

Three Caltech graduate programs rank number one in nationwide survey

Caltech ranked number one — either alone or with other institutions — in a recent report that judged the scholastic quality of graduate programs in mathematics and science at the nation's major research universities.

Caltech led the field in geoscience, and shared top rankings with Harvard in physics. The Institute was in a four-way tie for first in chemistry with Berkeley, Harvard, and MIT.

The report was the result of a two-year, \$500,000 study published under the sponsorship of four academic groups — the American Council of Learned Societies, the American Council on Education, the Social Services Research Council, and the National Research Council. It was funded by the Mellon-Ford and Sloan Foundations, the National Institutes of Health, the National Science Foundation, and the National Academy of Sciences.

The evaluations were based on a survey of 1,155 mathematics and science professors, or about 8 percent of all U.S. professors in those fields. The professors rated 228 institutions on "scholarly quality." Ratings were based on scores from 0 to 5.

The first report covers chemistry, physics, mathematics, geoscience, computer sciences, and statistics. Reports in the coming months will rate universities on programs in humanities, engineering, biological sciences, and social and behavioral sciences.



The Mead Laboratory is the setting for Chemistry 5, where Carlotta Paulsen uses a rotary evaporator to remove a solvent from a synthesized product. Paulsen is a junior majoring in chemistry.

Students in the Mead Lab: "Like kids in a toy shop"

By Winifred Veronda

Chemistry 3A has convened for its first fall session in the new Mead Laboratory, and first-term freshmen are recrystallizing their unknown acids.

"I'm having a great time!" says freshman Harold Felton, who plans to major in chemical engineering. "I'm like a kid in a toy shop."

"This is the best lab I've ever been in," says freshman Tom Tucker. "It has everything you could possibly need."

And indeed, the laboratory is the best that any undergraduate is likely to find, because the Clifford S. and Ruth A. Mead Memorial Undergraduate Chemistry Laboratory has been termed the most sophisticated in the country in terms of structure, instrumentation, and curriculum.

The lab — dedicated just last spring — has its origin in the February 9, 1971, earthquake. Gates Laboratory — for many years the site of freshman undergraduate chemistry instruction — was so badly damaged in the quake that it could no longer be used. When space was solicited on an emergency basis, Chemistry 3 was housed in ten different locations; other undergraduate chemistry labs were also spread around campus.

About a year after the quake, work was begun on a new undergraduate chemistry lab adjacent to Noyes Laboratory, and instruction started there in the 1973 fall quarter. Meanwhile, the undergraduate chemistry curriculum was beginning a transformation.

The requirement for three terms of freshman chemistry lab — in effect for many years — was reduced to one term (Chemistry 3A) and all freshmen were required to take it during the fall quarter. Chemistry 3B and 3C, emphasizing inorganic com-

pounds, became optional and were offered in the winter and spring.

But under this plan, there was an overlap in material that diluted the program's efficiency, blending persons in the same classrooms whose backgrounds varied widely. Some students took 3B and 3C before proceeding on to 46A and 46B, which focused on organic systems, while other students went directly into the organic program.

Another matter to be addressed stemmed from the fact that, across the country, the lines between inorganic and organic chemistry had become increasingly blurred. Explains Professor of Chemistry Peter Derivan, "We use common analytical equipment. We are both molecule builders in our efforts to invent new materials. We use common bonds for probing how chemical bonds are made and broken."

A redesign of the undergraduate laboratory curriculum seemed to be in order. This task was undertaken primarily by member of the professional staff Jane S. Raymond, director of undergraduate laboratories, and Professor of Chemistry John E. Bercaw. The redesign was completed in 1978.

In revising the curriculum Raymond and Bercaw (along with Derivan and Senior Research Associate William P. Schaefer) set three goals:

- Emphasize modern instrumental methods of analysis, separation, and characterization;
- Integrate experiments traditionally presented separately in organic and inorganic laboratories; and
- Prepare students to begin work in a research laboratory after a two-year program.

Explains Bercaw, "We want students who finish this program to be able to go right into a chemistry research lab and do meaningful work. Their background is almost equal to that of first-year graduate students." The program means that some students may begin independent research in their junior year.

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The new curriculum generated some controversy within the division. "Let's get them right into the research labs," said some members, "and let them learn by doing. This is what Caltech is all about."

"But," says Bercaw, "that approach requires that students be taught research techniques on a one-to-one basis. The big advantage of the new curriculum is that, when students *do* go into the research labs, they already have a grasp on basic research techniques."

In the new curriculum, Chemistry 3A stands alone while the other courses fit together in a sequence: Chemistry 4A features practical spectroscopy; 4B, chromatography, involving modern methods for separating compounds. Courses 5A and B get into sophisticated synthesizing techniques.

In the latter two courses, students learn modern methods for making a compound, and how to use a glove box and vacuum line as they work with compounds that react with air. They also are given exposure to the latest methods of synthesizing organic, organometallic, and inorganic compounds.

"The students who finish these courses know research techniques and methodology," says Bercaw. "They haven't refined the techniques, but they're not intimidated by them. If they have to put their hands in a glove box, they feel comfortable about what they're doing."

"This is a very ambitious program," he adds. "We expect the students to assimilate a lot of knowledge in a hurry."

But a major problem confronted the creators of the new curriculum: It emphasized the use of the most modern instrumentation, and students were being taught in a "temporary" lab with old equipment. They conceived a building to go with the curriculum — one that could be made a reality for \$1.2 million by



In Chemistry 3A, freshman Jeanine Gainey uses an analytic balance for accurate determination of the mass of the substance she is analyzing. Her TA (at right) is Stephan Witt, a graduate student in chemistry.

using the exterior of the existing structure and completely reconstructing the interior. The division gave the plan its solid backing and the building became a reality, thanks to a gift from the Mead estates.

The result, its designers believe, is the most sophisticated undergraduate lab in the United States in terms of structure, instrumentation, and

The result is the most sophisticated undergraduate lab in the country in terms of structure, instrumentation, and curriculum.

curriculum. They stress that not many universities could duplicate it, both because of the expense of the equipment and the high ratio of teaching assistants to students that the program requires. The ratio varies from about 6-to-1 in Chemistry 3A to 5-to-1 in 4B and 3-to-1 in 5B. All the teaching assistants in courses higher than 4A are graduate students.

Deceptively simple in its design, the building consists of two rooms, essentially identical except for instru-

mentation. One is used, three terms a year, for students in Chemistry 3A, while the other serves students in the more advanced courses.

All the work in the labs is done in a hood, or (for some of the experiments in Chemistry 5A and B) by using a glove box or vacuum lines. Each student is assigned a hood and small lab bench; a sink is shared.

Each hood is equipped with fixed and variable voltage electricity, water, air, steam, nitrogen, and house vacuum. There is no natural gas in the building. Heating mantles, oil baths, and steam baths substitute for Bunsen burners. Each hood has its own filter to protect the central vacuum system, and provision has been made for installing activated charcoal filters in the exhaust stream of each hood when that becomes necessary.

The hoods are arranged around the perimeter of each laboratory room, while at the center is a glass-walled room-within-a-room that houses all instrumentation. Students can see from their work stations whether an instrument they need is available, and teaching assistants can monitor students at the hoods and in the instrument room from any point in the laboratory.

In the Chemistry 3A lab, the central glass-enclosed room houses a basic set of beginning chemistry laboratory equipment. But in the second lab, where advanced courses are taught, students use instruments that are the envy of chemistry re-

search groups. Purchased through gifts from four corporations and a foundation (Varian Associates, IBM, Hewlett-Packard, Beckman Instruments, and the Camille and Henry Dreyfus Foundation), the equipment includes three nuclear magnetic resonance spectrometers (two of them new Varian 90 MHz instruments), two new Beckman infrared spectrophotometers, two new Hewlett-Packard gas chromatographs, and a new IBM liquid chromatograph.

