow a school of resource geology; $10 million to create the Center for Theoretical Studies in Physics, Mathematics and Astronomy; $2 million to complete funds needed for the Thomas J. Watson, Sr., Engineering Center; $2 million for the rehabilitation of Gates Laboratory; $3 million to endow professorships, purchase new equipment, and undertake research in computer science; $3 million for expanded student activities facilities including physical education; and $10 million to endow astronomical research at Palomar and the Owens Valley Observatories.

Throughout the campaign, Caltech has also emphasized its need for more endowed professorships and for endowed fellowships and scholarships. Additional funds for these endowments totaling $23 million will continue to be an important priority.

Caltech receives $1 million to endow Chandler Chair

Caltech will receive $1 million to endow the Norman Chandler Professorship of Cell Biology and Chemistry, Robert F. Christy, acting president and professor of theoretical physics, has announced.

The new professorship will honor Norman Chandler, long-time publisher of the Los Angeles Times, executive of the Times-Mirror Company, civic leader, and Caltech Trustee, who died in 1973. The endowment was made possible by past and pledged gifts from his family, friends, and certain foundations.

A distinguished scientist in chemistry or biology will be named the Chandler Professor. The research will be directed toward a better understanding of the nature of the chemistry and biology of cell surfaces — bringing new insight into such medical problems as cancer.

The professor's work will extend into new areas but will build on the ongoing research at the Institute on genes, viruses, enzymes, cellular activity, and the body's immune system. Caltech has become a world leader in molecular biology in the past 50 years. The Institute plans to devote increasing attention to the molecular biology and chemistry of animal cells with a special interest in relating research results to the problems of human health.

"Norman Chandler's leadership was an important factor in the evolution and growth of southern California," Christy said. "His wisdom and support were crucial to Caltech's past successes."

Chandler was a member of Caltech's Board of Trustees for more than 30 years. In that period he served as vice chairman of the Board and chairman of the Nominating Committee. The Harry Chandler Dining Hall, a gift to the Institute in 1959, is named for his father, the late Harry Chandler, who was publisher of the Times from 1917 to 1944.

Norman Chandler joined the Times as a clerk in the circulation department in 1922 and went on to become president of the Times Mirror Company in 1941, publisher from 1945 to 1960, board chairman and chief executive officer in 1960, and chairman of the Times-Mirror Company Executive Committee in 1968. His management and his successful acquisition program established the company in 1973 as the largest publicly-held publishing company in the country.

Gifts for the professorship are among contributions to Caltech's five-year, fund-raising campaign, "Caltech at the leading edge . . ."

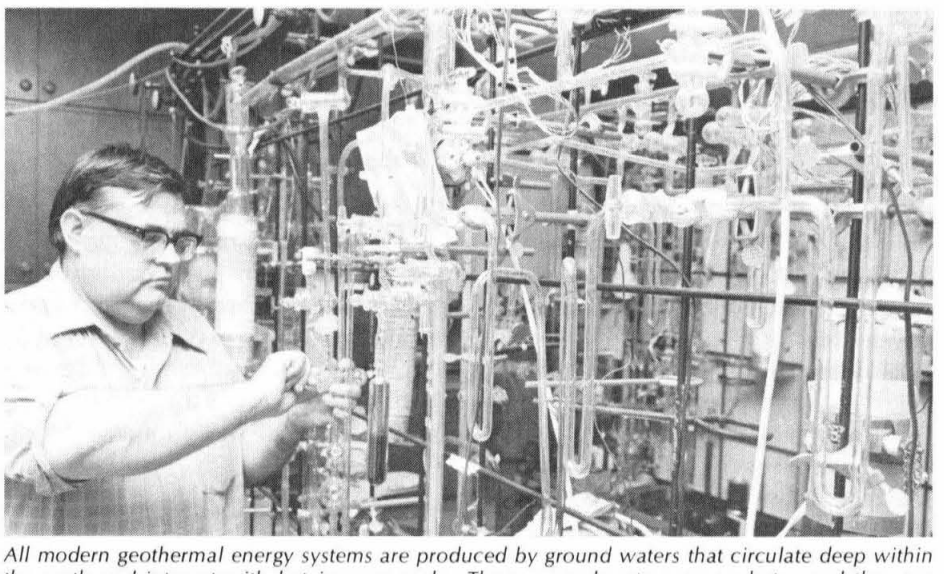
John R. Pierce named "Engineer of the Year" for exceptional work

John R. Pierce, professor of engineering at Caltech, is recipient of the 1977 "Engineer of the Year" award from the Institute for the Advancement of Engineering Inc.

As "Engineer of the Year" for the greater Los Angeles area, he received the George Washington Trophy, given annually for exceptional contributions to the profession.

Widely recognized for his accomplishments, he is the recipient of the National Medal of Science, nine honorary degrees, and numerous other awards, and is a member of both the National Academy of Sciences and the National Academy of Engineering.

Analysis: ancient geothermal systems



All modern geothermal energy systems are produced by ground waters that circulate deep within the earth and interact with hot igneous rocks. These ground waters are so hot – and they are moving at such great depths – that their behavior can't be directly studied due to deficiencies in drilling technology. But exposed rocks that once were part of a geothermal system can be analyzed and from them geologists can gain insight into the movement of ground water in the earth today. Here Hugh P. Taylor, professor of geology, adjusts an apparatus that is extracting water from minerals taken from one of these fossil geothermal systems. The water will be converted into hydrogen gas and measured in a mass spectrometer; the results will yield information about the origin of the ground water that moved through the rocks millions of years ago and exchanged with the minerals in them.

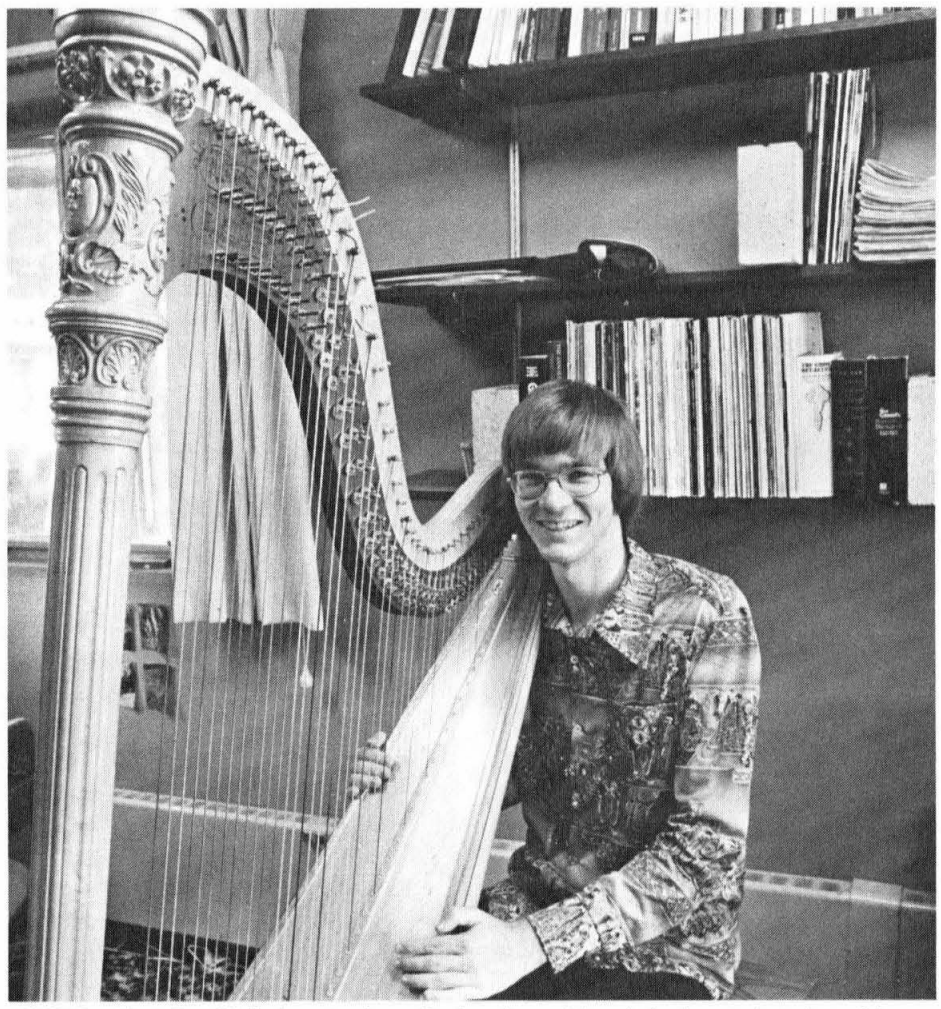
Bert Wells

New ASCIT president defines his goals

Bert Wells, a senior in mathematics, was elected president of ASCIT on February 1, defeating Edward Bielecki in a second runoff. A talented musician, Wells relaxes from his Caltech studies by playing the harp, an instrument he's been studying since the fourth grade. In high school he was a member of the San Diego Youth Symphony, and he sometimes plays with the Caltech-Occidental Orchestra. But Wells also plays the harp professionally. He accompanies individuals and choral groups and is a member of the Downey Civic Light Opera Association orchestra. Enthusiastic about the outdoors, he often hikes in the Sierras or San Gabriels with other members of Ruddock House.

President of the Caltech Mathematics Club, Wells recently learned that a paper he submitted has been accepted for publication in the Journal of Combinatorial Theory, and he's working on a second article. Eventually he would like to do graduate work at Oxford or Cambridge, but first he wants to tackle some challenges right here.