Raymond and Bercaw have wondered whether entering Caltech freshmen will appreciate the facility and how special it is, or whether they may simply presume it is typical of college chemistry laboratories. But upperclassmen who can compare old and new are outspoken in their enthusiasm for the new building. "They all say they'd like to come back and take the courses over," says Bercaw. And the program's mentors note that an increasing number of students in other options are taking chemistry lab courses as options since the Mead Lab became a reality.

Meanwhile, Raymond is busy developing new techniques and new experiments for the chemistry students to perform. "This is one of the challenges in working with Caltech undergraduates," she says. "You have to work hard to keep ahead of them. And you get a lot of feedback: they won't hesitate to let you know what they think about the program or the material."

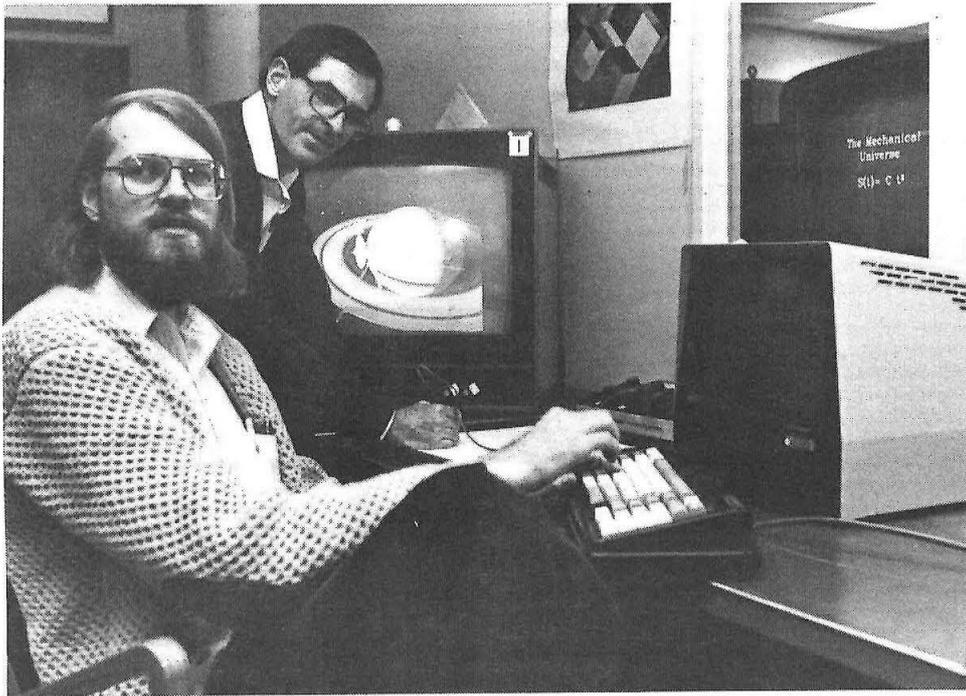
Some of that feedback comes from Jonathan Parker, a senior chemistry major, enrolled fall quarter in Chemistry 5.

"This is far and away the finest undergraduate lab I've seen," he says. "I can't imagine any other school going to the trouble or expense."

And with that the lab's creators are happy to agree.

AIChE gives posthumous award to William Corcoran

The late William H. Corcoran, the Institute Professor of chemical engineering, has been honored posthumously with the 1982 Warren K. Lewis Award for contributions to chemical engineering education by the American Institute of Chemical Engineers (AIChE). Corcoran, who died in August, was chosen for his teaching and research achievements.



Computer-graphics expert James Blinn (left) of JPL and Caltech Professor of Physics David Goodstein play major roles in creation of a college-level introductory physics course.

The Mechanical Universe: Caltech develops a physics course for educational television

A science series combining the visual resources of television with the academic rigor of a college-level physics course is being developed by Caltech with a \$1 million grant from the Corporation for Public Broadcasting (CPB)/Annenberg School of Communications.

Called "The Mechanical Universe," the series will consist of 26 half-hour programs, and will cover the standard topics in an introductory college course in classical mechanics — for example, the laws of motion and force discovered by such scientists as Galileo, Kepler, and Newton.

The series is being produced in cooperation with The Corporation for Community College Television (CCCT). Caltech Professor of Physics David L. Goodstein will be the project director and host.

Under the funding arrangements, Caltech immediately received \$500,000 to produce a half-hour pilot program for evaluation. The remainder of the award was made under a requirement that the Institute obtain enough additional funding to complete the \$2-million project. The pilot is scheduled for completion in January.

"The Mechanical Universe" is one of six television projects chosen by the CPB in February out of 227 proposed. The six projects share the first \$5 million of \$150 million in funds donated by Walter Annenberg, former U.S. ambassador to Great Britain.

Said Caltech President Marvin L. Goldberger, "We're quite excited by the prospect of the series. David Goodstein is a renowned teacher here, and his introductory physics course has received accolades and awards from the toughest group of critics any science teacher could ever face — Caltech students. For example, in 1981, he was named one of the outstanding teachers at the Institute by the student body." (Goodstein was the recipient of an ASCIT award for teaching excellence.)

"We expect 'The Mechanical Universe' to represent a benchmark in both science education and the use of television as an intellectual tool. We look forward to it, both as educators and as scientists."

Goodstein stressed that the series "will not consist merely of a series of dry televised lectures." The programs will involve animation, local shooting, and "the full range of special effects now common on television to make the series attractive and engrossing."

For example, he said, computer graphics expert James Blinn, famous for his animated films of the Voyager planetary encounters and his work on the "Cosmos" television series, is creating computer-animated equations, space scenes, and other sequences for the series.

Explained Goodstein, "The series will also probe the history, spirit, and methods of science, and application of the basic laws of mechanics. For instance, we'll delve into the notebooks of Nobelist Robert Millikan to show how he treated (or perhaps mistreated) data on his classic oil-drop experiment that revealed the charge of the electron.

"We'll discuss how the laws of conservation of angular momentum help us understand hurricanes, fire storms, and the shape of galaxies and solar systems. We'll show how basic laws are applied to navigation in space, to black holes, and to understanding how sound can break wine glasses and why the Tacoma Narrows Bridge collapsed.

"We hope to set a highly visible standard of science communication for both teachers and students. We also hope to show that it's possible to maintain academic rigor in such a series, because we will include a solid introduction to the mathematics needed to understand classical mechanics. For example, calculus will be taught as part of the course. We won't assume that students have had calculus beforehand.

"We believe the series is particularly important because American students today are poorly served by their science educations. They lag behind students in Japan, in Western Europe, in the Soviet Union, and there are signs that the situation here is getting worse, not better.

"Our schools are hampered by a lack of qualified science teachers. As a result, most students in the United States have foreclosed the possibility of a career in science or science teaching by the time they've reached the tenth grade — thus propagating the problem into the next generation. This is a vicious cycle that we must try to break."

According to Goodstein, "The Mechanical Universe" will be designed for use in conjunction with a text and teaching aids to be developed for the series. He expects it to prove valuable, both to students and to teachers, in high schools, community colleges, colleges, universities, and industries with continuing education programs.

Caltech Professor of Theoretical Physics Steven C. Frautschi will prepare the text for science majors, and Professor of Mathematics Tom Apostol will oversee the mathematical content of the series.

The national advisory committee for the course includes movie producer Frank Capra, BS '18; Shirley Hufstедler, former Secretary of Education and a member of the Caltech Board of Trustees; Frank Oppenheimer, PhD '39, director of the Exploratorium in San Francisco; and other prominent figures in science communication and education.

Industrial Associates research conferences open to alumni

The Industrial Associates of Caltech will sponsor these conferences over the next several months:

January 17-18: Earthquake Research Affiliates Conference. This conference will discuss what might happen if a repetition of the great earthquake of 1857 (magnitude 8+) were to take place on the southern portion of the San Andreas fault.

January 24-26: Multiphase Flows. Sessions will be devoted to subjects such as combustion processes, the thermohydraulics of multiphase flows, environmental multiphase flows, and multiphase flows in chemical engineering processes.

March 16-18: Frontiers of Catalysis. This conference will examine the implications of long-range fundamental studies for homogenous and heterogeneous catalysis.