Before the election Wells was ASCIT's director for academic affairs, and as such he worked closely with faculty and administrators to make sure student views were incorporated in decisions about academic policy. This experience led him to an interest in increasing communications between faculty and students in general. As ASCIT president he also hopes to help generate greater enthusiasm for undergraduate teaching among the faculty.



ASCIT President Bert Wells is not only a gifted mathematician, he's also a talented musician.

What do you mean when you talk about generating enthusiasm for undergraduate teaching?

Well, excitement about teaching has been tremendously high here at times. For example, about 15 years ago when Richard Feynman was teaching Physics 1 and 2, he created a new program that revolutionized physics teaching throughout the country. Half of our physics faculty became involved in developing the course and they were very enthusiastic about it. It must have been thrilling for Caltech students to be a part of a new program like that one — and then, a couple of years later, to hear that Dr. Feynman had won the Nobel Prize! There are other examples, of course. One of my goals is to have more of this kind of enthusiasm for teaching at Caltech.

How are you going to go about it?

When I was director of academic affairs this year, I introduced the ASCIT Awards for Excellence in Teaching. These awards honored five teachers who ranked especially high on the teaching quality feedback reports based on student evaluations. They attracted attention to some faculty members who are doing a tremendous job and gave them some of the recognition they deserve. I want us to continue these awards. I also want to maintain the reputation of the feedback reports as a good gauge of teaching ability — and I'd like to see their influence on campus increase.

What about other ways to stimulate teaching effectiveness?

A few years ago Caltech sponsored some seminars for its faculty members. They were taught by members of the faculty who were known for exceptional teaching, and they presented ideas on making teaching more interesting and effective. These seminars did a lot to improve the quality of instruction, from all I've heard. I believe we can have them again, with the same results.

You see, I believe the whole process of teaching lends excitement to the life of research. A faculty member who is enthusiastic about teaching undergraduates is going to find his research more stimulating. I teach sophomore mathematics. When I'm excited about teaching, I take more interest in my research.

What are the other areas where you want to be active as ASCIT President?

Caltech is choosing a new president, and I feel the students should have a voice in the selection. They have the opportunity, through liaison with the faculty members who are advising the search committee. A university should reexamine its goals when it is choosing a new president; otherwise it can't select the right person. The students ought to have a role in defining and clarifying these goals.

What qualities would you especially like to see in Caltech's new president?

A commitment to excellence in both instruction and research. I want him to encourage excellence in teaching, and to be aware of the importance of the student body to the success of Caltech.

During your campaign, you stressed improving communications between faculty and students. How do you hope to do this?

Partly by encouraging more faculty members to visit the student houses. This will help them to have a better understanding of student life at Caltech, and of the role of undergraduates on campus.

Student life here is very special. A person has to experience it to understand it. It's intimate and supportive because of the small size of the student body, and because students generally live in houses with people whose interests are like their own. Faculty members who went to other universities can't appreciate this environment unless they are a part of it. It's easy for a faculty member who is making decisions that affect the students to say, "Yes, I'm keeping their interests in mind," and to be perfectly sincere. But he can't work effectively for their interests if he doesn't know what their interests are.

We could begin by inviting specific faculty members to join us for dinner in the houses — and we could urge them to visit the houses on other occasions. The results would be good for everybody. Caltech faculty and undergraduates are bright and talented people. Each group can contribute a lot to the other.

Faculty understanding of student life is especially important right now because a faculty committee is deciding whether to increase the size of the undergraduate student body. The committee is supposed to determine the ideal number of undergraduates for Caltech. I hope the committee will think seriously about the right number of students to take advantage of the unique environment here.

You've talked about using human resources here more fully. What do you mean?

I believe faculty members can utilize their resources more fully by getting excited about their teaching and by knowing the undergraduates better. And I believe the students can realize their resources more fully by becoming more involved in activities.

Students today are very serious. They have practical, down-to-earth reasons for being here. They're concerned about the job market and about getting the grades that will help them in the market. They're also worried about the cost of getting an education and the way the cost keeps rising. So they probably don't contribute to student activities as much as students did a few years ago. I'd like to encourage them to become more involved.

Caltech is an exciting place and I'm excited about what we can do to make it more so. I hope my own enthusiasm will be catching. I hope that I can generate some enthusiasm among the students for the kinds of changes that will make life here more enjoyable for all of us.

Do you really feel that you can be effective in stimulating change?

Yes, I do. I've never seen a place where people are as willing to listen, and as receptive to new ideas as they are at Caltech. The faculty and the administration are interested in hearing students' ideas — if students are willing to offer them. They're flexible and they're not tied to any guidelines other than a commitment to excellence. This means that someone with goals has a good chance of accomplishing them.

Computer-enhanced pictures yield astronomical data

Important details about distant galaxies and the objects between them are being revealed through computer-enhanced photographs taken by the large telescopes at Palomar and Kitt Peak Observatories. The techniques used are the same as those that revealed details in the spacecraft pictures of Mars and Mercury.

Halton C. Arp, staff member of the Hale Observatories, and Jean Lorre of Caltech's Jet Propulsion Laboratory said that the sharpness of focus in the enhanced pictures was improved by 50 percent over the originals because the computer removed some of the photographic effects caused by turbulence in the earth's atmosphere.

For this enhancement, Arp selected photographs of three objects whose features are puzzling to astronomers. Two are groups of galaxies—Stephan's Quintet and Seyfert's Sextet—and the third is the jet in the radio galaxy M-87.

During the enhancement process, photographic plates are scanned with a photoelectric eye that converts variations in light and dark into numbers that the computer can read. It is then given instructions to increase the intensity of these variations. This phase of the work is done at the JPL Image Processing Laboratory with IBM 360/44 and IBM 370/155 computers.

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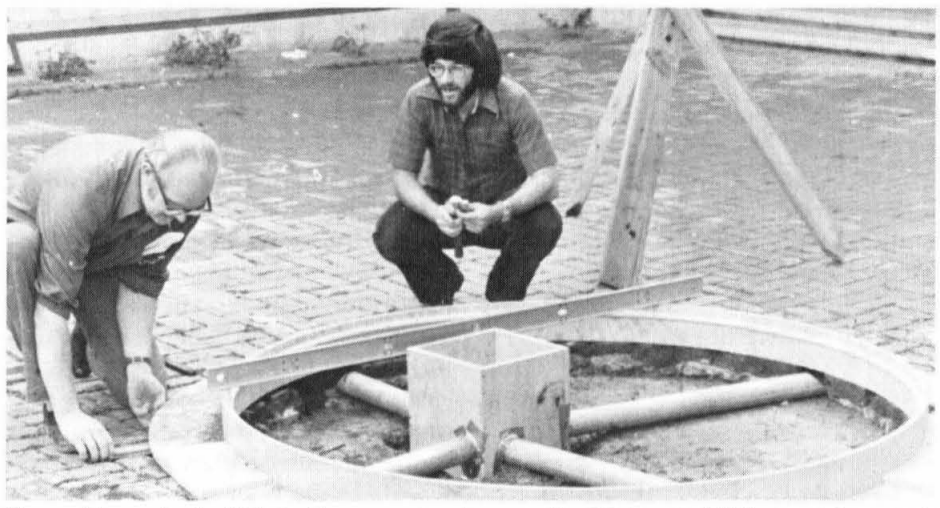
The Ricketts House urn is installed



The marble urn in the Ricketts House courtyard was a gift of Robert A. Millikan and for years it served many purposes. Wish-bearing coins and unwary students were often tossed into it and it frequently was used as a fire kiln. The fires proved to be the urn's undoing and eventually it broke into fragments. Last year, Ricketts House students decided they'd like to replace it with a modern model. A committee headed by Alan Silverstein inaugurated the Urn Fund Drive among Ricketts House alumni. Former residents contributed more than $1,600 — enough to create a concrete pot carefully crafted to resemble the original in shape, size, color, and uses. Here its foundation is examined by Ib Hansen of the Caltech Carpenter Shop and Silverstein. So that old disasters won't be repeated, the urn is lined with an inner firewall. A copper plaque on the pot is inscribed — "From the Alumni and Members of Ricketts House. Fatui Inverecundi: semper curate ut lateres ignium obsoletos reponatis." Crudely translated, the Latin reads — "Impudent Fools: always take care that the worn firebricks are replaced."

At Seminar Day

Harrison Schmitt to be general session speaker

U.S. Senator Harrison H. (Jack) Schmitt, BS '57, scientist-astronaut on the Apollo 17 mission to the moon in 1972, will be the featured speaker at Alumni Seminar Day on Saturday, May 14. He will address the general session in Beckman Auditorium at 2 p.m.

Schmitt, who received his doctorate in geology from Harvard University in 1964, became an astronaut in 1965 and was backup lunar module pilot for the Apollo 15 mission. In February 1974, after his flight to the moon, he was named chief of scientist-astronauts. During his years with NASA he accumulated 2,100 hours of flying time in jets, helicopters, and spacecraft. Schmitt was a Sherman Fairchild Distinguished Scholar at Caltech and in May 1974 he was appointed NASA assistant administrator for energy programs. He resigned from the space program in August 1975 and returned to New Mexico to enter politics; in November he was elected to the U.S. Senate.

During the morning and after the general session, alumni and their guests will hear about some of Caltech's newest developments in research and education from 12 faculty speakers.