March 21-23: Conference on VLSI. This conference will provide a forum for current research in very large scale integration (VLSI) of electronic circuits, with contributions from industry and from academic institutions.

May 10-12: Composites and Polymers. Polymers find increasing application in structural engineering designs where both short- and long-term load-carrying ability is a prerequisite. New developments in the field will be explored.

There are no registration fees for alumni, employees of Industrial Associates member firms, and members of the Caltech-JPL community and of other academic communities.

JPL imports VLSI design concepts by Mead

Carver Mead's class for Caltech undergraduates, EE 281, broke new ground in the early 1970s as it implemented Mead's beliefs about the humanization of computers and the creation of user-oriented machines. In the course, undergraduates from a variety of scientific and engineering disciplines received an intensive introduction to microelectronics and its applications, and then built their own integrated circuits.

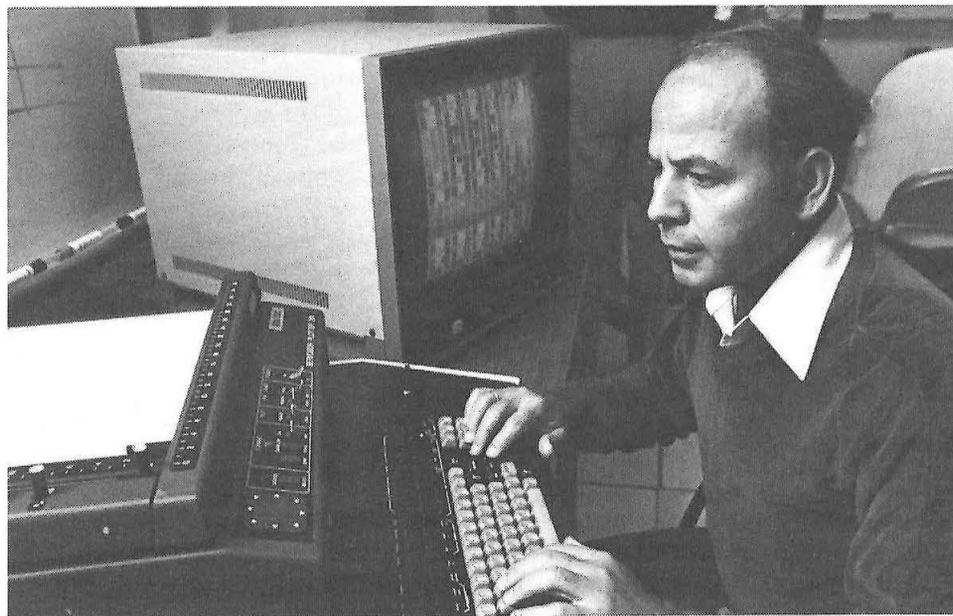
Mead's goal was to create an essentially new class of scientists and engineers: people with knowledge of the technology of computers and microelectronics but not restricted by the shibboleths and taboos inherent in each. These students went into many different areas, taking their knowledge with them, equipped to build powerful special-purpose electronic machines: machines to make people more efficient in their jobs and put more power at their fingertips — and yet leave them in control.

Mead went on to teach courses embodying the same concepts to engineers in industry, and in 1976, to engineers at JPL.

This year, the same philosophy, in a framework encompassing all that is new about VLSI (Very Large Scale Integration) is at the core of an ongoing series of courses being given to JPL engineers by a Caltech staff member. The courses are taught at JPL by George Lewicki, co-director of Caltech's Silicon Structures Project. The first class began in August and a second in October.

Enrolled in the courses are people experienced in systems or logic design but not necessarily in VLSI. Before the classes are over, they complete several VLSI design projects and submit them for fabrication. A course for managers (to help people managing the technology to understand the issues involved) is also going to be offered.

Provided as a part of the course is the use of design-automation software from Caltech (for circuit layout and design verification) on



Kamal Soliman, electronic parts engineer at JPL, displays the plot of a chip design on an AED frame buffer and color monitor. Soliman was a student this fall in a course in VLSI design taught at JPL by Caltech's George Lewicki.

loan for educational use and some software developed at the Lab. Part of the course format consists of videotaped lectures licensed from VLSI Technology Inc. These feature current leaders in the field, including Mead and some of his former students.

The common denominator in the backgrounds of the people chosen for the project, according to William Whitney (BS '51), section manager for the Information Systems Research Section at JPL, is that all of them can profit from the training because of opportunities to apply their new

design skills in their jobs. They come from diverse technical backgrounds, ranging from computer programming to reliability engineering.

Says Whitney of Caltech's experience in VLSI, "Caltech is at the frontier in teaching VLSI design, developing computer-aided design tools, and making fabrication capabilities available to students and faculty at universities and at systems houses like JPL. We want to apply this knowledge in our work."

Linda Getting, co-director of Caltech's Silicon Structures Project, hopes the educational program will lead to a closer relationship between JPL and Caltech in the development of VLSI technology, with Caltech conducting basic research and JPL developing and testing the concepts that evolve in the Institute's labs. Such an arrangement would help Caltech students, who could be involved as ideas progressed from conception on campus through the rigors and refinements of the final testing and qualification. And the arrangement would help JPL take advantage of state-of-the-art technology in its systems work.

Vogt named to new Avery Professorship

The R. Stanton Avery Distinguished Service Professorship has been established at Caltech, and its first holder will be Caltech physicist Rochus E. Vogt.

The professorship was endowed by Avery — chairman of the Caltech Board of Trustees and founder-chairman of Avery International, a Pasadena-based office products firm.

Said President Marvin L. Goldberger, "It is particularly appropriate that Stan Avery's gift be used to establish a Distinguished Service Professorship, because he is so widely known throughout southern California for his service to educational and cultural institutions.

"And no one could be more appropriate as the first person to hold the professorship than Robbie Vogt, who has combined a record of scientific achievement with one of dedicated administration."

Vogt, 52, is a high-energy astrophysicist and authority on cosmic



Rochus E. Vogt

rays. In 1969, he and Edward Stone founded the Caltech Space Radiation Laboratory, which developed numerous cosmic ray instruments flown on balloons, satellites, and space probes. He is principal investigator on the Voyager cosmic ray program.

Chairman of the Division of Physics, Mathematics and Astronomy, Vogt is a native of Germany. He received his SM and PhD degrees from the University of Chi-

cago and joined the Caltech faculty in 1962. He served as chairman of the faculty and as chief scientist at JPL, and was recipient, in 1981, of the NASA Exceptional Scientific Achievement Medal.

A member of the Caltech Board of Trustees since 1971, Avery became chairman in 1974. He holds honorary degrees from Pomona College, his alma mater, as well as Claremont Graduate School and Pitzer College.

He is chairman of the Board of Trustees of the Huntington Library in San Marino, a member of the Board of Fellows of Claremont University Center, and a member of the Board of Visitors of the UCLA Graduate School of Management.

He is a member of the Board of Trustees of the Los Angeles County Museum of Art and the Performing Arts Council of the Music Center, and a director of the Music Center Foundation and the Los Angeles World Affairs Council.

Ramo probes impact of information technology revolution

In the last few decades, the capacity within our society to store, process, and make use of information, through electronic technology, has increased enormously — and this capability affects the cost and qualitative performance of virtually every activity in which we are engaged, Simon Ramo told members of The Caltech Associates at the annual dinner in the Beverly Wilshire Hotel.

Ramo, who spoke on "The Triangle of Society-Technology-Liberty," is co-founder and director of TRW Inc., and chairman of the board of the TRW-Fujitsu Company. A long-time friend of Caltech, he is a Trustee, research associate, and visiting professor.

Along with the benefits of the revolution in information technology will come tremendous problems and adjustments for our society, he said, and we have no way of predicting what these will be — just as we could not have predicted the way television eventually would dictate our choice of presidential candidates.

Ramo noted that information technology can be used to make commerce and industry more efficient and economical, through effective coordination of production, shipping, and marketing. All of these functions could be coordinated effectively with sources of supply through electronic technology. "Imagine a whole nation wired up in this way," he observed. "What a tremendous economic difference this would make for the country."