Caltech graduates schedule five-year reunions in June

Spring is the season for alumni get-togethers on the Caltech campus and plans are already being made for June reunions of classes graduating five years ago and at previous five-year intervals. Only members of the class of 1952 (always individualists) will hold their reunion during May. Their plans are described in a separate article.

Members of the class of 1927 will celebrate their 50th reunion with a dinner in the Athenaeum on Thursday, June 2, and the traditional Half-Century Club luncheon at the Huntington-Sheraton Hotel on Friday, June 3, when they will be guests of the Alumni Association. Any alumnus who graduated 50 years ago or more is invited to attend. John G. Case, BS '27, heads the reunion planning committee.

The other classes will hold their reunions on June 3, 4, or 11, with campus tours at 4 p.m., social hours at 5:30 p.m., and dinner at 7 p.m. in the Athenaeum. These classes, their reunion dates, and persons handling arrangements include: **1932** — June 3, Robert E. "Ed" Foss; **1937** — June 4, Paul C. Schaffner; **1942** — June 11, Fredrick H. Felberg; **1947** — June 4, Le Val Lund; **1957** — June 4, Reuben B. Moulton; **1962** — June 11, Frank Ridolphi; **1967** — June 11, Terry Hendrickson, Terry G. Allen, and Daniel E. Erickson.

With the assistance of Robert A. Bell, BS '72, MS '72, the class of 1972 is planning a picnic on June 11 at either Tournament Park or the beach, depending on class members' wishes.

Class of '52 plans May 13-14 reunion

More than 100 alumni and their guests are expected to come to the reunion of the class of 1952 on May 13–14. "The event gives promise of being the best attended and most enjoyable in a long history of fine reunions," said R. K. Catterlin, BS '52, class secretary.

The festivities will begin on Friday, the day before Alumni Seminar Day, with a tour of the campus. "A no-host cocktail party in the Athenaeum will precede a magnificent prime rib dinner," Catterlin commented.

On May 14, Seminar Day, the class will have lunch in Dabney Gardens. That evening the members will meet for cocktails. Caltech faculty members who received degrees in 1952 will be among the guests.

Outpacing 1975-76

Alumni Fund headed toward new records

The Caltech Alumni Fund is running well ahead of 1975-76 and appears to be headed toward another record-setting year. "We're off to a great start," said Martin J. Poggi, BS '37, national chairman. "If everything continues as we hope, we'll break our previous records."

As of February 18, the Fund had received $560,000 from 2,475 donors compared with $460,000 from 2,133 alumni the same time a year ago — increases of 22 percent in contributions and 16 percent in donors. The fund hopes to receive $600,000 in gifts from 4,200 persons by June 30 — surpassing the $577,000 given by almost 4,000 persons last year. So far this year, 21 percent of the Institute's 12,000 alumni have made gifts to the fund.

Poggi said he's especially pleased with the support from alumni who contribute $1,000 or more. These gifts generally arrive at the end of the calendar year and are, to a large extent, the determining factor in the fund's success.

"Before the year started, we estimated that we'd need 84 gifts of at least $1,000 — totaling $310,000 — to make our goal," he said. "By mid-February, we had already received almost 100 gifts that totaled about $350,000. Now we need a large number of gifts under $1,000 to achieve our donor goal. Traditionally we receive these gifts during the last half of the year through our mail and telephone programs so we feel optimistic about success."

For the third consecutive year, Richard L. Hayman, Ex '36, president of Haskel Engineering and Supply Company, made the largest single contribution to the fund.

"Caltech is deeply grateful to Dick for his continuing generosity and for what his gifts have meant to the Institute's research and educational programs," Poggi said. "His support is an inspiration to all of us."

Poggi said another important factor in the fund's success this year is the number of alumni who have joined The Associates. These new members are: Amasa S. Bishop, BS '43; William Bollay, MS '34; Robert R. Bowles, BS '41; William F. Chapin, BS '41; Trent R. Dames, BS '33, MS '34; David L. Douglas, BS '47, PhD '51; Hubert E. Dubb, BS '56; William B. Elconin, BS '38; Albert A. Erkel, BS '45; William R. Fair, BS '43; Warren E. Fenzi, BS '37; William W. Haefliger, BS '50; William N. Harris, BS '49, MS '50.

Robert Hensigson, BS '48, MS '49; George W. Housner, MS '34, PhD '41; Herbert A. Lassen, BS '43, MS '47, PhD '51; Harrison C. Lingle, BS '43; Raymond R. Lochhead, BS '44, BS '47; William W. Moore, BS '33, MS '34; Robert L. Noland, BS '41; Bernard M. Oliver, MS '36, PhD '40; Newell T. Partch, BS '41; Jean C. Schwarzenbach, MS '42, Eng '42; Frank C. Smith, Jr., BS '44; John E. Taber, BS '46; Clarence J. Woodard, BS '45.

Poggi praised the efforts of the 550 alumni volunteers who have worked hard to make the first half of this fund year so successful. In particular he called attention to the efforts of area chairman William J. Williamson, BS '48, MS '49, Eng '55, whose central San Fernando Valley area leads in participation with 44 percent, and five others whose area participation exceeds one third: George J. Gleghorn, MS '48, PhD '55, TRW; Andrew B. Campbell, BS '46, San Marino; Alan L. Porter, BS '67, Georgia; Elvin B. Lien, BS '34, Orinda; and J. Robert Schreck, BS '34, Arcadia.

In conclusion, Poggi urged workers to continue their efforts to achieve this year's goals so that the 1976-77 fund can become the most successful on record.

Alumni Directory Supplement ready

The supplement to the 1975 Alumni Directory is now ready for distribution. It lists the names and addresses of those who received degrees in June 1975 and June 1976. Copies will be sent automatically to Association members who received degrees in 1976. Other Association members may receive a copy by filling in the form below and sending it to the Alumni Office, 106 Dabney — mail code 106–40, the California Institute of Technology, Pasadena, California 91125.

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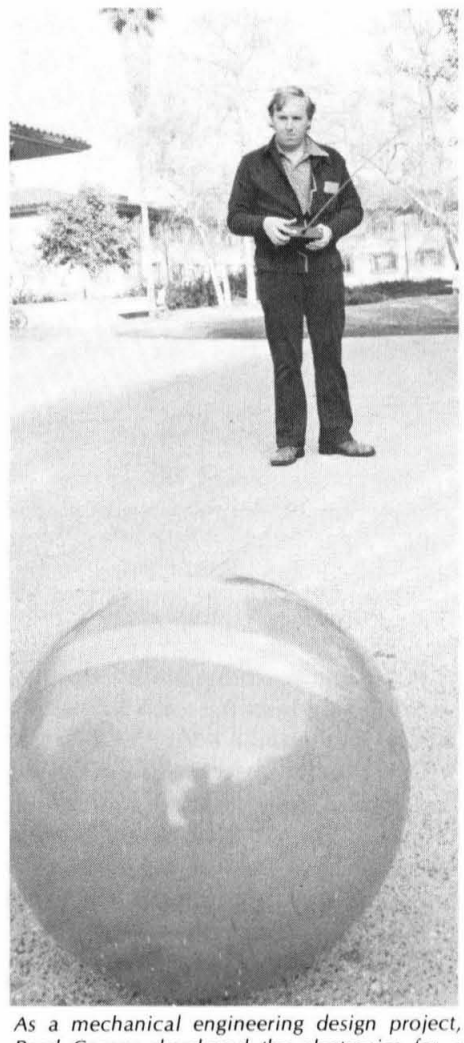
Please send the 1977 supplement to the 1975 Alumni Directory to:

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____



As a mechanical engineering design project, Reed Copsey developed the electronics for a remote-controlled, stair-climbing robot that can enter unsafe structures. Then he adapted the electronics for use in this stainless steel ball. Fully maneuverable, the ball's speed and movements are guided by a model airplane radio. Copsey, a senior majoring in mechanical engineering, hopes to market the device as a toy.

ALUMNI ACTIVITIES

March 22
North Carolina chapter meeting, the Old Trinity Room, the Duke University Union, Durham, North Carolina. Dinner, 7 p.m. Irving Bengelsdorf, Caltech director of science communication, will speak on "Of Men and Chromosomes."

March 24
Chicago spring chapter meeting. Fredrick H. Shair, professor of chemical engineering, will be the speaker; additional details will be announced later.

March 25
San Diego spring chapter meeting, the Versailles Room of the Little America Westgate Hotel, 1055 Second Avenue, San Diego. Cocktails, 6 p.m., dinner, 7 p.m., followed by a concert by the Caltech Glee Club.

March 28
Denver annual spring chapter meeting, the Continental Denver Motor Hotel, Valley Highway at Speer Boulevard. Cocktails, 6:30 p.m.; dinner and meeting, 7:30 p.m. Speaker, Irving Bengelsdorf, on "Of Men and Chromosomes."

March 29
New Mexico first annual chapter meeting, Bishop's Lodge north of Santa Fe on Bishop's Lodge Road, Los Alamos. Cocktails, 6:30 p.m.; dinner, 7:30 p.m. Speaker, Irving Bengelsdorf, on "Of Men and Chromosomes."

March 31, April 1 and 2
Reunion for all alumni of the Division of Geological and Planetary Sciences, sponsored by the division and the Alumni Association. This 50th anniversary celebration will emphasize the theme, "The Earth and the Planets." An overnight field trip is being planned.