The consequences could move the country, politically, in one of two directions, he suggested: toward a tightly controlled economy if the government so chose — or toward an increasingly democratic system. For example, he said that information technology would make it possible to ask people to vote electronically on what government programs and policies they would prefer. Such a system, he observed, "would probably give us more democracy than we could stand."

He pointed out that, using the same technology, it would be possible for entrepreneurs to propose new products — and if enough people placed advanced orders, to build plants and begin production. Foreknowledge of consumer demand would decrease risks for entrepreneurs, and initial purchasers could be given a discount.

Discussing the arms race between the U.S. and the Soviet Union, Ramo expressed strong optimism that neither country will launch a nuclear war because both sides are keenly aware of the consequences.

He noted that, in information technology, the U.S. holds a clear lead over Russia, and said that potentially, we could use this superiority to defeat the Soviets, should they ever invade Western Europe, by developing "smart" conventional weapons. These weapons would enable ground systems to be deployed at a minimum risk to U.S. lives, and could prove highly effective against an invading force.

Ramo expressed concern over the poor quality of science and mathematics education in U.S. schools, and over the low percentage of the U.S. population studying to become scientists and engineers, compared with the percentage in Western Europe and Japan. He noted that, at Caltech, the percentage of students earning PhD's in engineering is only two thirds of what it was ten years ago —

and that almost half of these graduate students are foreign citizens.

He also pointed out that the U.S. spends 40 percent of its research and development budget for military-oriented research, while Europe and Japan spend far more on research with applications for the civilian sector. As a result, he warned that we are setting ourselves up to be technologically inferior.



Mr. and Mrs. Andrew Campbell, Mr. and Mrs. Craig Norton attended The Associates dinner.



Mr. and Mrs. Charles Thomas (right) and their guests, Mr. and Mrs. Gardner Bickford.



Mrs. Charles Thornton, a guest of Dr. and Mrs. Ramo; Dr. and Mrs. Ramo; Mr. Rodney Williams, a guest of Dr. and Mrs. DuBridge.



Mr. Albert Burford, Mrs. Vernon Barrett, Mrs. Burford, Mr. Giles Hall.

Caltech was the first college or university to offer karate — and under Mr. Ohshima, it evolved as the most popular sport on campus.

By Winifred Veronda

As Joe Stupak recalls, karate was considered something of a cross between “a weird oriental cult and a form of mayhem” when he enrolled in courses in Pasadena under a young teacher who had just arrived from Japan.

Stupak (BS '66, MS '69) was so taken with the discipline, and with the teacher, Tsutomu Ohshima, that he asked Ohshima whether he would be interested in teaching a class at Caltech. Intrigued with Caltech's reputation, Ohshima eventually agreed, and in 1958 the Caltech Karate Club became the first to form on a college or university campus. As members of the first group, Caltech alumni have had a strong influence

most popular sport on campus with up to 60 participating during a term. When the club celebrated its anniversary last spring with a 25-year reunion, some 100 former members came back from throughout the United States.

(Their enthusiasm matches that of a dozen or so alumni in the Palo Alto area who practice two hours a day, three or four times a week, on the Stanford campus with Jim Sagawa (BS '63), a black-belt alumnus of the Caltech Karate Club and president of Shotokan Karate of America, as their teacher. It is alleged that some of the alumni moved to the Bay Area because the karate group was there — including one who migrated west from MIT.)

Karate and the discipline it offers

“At Caltech you can take physics from Feynman and karate from Mr. Ohshima.”

on collegiate karate across the country.

Stupak was the first captain. “My form was remarkable,” he says of his early days as a karate student. “Several years later, after a good deal of practice, it was suggested with some accuracy that I was the worst student Mr. Ohshima had ever had. Now he has been training students at Caltech for 25 years, and I hope that someone else has been able to claim that title.”

The initial reception to karate within the athletics department was restrained (although Coach James Nerrie greeted it with customary enthusiasm, Stupak recalls.) Until 1964, students paid Ohshima themselves; that year it became a regular part of the athletic program.

But there was no restraint in the enthusiasm of Caltech students, and over the years, karate evolved as the

have been strong attractions for Caltech students, but the greatest attraction has been their teacher — whom they address as “Mr. Ohshima” with a mingling of awe and affection. Floyd Herbert (BS '64) remembers that “in a very real sense, we were training to be like him. He's a very admirable person. It became an adage among students in karate that here we could take physics from Feynman and karate from Mr. Ohshima.”

This assessment is a valid one. A student of the founder of modern karate, Master Gichin Funakoshi, Mr. Ohshima holds a 5th degree black belt — the highest awarded by his teacher — and he is internationally recognized for his stature in the field. He is the chief instructor for Shotokan Karate in the United States and in five foreign countries, working with advanced students and with instructors. But only at Caltech does he teach beginners.

The current Karate Club captain, research fellow Malladi Subbaiah, comments, “Mr. Ohshima has a



Mr. Ohshima welcomes alumni who have returned to campus to celebrate 25 years of Caltech karate.

sentimental attachment to Caltech because it was the first school where karate was offered, and it is the only place where he is still in touch with beginners. He really enjoys this, because he knows how hard the students try.”

On the surface of it, an oriental martial art that emphasizes spiritual and intuitive development at least as much as physical capacity seems a strange discipline for rationally and analytically oriented Caltech students. But the two seem to work as a natural combination.

With a warmth that matches his capacity for discipline, Mr. Ohshima observes, “We don't believe that real strength comes from physical ability, but from a person's total strength as a human being. We train both the mind and the body, and we work to develop a clear consciousness. In karate, there is only one opponent — oneself — and Caltech students have a strong mental attitude. They push themselves hard. And while they may be physically less skillful than some others, they have a remarkable capacity to understand ideas from

another culture.”

They have also demonstrated a capacity for integrity that is an important ingredient in the training. For example, Mr. Ohshima enforces one requirement that, before the end of their first semester, students must crouch down and then hop 10 times back and forth across the gym. They may take as long as they need but they must finish — because it is a rule in karate that one must always complete what one undertakes. (“In karate you must be careful about the goals you set,” says Subbaiah, “because you have to meet them.”)

“In all the years I have taught here,” says Mr. Ohshima, “only one person in my class ever cheated on this exercise. He hopped across only nine times, but told me ten. I realized he had done this, and I was surprised that he had cheated. Then I learned that, although he was in the class, he wasn't a Caltech student.”

One of the reasons why karate has appealed to Caltech students is that the discipline does not require superior athletic potential. Rather, it takes a person where he is and goes on to develop composure, clearer thought processes, deeper insight into one's mental capabilities, and more self confidence — at the same time that it is toning the body, strengthening coordination, building stamina, and quickening reflexes — as well as integrating the hemispheres of the brain.

Floyd Herbert, who describes himself as “short,” suffered from asthma as a student, and says he “had a vague idea that it would be a good idea to learn self defense.” He watched the Karate Club members perform and decided to get involved.

“The approach fascinated me,” he says. “It's very intuitive and anti-deductive. Karate shows you how you make physical models with your mind about the way things are happening, and how these models lead you into errors.

“For example, I remember how once we were talking with Mr. Ohshima about the physics involved in a movement, and how the movement would be constrained by physical

laws. Then he proceeded to demonstrate the movement, and he proved that we were wrong. Our reaction was, 'He can't be doing that. We just proved by laws of physics that it's impossible.'

"Karate has had a tremendous effect on the way I view life, on my relationships with people, and on the way I face problems," Herbert adds. "In karate, you deal with a lot of pain, and over the years this helped me learn to endure hardships of various kinds a lot better. I developed psychological techniques for dealing with emotional as well as physical stresses."



With advanced students setting the pace, freshmen learn what Mr. Ohshima meant when he told them, "You came here to learn your own strength. Your opponent is yourself. Don't make any excuses."