April 11
Houston chapter meeting. Eugene Shoemaker, professor of geology, will discuss the geology of the Colorado River; additional details will be announced later.

April 12
Dallas/Fort Worth chapter meeting. Speaker, Eugene Shoemaker, on the geology of the Colorado River; additional details will be announced later.

April 19
Philadelphia spring chapter meeting, the Open Hearth Restaurant, the Gateway Shopping Center. Cocktails, 6 p.m.; dinner, 7 p.m. Speaker, Irving Bengelsdorf, on "Of Men and Chromosomes."

April 20
Pittsburgh chapter meeting, the University Club. Cocktails, 6 p.m.; dinner, 7 p.m. Speaker, Irving Bengelsdorf, on "Of Men and Chromosomes."

May 13 and 14
Class of 1952 reunion in conjunction with Alumni Seminar Day.

May 14
Alumni Seminar Day on the Caltech campus. U. S. Senator Harrison H. Schmitt, BS '57, the only scientist to explore the moon, will be the general session speaker.

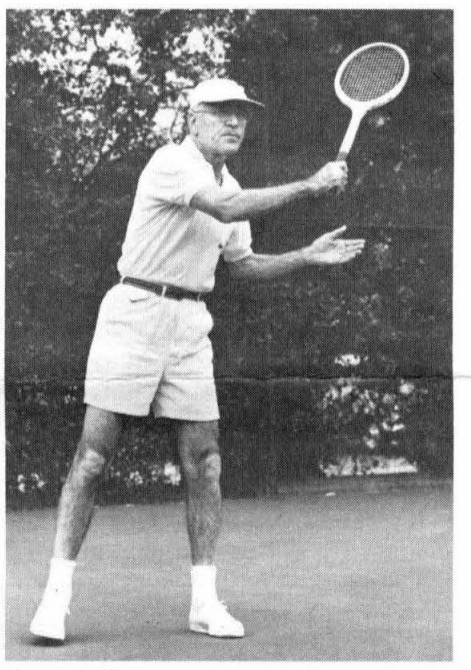
June 6
New York spring chapter meeting. William H. Corcoran, vice president for Institute relations and professor of chemical engineering, will speak.

Fund to honor Ernest Swift established

Ernest H. Swift, Caltech professor of analytical chemistry emeritus, has served the game of tennis long and well. Now one of his tennis partners has thought up a scheme that will serve Swift — and chemistry at Caltech.

Swift is a member of a long-standing (or long-running?) rotating group of tennis players that meets weekly at the home court of Dana C. Smith, retired Pasadena attorney. Preston Hotchkis, chairman of the board of the Fred H. Bixby Ranch Co., is another member of the group. All three of these veteran players were born in the 1890s. Joining them when they can are some Institute professors who also play a good game of tennis — Jack Roberts, Harry Gray, Dick Dean, and Ned Munger.

Dana Smith is the man who came up with the idea of the Ernest H. Swift Chemistry Fund — a fund to be made up of contributions by Swift's friends and admirers, who include survivors of his sophomore



Ernest Swift serves up some action on the tennis court in this 1960 photograph.

chemistry classes during his 48 years of teaching at the Institute.

The fund, which was started off with $4,500 from the T. B. Walker Foundation, will be invested like other funds at Caltech, but its income will support activities in chemistry designated by Swift. He hopes the support rallied will net income to serve as a fund for lectures in analytical and inorganic chemistry.

Wrestling, swimming, basketball

Coaches laud team members' talents

Wrestling

by Coach Tom Gutman

Although small in numbers, the 1977 varsity wrestling team has been one of the most talented at Caltech in many years. After running into difficulties during its opening events, the team worked its way into a successful second half. Caltech won 5 of 12 dual matches, all of them during the last half of the season.

Although plagued by a lack of depth, the team performed competently and competed in 7 of 10 weight classes. Captains Bob Loveman and Tom Snyder headed the team in the win and loss columns, followed by Chris Russell, who finished the season with an exciting record. All three of these wrestlers are seniors and will be graduating.

It has been especially satisfying to see Caltech wrestlers defeat opponents to whom they lost early in the season — a phenomenon that has characterized this year's wrestling squad.

Caltech completed the season by placing fourth in conference standings.

Swimming

by Coach Ed Spencer

A strong performance by the first women's swimming team in Caltech history provided a bright note in this year's season. Interest in swimming ran high among women students as 7 out of the 90 females enrolled at Caltech came out for the team — a higher percentage than for any other school in the conference — and they proved to be excellent swimmers.

Leaders in performance were Captain Becky Hartsfield, Stanzi Royden, and Pam Crane. Angela McTaggart, who came to the team directly from physical education classes, soon was scoring conference points regularly. Lynn Hildemann earned a reputation as the best diver in the conference and Stanzi Royden distinguished herself in butterfly swimming and freestyle events.

The team was hurt by a lack of depth, however, and lost several meets because of its inability to compete successfully in relays. The women finished the season with a 2-4 record. Next year all seven members will be returning and we hope that incoming freshmen will add the depth that is so important.

Short-handed this year after several outstanding swimmers took leaves of absence, the men's team finished the season with a 4-6 record. Making strong contributions through their performance were Captain Jim Seidel, who scored successfully in free style events; Peter Goodwin and Ed Bielecki, who compiled conference points in their first season of competitive swimming; John Reimer, successful in mid-distance freestyle swimming; Josh Levin and Jim Findley, who competed in freestyle events; Doug Jones, who made points in freestyle, backstroke, and individual medleys; Chris Sexton, successful in the butterfly; Stan Chen, a breaststroke competitor; and Werner Pyka and Ray Morris, specialists in the backstroke. Next year, all of the team members except Seidel will be returning so the outlook for a successful season seems bright.

Basketball

by Coach Hudson Scott

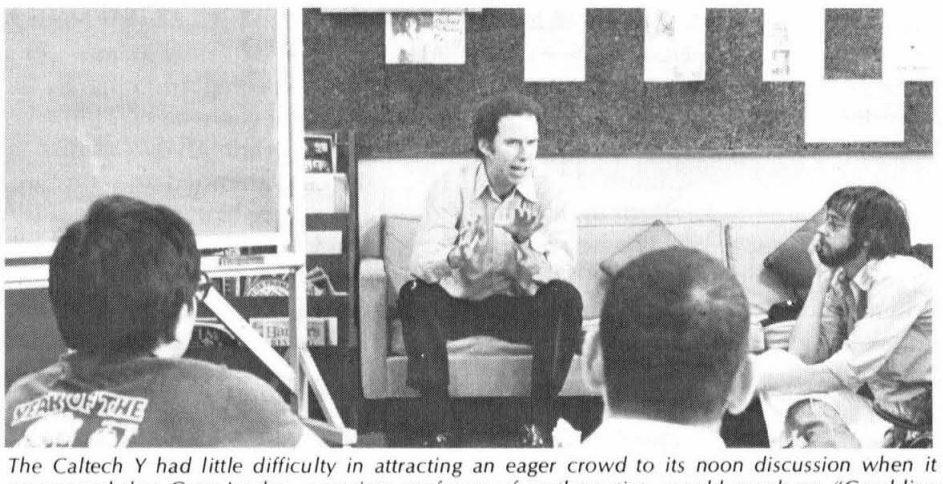
This year's Caltech basketball team is a pleasant surprise. Although most of its members are freshmen, they have hustle, ability, and a positive attitude about competing and winning. Greg Blaisdell, a leaping 6'4" forward, scored the winning basket for the varsity in the game against the alumni; Joe Zasadzinski, center, is 6'4" and has a good eye for baskets; Peter Edwards, at 6'1", is the freshman floor general; sophomore Bart Croes, at 6'2", is the team's other guard.

Captain and team leader in both scoring and rebounding is junior John Pender; Pender has been chosen Player of the Week *every week* of the season. In league scoring for the overall season, he ranks fourth. In conference-game scoring he ranks fifth with an average of 14.5. Pender also ranks sixth in league rebounding; in this category, Caltech is fourth in league standings.

The team is beginning to work as a unit and its defense is becoming increasingly disciplined as the season progresses. Other players showing promise are Ernie Lewis, a forward who has been recovering from a broken hand; guards Beau Lee and Charlie Curatalo, who are helping the team through rough spots; and Curtis Meissner, who plays as back-up center.

(Note: the basketball team finished the season with 2 wins and 20 losses.)

Some advice on beating the odds



The Caltech Y had little difficulty in attracting an eager crowd to its noon discussion when it announced that Gary Lorden, associate professor of mathematics, would speak on "Gambling Systems: Getting Rich in Theory and in Practice." Some 30 students turned out to ask about their chances for making a killing in black jack at the Las Vegas casinos through a knowledge of the odds. Lorden's answer: You may win big, but you probably won't. Even with an effective knowledge of statistics, a lot of luck is still involved in the game, he said. But the casino management is an even more formidable obstacle to success, Lorden pointed out. "The owners watch for players who are using effective systems and ban them rather quickly," he said. "This process can repeat itself throughout Las Vegas. I know Caltech students who've been banned from a lot of casinos."