Although he enrolled in karate to learn self defense, Herbert has never used it for that purpose. He notes that karate students are taught not to be drawn into fights if there is another alternative, and that the average student should perhaps have the occasion to use it only once in a lifetime. Because it teaches courtesy and respect for opponents, Herbert notes that you become less "hot headed" — and thus less likely to be drawn into conflict in the first place.

Karen Roberts (BS '74), an alumna of the Karate Club, met her husband, Jim Sagawa, when she joined the group he teaches in Palo Alto. Now she practices two hours a night, four nights a week. "Karate isn't based on strength," she says,

"and this is its attraction for a lot of people. You learn to face pain, fear — whatever you need to face to get through a situation. You take the attitude that 'it hurts, but I'm going to do it anyway.' Besides the physical skill and coordination, karate has helped me mentally to become more aware of my surroundings and more confident in them, to feel I can take care of myself if I need to."

It is fall now, and a new group of some 30 freshmen have converged for their first karate lesson under Mr. Ohshima. Torsos range from those heavily developed by weight lifting to — more typically — those best

described as skinny or spare. Several Caltech black belts assist Ohshima as he leads the class, acting as role models as they perform exercises, and guiding stragglers.

After a vigorous 30 minutes, some students are turning pale around the lips, but no one has fallen by the wayside. Exercises have been introduced; now it is time to speak of philosophy.

"Here we are seeking oneness from top to bottom," Mr. Ohshima tells them, "—no mental blocks. Your opponent is yourself. Don't make any excuses. You came to learn your own strength. I consider that, when you come here, you are asking me to push you, and I will do so."

"Pass out but don't quit," he admonishes warmly. "I'm an expert at resuscitation. I'll resuscitate you."

And for freshmen facing four years of academic life at the Institute, Mr. Ohshima's counsel will be practical on more than one level.

The Earth and Venus: some surprising parallels

The hot, sulfurous, cloud-shrouded atmosphere of Venus would seem to have little in common with the more benign atmosphere of Earth, but chemists have found some surprising and useful parallels between the two planets.

In a recent article in *Science* two researchers from Caltech report that the trace element chlorine plays a similar role in the atmospheric chemistries of both Venus and Earth. The scientists are William B. DeMore, senior research scientist at JPL, and Yuk L. Yung, associate professor of planetary science at Caltech.

In the article, "Catalytic Processes in the Atmospheres of Earth and Venus," they discuss how chlorine oxides on Venus and Earth control the conversion of both atomic oxygen (O) and ozone (O₃) to molecular oxygen (O₂).

This chemical reaction as it occurs on Earth has received considerable attention because it is the basis for fears that man-made fluorocarbons released into the atmosphere may damage the stratospheric ozone layer. This fragile band protects life on the planet's surface, including man, from damaging ultraviolet rays.

Venus could be said to represent an extreme case of the effects of chlorine on the atmosphere, according to the scientists. Venus, unlike Earth, lacks large quantities of water in the form of rain to remove atmospheric chlorine. Thus the planet has a concentration of chlorine over a thousand times higher than that of Earth.

Besides its role in producing molecular oxygen on Venus, chlorine, in another reaction, also acts to remove it from the Venusian atmosphere. Chlorine oxides catalyze the reaction of O₂ with carbon monoxide to form carbon dioxide, according to the scientists.

The energy for this reaction comes from solar radiation that has been absorbed by sulfur compounds in the Venusian atmosphere. Thus, without chlorine, Venus's atmosphere might contain far more oxygen, although the level would reach nowhere near that of Earth's, said DeMore and Yung.

"This removal of oxygen is analogous to the process of smog formation in urban atmospheres on Earth," said Dr. DeMore. "Both of the processes are catalytic and in both cases they utilize O₂. However, on Venus the O₂ is converted to carbon dioxide and on earth it's converted to ozone."

One basis for the similarities between the chemistries of the two planets' atmospheres is that their stratospheres are surprisingly similar, according to the scientists. Their pressures and temperatures are about the same despite the huge differences in the two planets at lower altitudes. The Venusian atmosphere reaches pressures 300 times that of Earth's at sea level and temperatures of several hundred degrees.

"A major point in this work is the importance of catalysts in the atmospheric chemistry of the planets," said Yung. "Substances like chlorine play a role far out of proportion to their concentration in the atmosphere. We now have evidence that both Mars and Venus, as well as Earth, show such effects."

Yung said that another major lesson of the studies is that the planets have proven valuable and valid laboratories for understanding the chemistry of the Earth's atmosphere.

The scientists' work was based on a combination of laboratory experiments — in which individual reactions are studied and characterized — and mathematical modeling of the myriad of chemical reactions that occur in the atmosphere. According to the scientists, atmospheric chemists have made great strides in the last few decades in understanding the chemistry of planetary atmospheres in a systematic way. The understanding of the 200 or so fundamental chemical reactions that make up atmospheric chemistry represents a body of knowledge that can be applied throughout the solar system, they said.

ASME honors Allan Acosta

Allan J. Acosta, professor of mechanical engineering, is the 1982 recipient of the American Society of Mechanical Engineers' Henry R. Worthington Award. Acosta was selected for his contributions in fluid mechanics.

The Way it Was

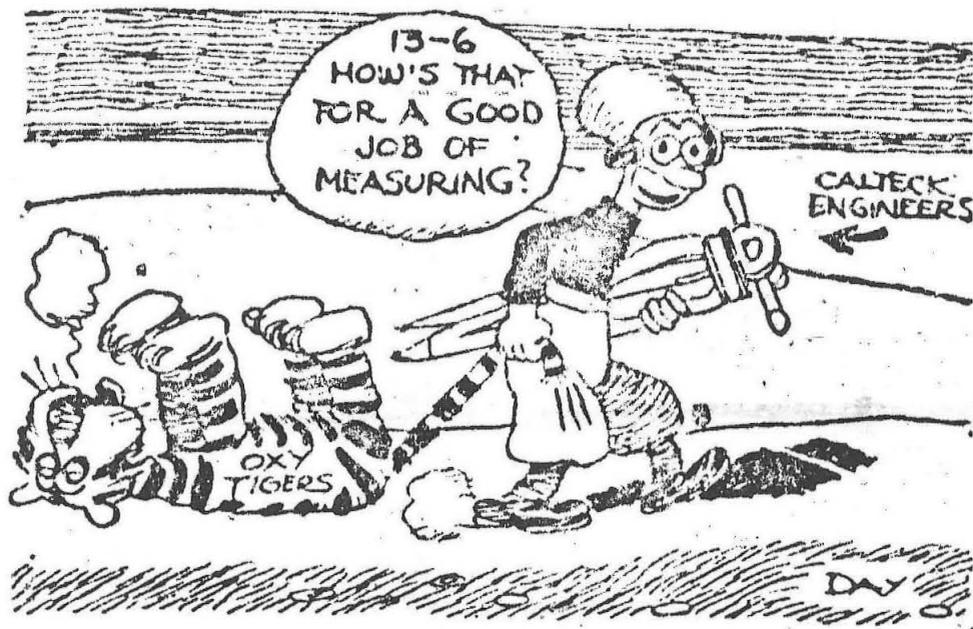
1923

The Nobel Prize in physics is awarded to Robert A. Millikan, executive head of Caltech, as the first scientist to isolate and measure the electron, reports the *New York Times* on November 14. Explains Millikan of his work, "This discovery constitutes a direct and convincing proof of the discrete or atomic character of the force we call electricity." Meanwhile, in Stockholm, a young Swedish scientist describes Millikan as "the most friendly person I ever met. He gave me several hours of his

citizens should be persecuted the same way the Nazis have persecuted the Jewish citizens of Nazi Germany."

Caltech graduates dine at the eighth annual Seminar Day on newly developed processed foods especially designed for feeding Europe's hungry millions, according to the *Star-News* on April 22. The foods were developed by the Foods Research Department of the Department of Biochemistry under the direction of Professor Henry Borsook.

Caltech's war training program, under which more than 5,000 men



A Caltech football victory is commemorated in a 1923 edition of the Los Angeles Times.

valuable time. I could hardly believe I stood before the greatest research scientist of the present day."