Alumni Board nominates officers

The Board of Directors of the Alumni Association met as a nominating committee on January 25, 1977, in accordance with Section 5.01 of the Bylaws. Five vacancies on the board, in addition to the positions of the president, vice president, secretary, and treasurer, are to be filled. The current members of the board, with the years in which their terms expire, are as follows:

Clarence R. Allen, MS '51, PhD '54 — 1979
William J. Carroll, BS '48, MS '49 — 1977
James R. Davis, BS '48, MS '49 — 1979
Joseph A. Dobrowolski, BS '49 — 1978
Oliver H. Gardner, BS '51 — 1978
John D. Gee, BS '53 — 1978
Carole L. Hamilton, PhD '63 — 1977
Rolf C. Hastrup, BS '53, MS '54, Eng '58 — 1978
Hiroshi Kamei, BS '51, MS '52 — 1979
Le Val Lund, BS '47 — 1977
William L. Martin III, BS '69, MS '70 — 1978
Harry J. Moore, BS '48 — 1977
Carel Otte, MS '50, PhD '54 — 1979
Raymond A. Saplis, BS '44 — 1977
Howell N. Tyson, Jr., BS '50 — 1978
Richard L. VanKirk, BS '58 — 1978
Peter M. Wilzbach, BS '70 — 1978
James W. Workman, BS '57, MS '58 — 1979

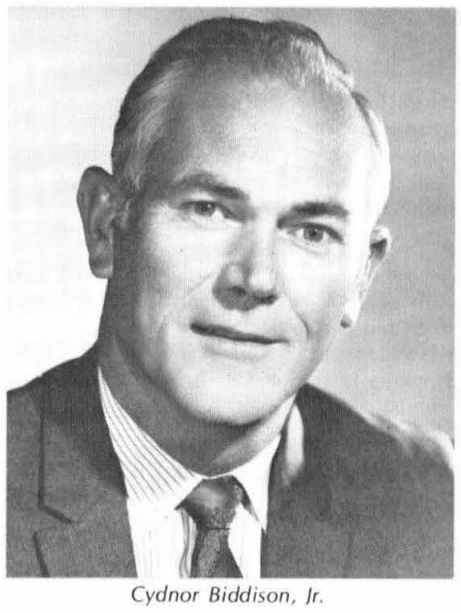
The following individuals have been nominated for terms beginning at the close of the annual meeting in June 1977:

President: *Richard L. VanKirk, BS '58* — 1 year
Vice President: *John R. Fee, BS '51* — 1 year
Secretary: *William L. Martin III, BS '69, MS '70* — 1 year
Treasurer: *Carel Otte, MS '50, PhD '54* — 1 year
Directors:
Cydnor M. Biddison, BS '40 — 3 years
John R. Fee, BS '51 — 3 years
James King, Jr., MS '55, PhD '58 — 3 years
Louise Kirkbride, BS '75, MS '76 — 3 years
Philip L. Reynolds, BS '58, MS '59 — 3 years

Section 5.01 of the bylaws provides that membership may make additional nominations for directors or officers by a petition signed by at least 50 regular members in good standing, provided the petition is received by the secretary no later than April 15. In accordance with section 5.02 of the bylaws, if no additional nominations are received by April 15, the secretary casts the unanimous vote of all regular members of the Association for the election of the candidates nominated by the board. Otherwise a letter ballot is required.

Below are the biographical summaries of those nominated for directors.

The election of officers at the annual meeting will conclude a busy spring schedule of alumni activities featuring class reunions, Alumni Seminar Day, and chapter meetings in many parts of the country. Details of these activities are given elsewhere in this section.



Cydnor Biddison, Jr.

Cydnor M. Biddison, Jr., BS '40, is vice president of Hillman, Biddison & Loevenguth, consulting structural engineers, in Los Angeles. Biddison is a past president of the Structural Engineers' Association of Southern California and the Structural Engineers' Association of California. He has been a member of the board of directors of several engineering groups, including the Consulting Engineers' Association of California, the Western States Conference of Structural Engineers, the Construction Specification Institute, the Institute for the Advancement of Engineering, the Los Angeles Community Design Center, and the Los Angeles Council of Engineering Societies.

He is a registered civil and structural engineer in California and a registered professional engineer in Nevada and Montana.

A member of the Alumni Association since his graduation, Biddison has been an active supporter of the Alumni Fund. His firm recently established a scholarship at Caltech to be awarded annually to an undergraduate for outstanding scholastic achievement.

John Fee

John R. Fee, BS '51, is executive vice president of James M. Montgomery, Consulting Engineers, Inc., Pasadena. A civil engineer registered in California, Florida, Hawaii, Idaho, Nevada, and Virginia, he is a fellow of the American Society of Civil Engineers and of the Institute for the Advancement of Engineering. He is also a member of the American Water Works Association, the Federal Water Pollution Control Association, the American Society for Testing Materials, the American Association for the Advancement of Sciences, and the Consulting Engineers' Association of California.

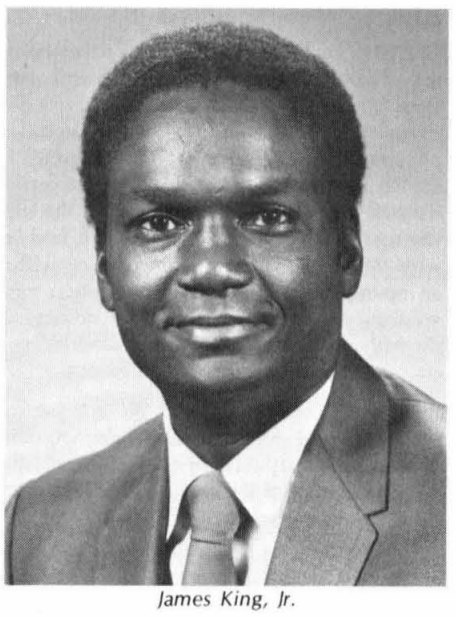
He currently is the vice president of the IAE College of Fellows and chairman of the CEAC Business Practices Committee.

Active in the Alumni Association for many years, Fee was a member of the Seminar Day Committee in 1952-54 and chairman of the Program Committee in 1955-56. He was a director of the association from 1956 to 1958 and again from 1960 to 1969. From 1960 to 1969 he was its treasurer and since then has been its treasurer emeritus. He also is the permanent secretary of the class of 1951 and a member of the Gnome Club.

James King, Jr., MS '55, PhD '58, is the manager of user development programs in the Office of Technology and Space Program Development at JPL. Recently on a leave of absence from JPL, King worked for NASA for two years in Washington, D. C., first as director of shuttle environmental effects in the space shuttle program and later as director of the upper atmospheric research program in the Office of Space Science. Before his assignment to NASA he managed the JPL physics section. Previously he worked for Electro-Optical Systems in Pasadena, investigating the conversion of solar and nuclear energy into electrical energy.

He is listed in the 1967 edition of *The Outstanding Young Men of America*, the 1974 edition of *The Current Blackman, 1970*, and the 1970-74 editions of *Who's Who in the West*. King was nominated for the 1966 Distinguished Service Award of the U. S. Jaycees and received a certificate of merit from the National Council of Negro Women in 1968.

He is a member of Phi Beta Kappa, the American Physical Society, the American Chemical Society, the American Geophysical Union, the American Association for the Advancement of Science, and the Society of Sigma Xi. He has been a consultant to the Los Angeles Air Pollution Control District and was a member of its Science Advisory Committee from 1972 to 1974. He is a member of the Caltech Alumni Association.



James King, Jr.

Louise Kirkbride, BS '75, MS '76, is an engineer in the Communications Research Division at JPL. Before receiving her BS degree from Caltech, she worked for a year with the Burroughs Corporation in Santa Barbara.

Kirkbride is a member of the Alumni Seminar Day Committee and the Gnomes. She also belongs to the Institute of Electrical & Electronic Engineers and the Alumni Association.

Louise Kirkbride

Philip L. Reynolds, BS '58, MS '59, is a partner in the law firm of Latham & Watkins, Los Angeles. After working in the Solid Rocket Plant of Aerojet-General Corporation, Sacramento, he received his law degree from Harvard Law School in 1965.

Reynolds has been a member of the Caltech Alumni Seminar Day

Philip Reynolds

Committee since 1971 and is general chairman of the 1977 Seminar Day Committee. He is a life member of the Caltech Alumni Association. He also belongs to the American Bar Association, the California State Bar Association, and the Los Angeles County Bar Association.

Annual meeting to be June 23

NOTICE IS HEREBY GIVEN that pursuant to the bylaws of the Alumni Association, California Institute of Technology, the annual meeting of the members thereof will be held on Thursday the twenty-third day of June, nineteen hundred and seventy-seven, at 6 p.m. in the Athenaeum, 551 South Hill Avenue, Pasadena, for the purpose of receiving results of the election of officers and directors and for the purpose of transacting any and all business that may properly come before such meeting of the members.

JOHN D. GEE, BS '53, PRESIDENT
JOSEPH A. DOBROWOLSKI, BS '49, SECRETARY

PERSONALS

1932
E. C. KEACHIE retired from UC Berkeley and is now professor of industrial engineering, emeritus. Chet and his wife, Grace, continue to live in Berkeley and send their best wishes to their old friends.

1935
BERNARD B. WATSON, PhD, after 23 years with the General Research Corporation and its predecessor organizations, retired in May 1976. He is now in the travel business.

1936
EUGENE BOLLAY, MS, a consulting meteorologist in Santa Barbara, California, was awarded the 1977 Charles Franklin Brooks Award by the American Meteorological Society "for his remarkable leadership in Society affairs as counselor, commissioner and president; and for his exemplary efforts as a champion of the Society's efforts on behalf of private meteorology in the industrial sector."