1945

The FBI investigates a threatening note sent to Linus Pauling of Altadena, a research expert in explosives chemistry at Caltech, and co-developer of oxypolygelatin, a blood plasma substitute, according to the *Pasadena Star-News* on April 10. The note apparently stems from the fact that Pauling has employed a Japanese-American gardener, a young man recently released from a relocation center. The threat is the second act of harassment in four days. Earlier, a painting of a rising sun appeared on Pauling's garage door, inscribed, "Americans die but we love Japs." Pauling terms the act one of "misguided people who believe American

and women were trained for vital war jobs since October 1940, will shut down on June 30, the *Pasadena Star-News* announces on April 27. Closing orders from Washington affect 150 institutions throughout the United States. Under the program, workers were trained at Caltech in such skills as aircraft design, plastics, industrial relations, and engineering mathematics.

J. Robert Oppenheimer, head of the atomic bomb project at Los Alamos, leaves to resume his teaching duties at Caltech, according to the *Star-News* on November 4. On November 14, Oppenheimer and 189 other scientists and humanitarians from Caltech, Mount Wilson, and the Huntington Library send an open letter to President Truman urging a national commission to inaugurate national control of the atom bomb. "We are concerned about the future of our country and of civilization itself if faced by another war," they tell Truman.

1959

Karate was added to Caltech athletic program, in its first appearance on a U.S. college campus. "Caltech students are practicing this lethal art once a week under the direction of Tsutomu Ohshima from Tokyo, Japan," according to February *Engineering & Science*.

The Institute receives a \$2,500,000 gift from the W. M. Keck Foundation and the Superior Oil Company for construction of a new engineering building, the Keck Engineering Labs, at San Pasqual and Chester. The gift is the largest the Institute has ever received for building purposes, relates *E&S* in March.

Murray Gell-Mann, professor of physics, is named 1959 winner of the Dannie Heineman Prize for Mathematical Physics for contributions to

field theory and to the theory of elementary particles, notes April *E&S*.

Three-hundred-and-fifty-pound Eric Nord, "Big Daddy of the Beatniks," visits campus and talks to 150 students in the Caltech Y. Martin Carnoy, BS '60, reports in May *E&S* that Nord talks about "the big scene up in San Francisco and how the L.A. cats can make the same scene in Venice, and how the nine-to-five scene is a drag." Carnoy reports that over the next few days, the increase in sandals worn and growing beards is astounding, and undergraduates sprout phrases like "Man, don't bug me," and "He makes his scene and I make mine. Dig?" But midterms approach and the campus returns to normal

ALUMNI ASSOCIATION BALANCE SHEET

ALUMNI ASSOCIATION
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

BALANCE SHEET

June 30, 1982

ASSETS

Cash on Hand and in Bank	\$ 10,333.11
Investments:	
C.I.T. Consolidated Portfolio	647,150.23
Money Market Funds	72,242.96
Investment Income Receivable	11,000.00
Other Receivables	2,431.48
Postage Deposit and Deferred Expenses	620.67
TOTAL ASSETS	\$743,778.45

LIABILITIES, RESERVES AND SURPLUS

Accounts Payable	\$ 33,880.47
Deferred Income:	
Annual Membership Dues paid in advance	20,495.00
Investment Income from C.I.T. Consolidated Portfolio	33,000.00
Life Membership Reserve	647,102.93
Reserve for Directory	49.58
Surplus	9,250.47
TOTAL LIABILITIES, RESERVES AND SURPLUS	\$743,778.45

COMPARATIVE STATEMENT OF INCOME, EXPENSES AND SURPLUS For the Year Ended June 30, 1982

INCOME	
Dues of Annual Members	\$ 63,106.00
Investment Income:	
C.I.T. Consolidated Portfolio	47,393.93
Money Market Funds	10,987.16
Annual Seminar	21,755.50
Program and Social Functions	64,308.78
Class Reunions	8,323.48
Area and Chapter Meetings	8,342.75
TOTAL INCOME	\$224,217.60

EXPENSES	
Publications	\$ 12,000.00
Annual Seminar	24,081.83
Program and Social Functions	65,066.48
Class Reunions	13,241.22
Area and Chapter Meetings	16,698.74
Student Programs	16,954.96
Institute Secondary School Relations	1,560.30
Administration	41,537.39
Membership	6,830.35
Directory	9,000.00
TOTAL EXPENSES	\$206,971.27
EXCESS OF INCOME OVER EXPENSES	\$ 17,246.33
Surplus (Deficit), June 30, 1981	(7,995.86)
Surplus, June 30, 1982	\$ 9,250.47

AUDITOR'S REPORT

Board of Directors
Alumni Association
California Institute of Technology

I have examined the balance sheet of the Alumni Association, California Institute of Technology as of June 30, 1982, and the related statement of income, expenses and surplus for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as I considered necessary in the circumstances.

In my opinion, the accompanying balance sheet and statement of income, expenses and surplus present fairly the financial position of the Alumni Association, California Institute of Technology at June 30, 1982, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Calvin A. Ames
Certified Public Accountant



As Creon, King of Thebes, Al Hibbs (BS '45, PhD '55) listens to citizens of Thebes and the pleas of his son, Haemon, to retract his sentence of death for Antigone.

Caltech drama revives a classic tradition

By Phyllis Brewster

Greek drama returned to Caltech this fall after an absence of 40 years. When the Institute's program in the theater arts (TACIT) chose Sophocles' *Antigone* as its opening production, it was reviving a campus tradition dating back to 1924. That year, according to the *Big T*, "a new departure in the annals of forensics at the Institute occurred, with the presentation of *Philoctetes* by the California Gamma chapter of Pi Kappa Delta."

This particular Sophocles tragedy was chosen, reported the 1924 yearbook, because of its entirely masculine cast — "obviating the necessary impersonations . . . which are (always) accompanied by much loss of dramatic effect in a serious production."

The performance was pronounced a success — and it was hoped that such a presentation would become an annual event.

An annual event it did become, but alas for serious productions, classical plays with all-male casts were in short supply. The forensics group turned to comedy. The following year, and in fact, in almost all of the succeeding 17 years in which a

Greek or Roman drama was given, the plays were comedies, with the feminine characters being impersonated by masculine persons, adding considerably to the comic dimensions.

In 1925 *Phormio* (a Latin comedy written by Terence in the time of Cicero) was presented at Culbertson Hall. The two female characters were played by Jack Fahs and Harold Sheffield, who, it was reported, "provoked more than the usual laughter accorded female impersonators." And when Plautus' *The Persians* was given the following year, the *Big T* declared that "the women in the production are always worth the price of admission alone."

In addition to humor, the year 1929 marked a momentary return to tragedy — Sophocles' *Oedipus Rex*. And in another departure from the then five-year-old tradition, a real woman was cast as Jocasta, Queen of Thebes.

But in 1930, comedy was back, with Terentius' *Andria*, "replete as it is with shameless scandal and outlandish buffoonery" — and men playing women's parts.

In 1934 a *Big T* copywriter fantasized that "the spirit of Plautus,



"The plays of Terentius (Terence), the youthful Roman playwright, have for centuries been the despair of old age and the joy of younglings," reported the *Big T* in 1930. "The play 'Andria' is no exception, replete as it is with shameless scandal and outlandish buffoonery." Members of the cast appeared in this *Big T* photograph and it was reported that "Harold Roach, as Davus, was the star of the play. His antics kept the audience in a continual uproar."



The Caltech Drama Club presented the comedy "Curculio" in 1941 with Frank Fleck (BS '42) in the title role, and the *Big T* termed the production "a smashing hit which featured all the well-known Tech annotations." Above: Richard Riddell (BS '44) and Myron Pollycove (BS '42) grapple with Clifford Truesdell (BS '41, MS '42).

hovering above Culbertson Hall . . . must have chuckled to witness the performance of his comedy, *The Menaechmi* — starring Caltech's twin students, Francis and Milton Clauser, in the leading roles of the twin Grecian gentlemen, the Menaechmi.