RAYMOND H. F. BOOTHE, MS '37, recently returned from an 18-month assignment in Madrid, Spain, for the Bechtel Power Corporation.

HUGO A. MENEGHELLI retired December 31. He had been manager of Tire Development Operations for General Tire and Rubber Company in Cuyahoga Falls, Ohio. "I have no definite plans except to travel a bit and read books I've always meant to read but never got to," he writes.

1943
CHARLES V. CHENAULT is retired and is a solar energy consultant and engineering advisor for building air conditioning and heating systems in Houston.

1946
TECK A. WILSON writes, "I returned, as of the first of the year, from the land of fine food and drink and dreadful weather (Belgium) to just the opposite — as president of Teledyne Ryan Aeronautical in San Diego."

1949
WILLIAM H. SIMONS, vice president of operations for Circle Seal Corporation of Anaheim, California, a manufacturer of high-technology precision controls for modern fluid systems, has been promoted to executive vice president in charge of the management of the corporation and its subsidiaries.

1950
HAROLD A. STREAKER has been elected vice president of materials supply of the Arabian American Oil Company in Saudi Arabia. He joined Aramco in 1954.

1953
DOUGLAS C. McLEAN, physics instructor at North Idaho Junior College, Coeur d'Alene, writes, "Naturally, North Idaho College won the first annual beer-keg catapult contest, since I was chief advisor to the design sector — a 2.14 stone keg, 357 cubits range."

1957
FREDERICK J. BEUTLER, PhD, was appointed to a five-year term as chairman of the computer, information, and control engineering program at the University of Michigan, Ann Arbor.

VLADIMIR A. HVOSCHINSKY, MS, is managing director of Eurintrade (a subsidiary of Belgian Bank Bruxelles-Lambert) at the firm's Moscow office. "Inquiries from alumni interested in doing business with the USSR are accepted," he writes.

DAVID H. NISSEN writes, "After two and a half years analyzing energy demands at the Federal Energy Administration, I've been appointed director of the energy systems modeling and forecasting office. Among other activities, this office has the lead in the analysis and production of the FEA's *National Energy Outlook*."

DOUGLAS G. RITCHIE has been appointed vice president, engineering, of Konigsberg Instruments, Pasadena. Ritchie joins Konigsberg after serving as deputy general manager of Ailtech West, a Cutler-Hammer Company in Los Angeles County.

GARY A. ZIMMERMAN, dean of science and engineering at Seattle University, was elected to the board of directors of the American Association for Clinical Chemistry.

1961
HENRY I. ABRASH, PhD, has returned to his position as professor of chemistry at Cal State University, Northridge, after taking his sabbatical at the Carlsberg Laboratories in Copenhagen, Denmark.

ROBIN L. HEATH, associate professor of biology and biochemistry at UC Riverside, has returned from his sabbatical in York, England.

1962
EVAN E. HUGHES, JR., MS '63, PhD '69, writes that he left his job at SRI and is now in charge of the geothermal energy and fuels office of the California State Energy Resources Conservation and Development Commission in Sacramento.

JOHN A. NEWMEYER, epidemiologist, writes, "I've acquired a beautiful Victorian house on Lafayette Park in San Francisco where I live merrily with five friends. I continue to do research and administration for the Haight-Ashbury Free Medical Clinic."

1963
BRIAN C. BELANGER has accepted a new job as scientific assistant to the director of the Institute for Basic Standards, U.S. National Bureau of Standards, in Washington, D.C. Earlier he had been project officer for the U.S. Atomic Energy Commission.

MALCOLM L. HEIMER, MS, received his PhD in electrical engineering from the Pennsylvania State University in May 1976 and is now assistant professor of electrical and biomedical engineering at Vanderbilt University in Nashville, Tennessee.

ARTHUR B. ROBINSON and his wife, Laurelee, announce the birth of their first child, Zachary Wahl, on July 6, 1976. Robinson is president and director of the Linus Pauling Institute of Science and Medicine in Menlo Park, California, which emphasizes research in preventive medicine and nutrition.

1964
DAVID A. HAMMER was appointed associate professor of electrical sciences and engineering at UCLA.

MALCOLM C. MORRISON, PhD '69, writes, "My wife of two years, Roxane Florien, and I moved this past year to a 50-year-old farmhouse in Silverado, California. I'm vice president of production and engineering for Chemical Systems, Inc., in Santa Ana."

MICHAEL T. WAUK has been named manager of chemical vapor deposition research and development for Applied Materials, Inc., of Santa Clara, California. The company is a leading supplier of process systems, materials, and induction power supplies for the semiconductor industry and other industrial markets. Wauk was formerly affiliated with Hughes Research Laboratories.

JAMES C. WHITNEY has been appointed vice president of research and development at Dictaphone Corporation, Rye, New York.

1965
GEORGE C. BRACKETT writes, "After receiving a PhD in physics (experimental solid state) from UC Berkeley in 1970, I spent five years there working on improved methods of physics instruction in the graduate group in science and mathematics education. I accepted a position as instructional designer at the University of Mid-America in July of 1976, and am now developing multi-media courses within an open-university consortium of eight midwestern universities. (Most have nothing to do with physics — my present work is on a course in Japanese history and culture.)"

ROGER C. DAVISSON, MS '66, is a partner of Brentwood Associates, a Los Angeles-based venture capital investment firm. He and his wife announce the birth of their first child, Julie, born November 1975.

1966
JONATHAN F. CALLENDER tells us that he is married, has three children, and is associate professor of geology at the University of New Mexico, Albuquerque. He was recently elected president of the New Mexico Geological Society.

RONALD L. CONSTABLE writes that he is an advanced systems engineer with Lockheed and he and his wife, Linda, became parents of their first child, Jennifer, on September 26.

WILLIAM L. GAVAN, MS, is manager of shops and the northern area maintenance department for the Arabian American Oil Company of Saudi Arabia. He has been with the company for the last six years, working in new construction, producing operations, and maintenance, and enjoys life in Arabia.

A. STEWART HOPKINS, MS '67, is a senior analyst and project manager with NASA's Institute for Advanced Computation, which defines and designs computer programs for the advanced parallel processor, the Illiac IV. Hopkins is responsible for earthquake fault simulation.

DAVID W. SCHWARTZ writes, "I live and work at Synanon Foundation, Inc. After finishing at CIT, I went to UCLA Medical School for my MD training. I did two years of training in pediatrics at Cedars-Sinai Medical Center until 1973. Since finishing my training, I've been working as a family practitioner and emergency medicine specialist. My job at Synanon has included the development of a community aerobics exercise program, a very successful weight reduction program, a high fiber-no refined sugar diet for the whole community, and the use of the Synanon game to help people learn about health. The Synanon game involves a candid conversation among 12-14 people seated in a circle and is a fantastic method of communication."

PO KEE WONG, Eng, is president of System Research Company of Brookline, Massachusetts.

1967
THOMAS J. BUCKHOLTZ, senior scientist with Insurance Technology Company, a consultant in the theoretical physics division at Lawrence Livermore Laboratory, and owner of T. J. Buckholtz & Associates, is married and living in Piedmont, California.

ROBERT W. CLAYTON, MS, is a project engineer with Kaiser Aluminum and Chemical Corporation in Ravenswood, West Virginia.

1968
ARTHUR D. STRUBLE III, MS, is a lieutenant commander and aeronautical engineering duty officer in the U.S. Navy. He is also an air launch missile systems officer in charge of weapons systems for all Navy and Marine aircraft in the Pacific Theatre.

1969
SEBASTIEN M. CANDEL, MS, PhD '72, presented his French thesis on January 26 and received the title of "docteur es sciences avec la mention très honorable" from the University of Paris VI.

RALPH E. ROPER, JR., MS, received his PhD in environmental engineering from Purdue University in June 1976 and is an environmental engineering consultant with H. B. Steeg & Associates of Indianapolis.

GREGG F. WRIGHT has a two-year fellowship in school and community pediatrics at the University of Texas Medical Branch in Galveston. His wife, Dr. Chris Wright, will be a chief resident in pediatrics in 1977-78.

1970
RICHARD R. BURTON, programmer at Bolt, Beranek & Newman, Inc., in Cambridge, Massachusetts, received his PhD in information and computer science from UC Irvine in June 1976. In April 1976, his volleyball team placed seventh in the national championships.

DENNIS E. POCEKAY is doing his internship in internal medicine at UC San Diego.

1971
THOMAS C. GUNDERSON, MS, received his PhD in environmental engineering from the University of Florida in 1975 and is working as an environmental engineer at Los Alamos Scientific Laboratory in New Mexico.

THOMAS R. JOSEPH, Fullerton, California, received his PhD in electrical engineering at USC in June 1976 and is working in the grounds systems group at Hughes Aircraft Company in microwave acoustics.

1972
NELSON E. BRESTOFF, MS, left his position as a deputy city attorney for Los Angeles to become a candidate for Los Angeles city controller, a non-partisan office, in the April election.

CHRISTOPHER DIAMANTOUKOS was appointed assistant actuary in the commercial line actuarial division of the Insurance Services Office of New York in July 1976.

GARY K. REEDY married Kathleen Burton in April 1976 at Yale University, where he earned MS and PhD degrees in applied physics. They live in Richland, Washington, where he works for the Exxon Nuclear Company.

1973
SANFORD A. BOLASNA, MS, has been promoted to senior associate programmer at IBM's General Product Division, San Jose, California.

MARVIN R. MANDELBAUM is working as a systems consultant for I. P. Sharp Associates, a computer services firm. In May 1976 he married Elizabeth Sheldon and they live in Rochester, New York.

1975
PAUL D. GOODSON received his MS degree in chemical engineering from the University of Wisconsin and works for TRW in McLean, Virginia.

OBITUARIES

1909
NATHAN A. BOWERS of Portola Valley in July 1976. He was a consulting civil engineer.

1925
LEO M. MILLER in November 1975. He was retired.

1931
HARLAN B. ROBINSON, MS, in December 1976. He was retired.

1932
FREDERICK W. BOWDEN, MS '33, on November 23, 1976. When he retired several years ago, he was head of the electrical engineering department at Cal Poly, San Luis Obispo, where he had been a professor for 23 years. Bowden is survived by his wife, Margaret, a son, and a daughter.

WALTER L. JOHNSON, MS, on October 26, 1976, of a coronary. He was retired.

1933
FRED B. BOWMAN, MS, in December 1976 from injuries from a fall at his home in Billings, Montana. He was a retired civil engineer for the Bureau of Reclamation.

1935
HOWARD M. McCOY, MS, Eng '41, in 1976. A resident of Baltimore, Maryland, he was a consulting engineer.

1937
ROBERT G. H. MEYER, MS, on November 22, 1976. He was a retired U.S. Army Colonel.

1938
L. BRUCE KELLY on December 3, 1976. A retired captain in the U.S. Naval Reserve, he was employed as a mechanical engineer in the engineering division of the Naval Plant Representative Office in Pomona, California. Surviving are his wife, Betty, a daughter, and a son.

Placement Assistance
To Caltech Alumni

The Caltech Placement Service may be of assistance to you in one of the following ways:

(1) Help you when you become unemployed or need to change employment.

(2) Inform you of possible opportunities from time to time.

This service is provided to alumni by the Institute. A fee or charge is not involved.

If you wish to avail yourself of this service, fill in and mail the following form to:

Caltech Placement Service
California Institute of Technology
Pasadena, California 91125

Please send me: (Check one)

☐ An application for placement assistance.

☐ A form indicating a desire to keep watch for opportunities although I am not contemplating a change.

Name .....

Degree(s) ..... Year(s) .....

Address .....

.....

Caltech tour guides

Students show off the home-site

"Caltech welcomes visitors, and experienced student guides conduct tours throughout the year. Times: Monday, Thursday, and Friday — 3 p.m., Tuesday and Wednesday — 11 a.m. Meeting place: Monday through Friday — building No. 71. For special tour arrangements (more than 10 people) call the Office of Public Relations, 795-6811, ext. 2326."

from "A Vistor's Guide to the California Institute of Technology"

Tour guides come in any size, any shape, any option, any house, but they all wear yellow or blue polo shirts with a Caltech logo, and they are all adept at walking backwards and talking, at answering questions, and most difficult of all, keeping visitors from lingering too long at particularly fascinating tour stops. They are all interested in people and proud of Caltech.

Tourists, for the most part, fall into two categories. Special groups have reservations and include classes of junior and senior high students, alumni reunion groups, school science clubs, senior citizens. They usually require several guides at special hours. Drop-in visitors come at the scheduled times mentioned above; they include prospective students and their parents, long-time Pasadena residents curious about Caltech, local southern California people who "do" places of interest, and out-of-state visitors intrigued by the research at the Institute.

The tours are touted as taking an hour, but the guides can be flexible if they don't have classes — or a paid-for lunch ticket. It really takes about an hour and a half of brisk walking, and little loitering, to scan most of the points of greatest interest. People taking a tour will find themselves skipping several of the stops described in this article because of the time factor. However, anyone who is interested in a particular area should mention it to the guide, who will be happy to include it.

Tours start at the Public Relations building on the north side of San Pasqual, third house from Wilson (parking in the rear). The tour usually starts out to the south, into Church. Down the steps, and down again, into the subbasements of Alles to visit the SEM and the TEM, microscopes that peer into the smallest worlds.

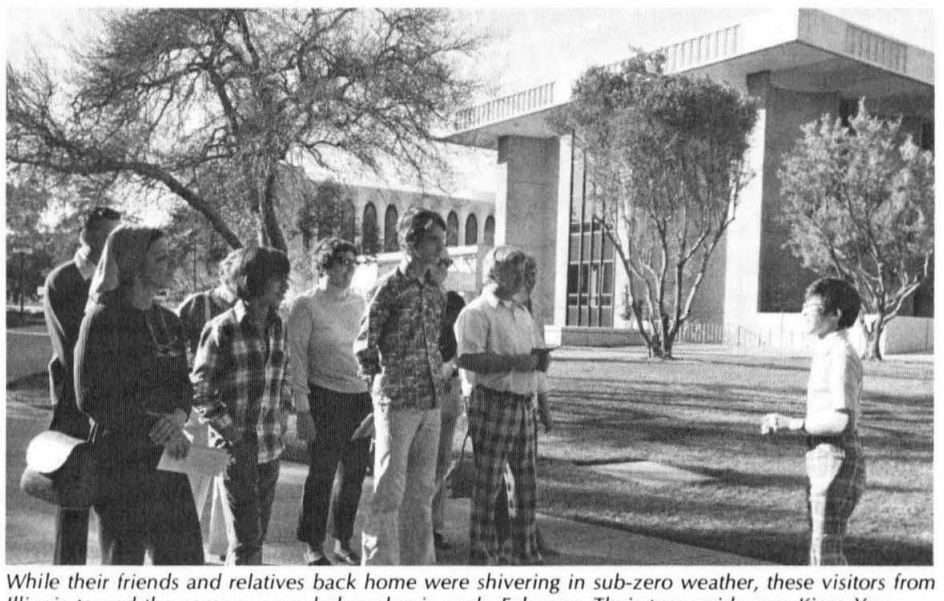
The tour surfaces in Kerckhoff (the buildings melt into one another; some visitors are bewildered), and moves on down Wilson Avenue to the South Mudd Building. Here, the tour schedule is already in trouble; there's too much to see and too many questions to ask. The wall photographic mural of Mars shows its Grand Canyon as wide as the whole United States; three seismographs in the lobby print endless squiggles; a Viking seismometer model is in a case; upstairs, satellite maps pick out the unmarked border between the United States and Mexico by the difference in vegetation; and the computers record data from seismometers all over southern and Baja California.

When the guides can get the tour out the door, they proceed to another showstopper, the rocks, crystals, and gems in glass cases in Arms. But before the group has quite enough time to take in the colors and sizes, the tour moves on, stopping briefly in Bridge to see the world's smallest motor.

Then it's back to the basements, this time in Kellogg to see the tandem accelerator and some pictures showing the struggle to get it underground. Up to the sunlight and over to Lauritsen-Downs to the old Synchrotron Laboratory. Here, where the 200-inch mirror was ground, new windows on the universe can be seen under construction — 10-mm radio telescope dishes for the Owens Valley Radio Observatory.

Then the tour moves toward the north, although sometimes, if there's time, it goes east down Olive Walk between the student houses to take in the tape decks and records floating the sounds of the Grateful Dead into the sunshine.

But usually the tour moves north to Jorgensen and the computer terminals where visitors might possibly watch the guide ask the PDP-10 to describe what it's doing. (One of the things it lists is that it is being asked what it is doing!) Then the group is off to Keck and the subbasements again, this time to see the water tanks, the waves, and the model harbors. (No one on a Caltech tour leaves thinking that the buildings are all above-ground here; visitors have gotten impressions of a race of moles inhabiting endless subbasements. Too bad the steam tunnels are off limits.)



While their friends and relatives back home were shivering in sub-zero weather, these visitors from Illinois toured the campus on a balmy day in early February. Their tour guide was Kimo Yap.

Then the cool elegance of the Court of Man appears. Sometimes the tours look into Baxter, with the unstraight corridors and the art gallery. Sometimes they look into Beckman Behavioral Biology Laboratory. Then they head down to the subbasements in Noyes for the famous tennis ball experiments, a stunt pulled off with the aid of liquid nitrogen.

Finally they wind up back in Public Relations — the last stop (unless there are prospective students in the group; in that case, the guide will walk them back to admissions where they can pick up some literature on the Institute and ask questions).

The guides have an easy way about them. They talk between buildings about the off-campus facilities, about the students, about ponding. (It's an honor to be tossed into the Millikan pool; it's not an honor to be thrown into either the Baxter or Beckman Labs pool.) They do a remarkable job of knowing the campus as a whole and fielding questions.

The five regularly scheduled guides are seniors Steve Hurst, Paul Tuinenga, and Alan Silverstein, and juniors Chris Wheeler and Kimo Yap. (There are about a dozen more trained tour guides for backup and for special groups.) Hurst, from Peoria, Illinois, chemistry major, and a member of the freshman admissions committee, is a gourmet cook who specializes in making cherry pie from scratch; Tuinenga, from Homewood, Illinois, electrical engineering major, is completing his undergraduate work in three years; Silverstein, from nowhere (he traveled around with his parents in the Air Force), an engineering major, is a master at computer art; Wheeler, from Sarasota, Florida, applied physics major, a member of the freshman admissions committee, and a photographer for the *California Tech*, is an avid snow and water skier; and Yap, from the San Fernando Valley, a chemistry major who may double major in English, is famous for walking backwards and for his umbrella.