And so it went, comedies and an occasional tragedy, but every year a classic play introducing a bit of the thought and feeling and life of the men of ancient Greece — and Rome.

But historical events were drawing the curtain, not only on the drama season, but also on most social and cultural activities on campus. The 1942 yearbook states simply that "the

war emergency prevented sponsoring the customary Greek play." And so, a tradition of 17 years was laid to rest — at least temporarily.

Its revival this year was Horace Gilbert's idea, says TACIT's director, Shirley Marneus. Gilbert, now professor emeritus of business economics, joined the Caltech faculty in 1929 and is a longtime enthusiastic supporter of student drama on campus. Recalling with pleasure the

Please turn the page.

years of classic plays, Gilbert suggested the Greek revival, and Marneus responded.

Ironically, Marneus seriously considered producing Sophocles' *Philoctetes* — the 1924 first play — as the revival opener. Eventually she rejected the idea, however, for the very reason it was chosen that first year — because of its all-male cast.

But Marneus did select a tragedy. Why?

"Greek comedies tend to date," says the director. "They are usually political, and, although the situations are universal, the humor depends on word play and on the current events of those times."

In the future Marneus would like to produce a politically updated version of one of the Greek comedies — for example, *The Clouds* — with current political situations substituted for those of the fourth century BC. However, Marneus says that would take someone a whole year to reinterpret, and to date she hasn't found a "someone" with the talent and the whole year.

Caltech alumnus awarded Nobel Prize in Physics

Kenneth G. Wilson (PhD '61), a Cornell University theoretical physicist, is winner of the 1982 Nobel Prize in Physics. Wilson, who did his thesis work at Caltech under Murray Gell-Mann and Richard P. Feynman, was awarded the prize for work on how matter is transformed from one state to another.

Called "phase transitions," these transformations involve such phenomena as water turning into water vapor under certain pressure conditions or iron losing its magnetic properties and becoming non-magnetic at particular temperatures.

At Caltech, Wilson did his thesis on "An Investigation of the Low Equation and the Chew-Mandelstam Equations." Gell-Mann, the Robert Andrews Millikan Professor of Theoretical Physics, won a Nobel Prize in Physics in 1969. Feynman, the Richard Chace Tolman Professor of Theoretical Physics, won a Nobel Prize in Physics in 1965.

1918: Frank Capra and friends storm Yosemite Valley

Film director Frank Capra (BS '18), who holds the longest unbroken string of motion picture Academy Awards in history, became the first director to have his name listed above the title of his pictures. But in this account of a senior trip to Yosemite Valley in the 1918 Throop Tech, he modestly signed his name at the article's conclusion. The historic piece, "Seniors' Blowout(s)," is reprinted here with permission.

It often happens that people who are not particularly gifted with brains or imagination are struck suddenly with very brilliant and wonderful ideas. Such an attack came upon several seniors of a sudden when they planned a trip to the Yosemite Valley in a machine during the one lone week of vacation.

A Hudson 40 was dug up for the

At two in the morning the all's clear signal was given and we left Pasadena happy and joyful in our ignorance, for we did not know what we would need or what we would encounter. Furthermore we did not care. At Glendale we picked up Imler and then made for Tehachapi. We might here give the exact identity of the parties concerned since the battle is over and the censorship has been lifted. The personnel was Sticht, Karge, Imler, Capra, Torgerson, Thomas and Weldon. Karge and Imler were going only as far as Fresno; the rest were going through into Yosemite Valley.

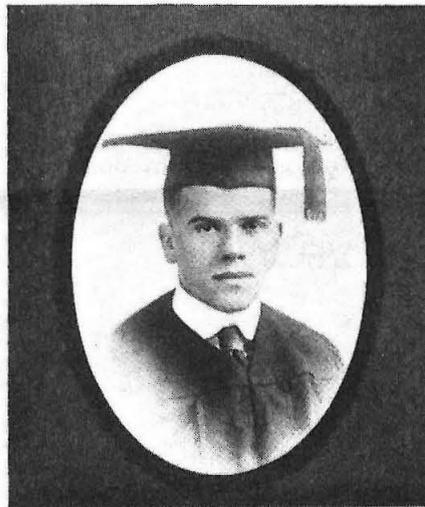
The tires stood up well this side of the desert, only two punctures early in the morning causing us any delay. But when we got on the long stretch of concrete across the desert, their age and decadent condition showed

traversing some very rough country we reached the Mariposa Grove of big trees and the sights we saw there amply repaid us for any inconveniences experienced. Here we had lunch and then started for the Valley. That night we slept out on Fish Creek, where we first were introduced to man's most pesky enemy, the mosquito, and oh, how warlike and bloodthirsty he was. One almost thought it was a dirty Hun trick that put these tormentors in this favorite place of nature.

That day we climbed mountains and entered the Valley by the Wawona Road. The day was misty and rainy and our first peek at the Valley found it clothed in mist and clouds through which Bridal Veil Falls shimmered mystically and ghostlike, while bold El Capitan frowned through the haze.

We found the Valley fairly populated and thinking that the French chefs at the camps were inferior to us in the culinary art, we nosed around looking for a camp. We had no tent and the ground was wet; we had no money and the hotels came high; so we were quite perplexed for the nonce, but on running along a slightly frequented road we came upon a cave that was formed by the falling of huge rocks from the cliffs above. It had a small and inconspicuous entrance and was full of jagged boulders set at every angle on the inside. Here we made our camp and cooked our first meal. The comfort of this cave was directly proportional to the wind, for as the wind blew, so the smoke went, and most of the time it went in our eyes. What crimes are committed in the name of adventure!

Since we were up there for a rest we decided that at least three or four hours a night should be given to sleep. In the day time we would hike around and in the evening we would go to Camp Curry where entertainers amused the crowd every night. Some were good; others were poor. Each night there would be also a firefall from Glacier Point which was right over Camp Curry. A huge fire would be built on the overhanging rock and then at night the ashes and burning logs would be pushed over. The fire fell about two thousand feet onto a huge ledge below.



CAPRA, FRANK RUSSELL

From Manual Arts High School
Entered 1915
B. S. in Chemistry
Freshman Travel Prize
Student Body Secretary 3
Junior Class Vice-President
Senior Class Sergeant-at-arms
Editor *The Tech* 3
Glee Club 1, 2, 3, and 4
Chem Club 2, 3, and 4
Dorm Club 2, 3, and 4, Pres. 4
Gnome Club 2, 3, and 4
Thesis—Conductivity of Picric Acid and its Salts

trip, which had five tires that were probably the ones that kept Noah's Ark afloat or the ones on which Caesar crossed the Rubicon, certainly they were not built to carry the precious load of bright and shining seniors who leaned back in the seats with all the air of pork barrel kings. These same tires gave early signs of their inability to stand the tremendous responsibilities, when four of the seniors, coming to the dorm dance on the eve of departure, made their fair friends get out and help shift tires, besides missing nearly half the dances.

up wonderfully. The sun was pitiless, the wind was like the breath of a fire-lunged dragon, while the concrete made the soles of our feet smoke. Bang, s-s-s-s, pop, whee-e-e-e-e, sowe-ee-ee, boom, went the tires. D—n, H—l, tires, went the seniors. We throttled the bus down to 20 per. Bang and out we would roll and slap on another five-minute vulcanizer. Down to 15, and a half mile further we would hear a long sweet whining sound, as if a shell passed over us. More sweat, the air became blue and hot, and Karge would lose five pounds pumping the tire.

To cut a long story short we might say that the above performance was repeated eighteen (18) times, and that we know every garage between Pasadena and Camp Curry from buying a few more second-hand tires and tubes.