Most of the guides were recruited by friends who have had a stint of guiding, and most of them keep at it for two or three years. They're good at sizing up a group, quelling seventh graders, and walking slowly for the senior citizens. They know what question they're going to have to answer too; this year it's, "Can we see the earthquake center?" The answer is yes.

Caltech's mini-might

Known on campus as "the world's smallest motor," the McLellan Micromotor in East Bridge is a regular stop on Caltech tours. It is 1/64th-inch cubed, in size, and it has an output of one-millionth of a horsepower. An AC electric two-phase permanent magnet synchronous device, it weighs 250 micrograms, operates on milliamperes at millivolts and runs at 1200 rpm for all of 10 seconds. Viewers can watch it in action through a magnifying mirror. The motor was constructed by William H. McLellan, BS '50, in 1960 in response to a challenge by Professor Richard Feynman, who was interested in new techniques in microminiaturization.

Information retrieval systems

Sleuths in the library gain new allies

"Nothing's so hard but search will find it out," mused poet Robert Herrick back in the 17th century. Little did he know that he was describing a 20th-century marvel — computer-based information-retrieval systems. And Caltech's library staff, which has recently acquired two of them, happily agrees with Herrick.

The first of these systems, in Millikan Library's cataloging department, consists of a computer terminal linked by direct telephone wire to the Ohio College Library Center (OCLC) in Columbus. OCLC is a nationwide cataloging consortium, and its shared cataloging program has an extraordinarily large data base — almost two-and-a-half million catalog records as of early October.

Caltech librarians searching for bibliographic data or wishing to catalog their own acquisitions can obtain information from OCLC in several different ways. If they want to use the system on-line, the computer terminal screen will print out the information requested in three or four seconds. If they need printed cards — off-line — the computer will send the cards to them in two or three weeks, neatly arranged in alphabetical order for convenient filing.

The system also provides the names of publishers — which aids in ordering books, and it lists which other libraries have the books in their collection to help in interlibrary borrowing.

The second of Millikan's new information-retrieval systems is somewhat different. A computer-linked literature-search tool has been installed in the centrally located Aeronautics Library in Guggenheim. This terminal, which produces printouts, is locked into Palo Alto by a telephone line to the Lockheed DIALOG Information Retrieval Service, which has access to 42 different international data bases. Information in books, journals, and reports on symposiums and meetings can be found and immediately printed on-line. For less cost, it can be printed off-line in Palo Alto and mailed to Caltech — a procedure used when a fairly large number of references, for example, abstracts, are needed. Information can be obtained from the literature in the fields of science, social science, technology and engineering, and business and economics. Incidentally, about two-thirds of all the material searched for in these fields can be found in the Caltech libraries — if you know where to look.

New scale boosts accuracy of big quake recordings

A new earthquake magnitude scale is being developed that records the amount of energy released by the great earthquakes more accurately than the Richter scale, according to Hiroo Kanamori, Caltech professor of geophysics.

Kanamori said the Richter scale tends to underestimate the amount of energy released by great earthquakes. As examples he cited the Chilean quake of 1960 with a magnitude of 8.3 on the Richter scale and 9.5 on the new scale, and the Alaskan quake of 1964 with a Richter-scale magnitude of 8.4 and a new-scale magnitude of 9.2.

The revised magnitudes mean that the energy release in the Chilean quake was over 60 times stronger than it was initially believed to be, and the Alaskan quake was 15 times greater than initially believed. The revised readings for the new quakes are the first magnitudes above 8.9 that have been given to earthquakes in this century.

Much of the development of the new instrument was done at Caltech, first by the late Hugo Benioff and then by Frank Press. Press, now head of earth and planetary sciences at MIT, did part of his work while he was at Columbia University and much of it at Caltech while he was director of the Seismological Laboratory from 1957 to 1965. Two Caltech engineers, Francis Lehner and Ralph Gilman, also were involved in developing the long-period instruments.

Hiroo Kanamori

The Richter scale was created in 1935 by Charles Richter at Caltech. It was originally designed to measure earthquakes in California but then was refined by Richter and the late Beno Gutenberg to apply to quakes throughout the world. The Gutenberg-Richter scale has been used for 40 years.

Kanamori pointed out that the magnitude of an earthquake on the Richter scale is measured by using seismic waves of up to 100 kilometers (62 miles) in length from crest to crest. These waves measure accurately the amount of energy released in earthquakes whose fault length is comparable to that wavelength — about 100 kilometers. An earthquake's fault length is the portion of the fault that was disrupted in generating the temblor.

If the fault length is much longer than 100 kilometers, then the Richter scale begins to underestimate the energy released, according to Kanamori. The fault lengths of the Chilean and Alaskan quakes are about 700 to 1,000 kilometers and are much longer than the seismic waves used in the Richter scale.

The new scale is based on measurements of seismic waves of more than 500 kilometers (300 miles) that are much more difficult to record than shorter waves. But in the past 20 years instruments have been developed that can record them, and during this time theories have been developed that have enabled seismologists to interpret the waves accurately in terms of the energy released in the earthquake.

Peter Dewees entices a haunting melody from his musical saw.

Don't shiver and shudder; it's just a musical saw

A sound like a mournful wind wailing around a haunted house on a stormy night — to the tune of "Greensleeves," no less — is enough to jar any Techer loose from his concentration on Physics 1. But the source is less mysterious than the sound. It's just Peter Dewees, Ruddock House resident, playing his musical saw.

A sophomore majoring in biology and chemistry, Dewees became interested in musical saws through television. He decided to buy one and teach himself to play it, but discovered that they aren't easy to obtain. Eventually he found a music store that could order one for him — with a six-month wait that ended in December.

The saw is made of high-tempered steel and is more flexible than a regular saw. It's also, he adds emphatically, more expensive.

Dewees says he hasn't had many requests to play the instrument and he explains "I generally play for myself, behind closed doors. I have no plans to go on concert tours in the near future." Around the campus he carries the saw in a specially made bag along with his dulcimer — an Appalachian folk instrument he taught himself to play four years ago.

How have his friends responded to the saw's eerie tones? Says Dewees, "I sure get a lot of weird looks."

Conny Tanasale recuperates after coaching the Caltech Soccer Club through an undefeated season.

Soccer Club gains a new coach—and a championship

A Caltech team with an undefeated season! Supposition? Flight of fancy? Indeed not. It *has* just happened here.

The 1976-77 Caltech Soccer Club* — coached by a woman who spent the entire season on crutches — has delivered a no-loss, seven-win, one-tie record to the Institute's athletic archives.

How did it come about? Last fall when the 40 or so faculty, staff, and graduate students were reorganizing their coachless forces for the new season, they decided they needed a mentor. If Conny Tanasale would accept their invitation, they knew they would be getting an expert. Mrs. Tanasale is the only woman in California licensed by the United States Soccer Federation (USSF) to referee soccer; she has been coaching youth groups in the Pasadena area for more than five years, and she played European handball (a sport very similar to soccer) in her native Holland before she came to the U.S. in 1960.

The Caltech team not only got Mrs. Tanasale and her expertise, but with it the season's championship — which included defeating such formidable opponents as USC, UCLA, UC's Irvine and Riverside, and Cal State LA.

Tanasale herself modestly defines her greatest contribution to the team as "my good loud voice." Because she was on crutches — from a back injury received in 1975 — and could not "hopscotch around the field like a good coach should," she compensated for it by shouting constant advice, direction, and support to her players.

"Her enthusiasm was terrific!" says graduate student A. J. Hill, Jr., one of the team's outstanding players.

Another ploy of Coach Tanasale's to make up for her physical limitations was to use her children as role models. (With the Tanasales, soccer is a family affair. Husband Gus is also a coach and referee, and the couple's 13-year-old daughter and 12- and 9-year-old sons are expert players.) The three volunteered to demonstrate playing positions and technique, which their mother was unable to do.

**Not to be confused with the undergraduate soccer team.*

Was there any hassle because she was a woman coach?

"Absolutely not," Tanasale says. "I am very authoritative, very assertive. I don't think my being a woman made any difference to our team or the opponents."

One of the season's results that might be attributed to Tanasale's sex however — or, more appropriately, to her "ladylike influence" — was the pep talk she gave the team about behavior toward the referees.

"I've done so much refereeing myself," she explains, "that I know that the best of us make many mistakes. I told the team it just wouldn't do to put up a fuss."

Consequently, the Caltech team received an unprecedented number of compliments from the referees throughout the season to the effect that they were the *only* team that didn't make objectionable statements in the field — and didn't get into fights.

"We didn't get a trophy or a pennant for winning the championship," Tanasale said from her hospital bed where she was taken for rehabilitation treatments the week the soccer season ended, "but there were many rewards."

One of the best remembered of these came at the end of the last match. Undefeated Caltech was pitted against unbeaten Woodbury University. When the final whistle blew, with Caltech ahead 3 to 2, the entire team, sweating and grinning, descended on her, crutches and all, hugging and kissing her in their delight at their victory.

That's one of the special payoffs of being a coach, she concludes. And she has accepted the position again for the 1977-78 season.

French government honors Alfred Stern

Alfred Stern, Caltech professor of philosophy, emeritus, has been elevated by a decree of the president of the French Republic from the rank of Knight (Chevalier) of the Legion of Honor to the rank of Officer in the historic order that was created by Napoleon I. In conferring the honor the French government praised Stern's "eminent activity in favor of France's cultural radiance in America."