Imler and Karge were let off at Fresno twelve hours late, while the rest of us traveled on to Madera, where we stocked up on food. After

After the entertainment there would be a dance for about two hours. Here our party was very much in evidence. The fair sex was in abundance; the Valley full of romance; we were out for a good time; so what can you expect? Naturally some of our party had to fall, but the one that took the deepest plunge was Thomas. He met his Psyche early in the week and he was lost to us for ever after. Weldon also nearly forgot "the girl he left behind," while Torgy was enraptured with a young girl in fiery red from Long Beach whom he did not even speak to. Such was the effect the Valley had on the party. Indeed even Sticht broke the usual ice that surrounds him when the fair sex is concerned and tripped the light fantastic and chattered nonsense with the best of them.

A cold sweat broke out on Cap's brow while the girl looked inquiringly. Examination showed the gas had run out.

Capra pulled the prize boner, though. One night he met a fair harmer and she lived so far down the Valley that he offered to so much inconvenience himself as to take her home. Out they went into the starlit night looking for the machine. Alas, we Hudson was no where to be found. In vain he looked while the th became impatient and sarcastic. He offered a few lame excuses, but he was the goat and the young damsel went home with someone else. Weldon had taken the machine on an exactly similar mission only a few moments before. Curses! But even he did not find it all smooth sailing, for while being engrossed in the forms of flowers, girls, etc., he ran into a rope which stretched across the road to keep autoists off, and tore off the radiator cap.

After spending the next day cooking three meals, back to the dance we went, and Capra gave everybody to understand the machine was his for the night. The same girl was met and the same question asked. She made him swear he had a machine and would take her safely home four miles down the Valley, for she had to go to work at eight in the morning. He swore amply, so she consented. When everything was over they migrated toward the machine, being about the last to leave. The night was beautiful and quiet while the Hudson was going well, so they settled down to the ordinary actions and conversation common under the circumstances. (*The editor wishes to inquire of Mr. Capra what is considered the "ordinary actions" under these circumstances.*) About half a mile from the starting point, however, the machine took a notion to stop. A cold sweat broke out on Cap's brow while the girl looked inquiringly. Examination showed the gas had run out. The sweat grew colder. Three miles to her house, four miles back to camp, two in the morning and an angry female on his hands. Quite a pickle. The conversation will not be printed but it was well nigh dawn

when Cap sifted into the cave, threw himself on a rock and vehemently exploded, "D—n."

When it came time to leave the place we did so reluctantly, because it had been one continual joy for us. On the way out during the night we were going down a steep mountain road when we were confronted with a huge bonfire right in the middle of the road. Around it were stretched half a dozen bodies of men apparently asleep. For a while we thought it was a hold-up, but as we approached one of the men woke up and seeing us let out some awful yells of fear as he drew back off the road. A few of us got out to investigate and we found that they were all dead-drunk; the one who woke up thought we were fiends from hell or something, it surprised him so. We had on uniforms so we quickly ordered them to move and clear the road. Those that had still sufficient reason to grasp the situation helped us in a staggering fashion to kick the others off the road. They explained that they were loggers celebrating the Fourth.

We picked up Karge and Imler at Fresno and started on our return trip. Aside from getting half a dozen more

punctures and blowouts and having to send on two men in a passing machine, so as to lighten the responsibilities of the sadly overworked tires, the trip back was a repetition [sic] of the trip up. At Saugus five of us had a huge steak apiece, and three hours later saw us back in Pasadena, not a sou in our pockets, tired, and sadder but much wiser.

FRANK R. CAPRA

LETTERS

Dear Editor:

Anent the Great One, Albert Einstein, (*Caltech News*, August, p.8) be exposed to a fact that is less than little known:

During Dr. Einstein's stay at Caltech in 1932, I almost literally bumped into him one night in front of Throop Hall. It was quite dark, and for a moment or so, he and I were the only people in the universe. I don't remember the specifics of the brief conversation that ensued, but the crux of the situation was simple enough: The Great One was lost! He asked me to direct him to the Athenaeum!

I recall taking him gently by the arm and leading him toward California Street until we reached a point from where the lights of the Athenaeum were visible. I then literally pointed the one and only Albert Einstein in the direction whence came the light and instructed him to set sail for it.

This is a fact, but I could never "prove" it because he was the only other witness to the incident . . .

T. S. TERRILL, BS '33

Ed. note: This letter just arrived from the offices of the *California Tech* with a confession that it had been languishing there for several months after a misdelivery.

Dear *Caltech News* Sports Editor:

I have just read Sam Johnson's excellent letter on Tech football championships. He has, however, made one error when he calls the 1930 championship the first. The 1923 team also was conference champion. My brother Ray, who passed away May 5, played fullback on that team.

Incidentally, the 1928 team missed a tie or win by one point in either of two games. It lost to Pomona 7-6 and tied Whittier 12-12, with wins over Occidental, Redlands, and San Diego State.

FRANK ALDERMAN, BS '30

Prince Philip tours the Olive Walk



H.R.H. Prince Philip, Duke of Edinburgh, visited the Caltech campus in September. Here in his role as president of the World Wildlife Fund-International and vice president of the International Union for Conservation of Nature and Natural Resources, he took part in a conference in Beckman Auditorium sponsored by the Caltech-based L.S.B. Leakey Foundation and the World Wildlife Fund. He also found the time to stroll down the Olive Walk and discuss Tech and Techers with Edwin S. Munger (right), professor of geography and president of the Leakey Foundation.

Help us locate these lost alumni

Caltex has no record of the addresses of these alumni. If you know the current locations of any of them, please relay the information to the Alumni Office.

William M. Taggart	BS 22	Leslie A. Shannon	MS 43
Willard H. Tracy	BS 24	Peter A. Tileston	Ex 43
Willfred G. Thompson	BS 25	Ernesto Vicente	MS 43
Conrad J. Waller	BS 25	Courtland L.	
Nathan F. Scudder	BS 26	Washburn	MS 43
	MS 28	Warren H. Amster	BS 44
Frank F. Peterson	MS 27		MS 47
Francis C. Martin	MS 28		Eng 48
Kam H. Lau	BS 29	Francisco Barriga	MS 44
Julius Nelson	BS 29	William E. Bell	MS 44
True W. Robinson	BS 29	Donald G. Benjamin	MS 44
Willem Uytendhoeven	PhD 29	Mehmet N. Berkant	MS 44
Donald K. Allison	BS 30	Ertugrul Birlik	BS 44
William Kelley	BS 30		MS 44
Frank N. Moyers	BS 30	Joseph E. Burch	MS 44
	MS 31	William G. Burke	MS 44
	MS 40	Ahmed Cebeci	MS 44
William T. West	BS 31	Carlos A. De Medeiros	MS 44
	MS 32	E. J. Goehring	Ex 44
Carl K. Yoshioka	BS 31	Charles P. Harrison	MS 44
Thomas C. Burk	Ex 33	Paul J. Labanauskas	MS 44
A. Arthur Koch	MS 33	John W. Marshall	BS 44
William A. Larsen	MS 33	Kenneth L. McBrean	MS 44
Edwin B. Michal	MS 33	Merrill E. Onstad	MS 44
Winston H. Rice	BS 33	Ethem Ozkaragoz	MS 44
Maple D. Shappell	PhD 33	Te-Hsien Pi	PhD 44
Warren H. Smith	BS 33	Jim M. Riddlehuber	MS 44
Edward A. Bertram	MS 35	Mayo G. Shults	MS 44
M. Harrison Evans	BS 35	Enrique F. Silgado	MS 44
	MS 36	Roberto L. Stein	MS 44
	PhD 35	R. S. Tanyildiz	BS 44
Paul F. Genachte	MS 35		MS 44
Fun-Chang Huang	MS 35	Garland S. Taylor	BS 44
Don McNeal	BS 35	William M. Trimble	BS 44
Dagoberto Rivas	Ex 35	D. Roger Wight	MS 44
Neil W. Snow	MS 36	John J. Witt	MS 44
Larry L. Young	BS 37	Victor A. Ari	MS 45
Thomas R. Burnight	MS 37		MS 46
Ju-Yung Cheng	MS 37	Chung-Pen Ho	MS 44
Roderic C. Davis	MS 37		Eng 46
Anthony Easton	MS 37		PhD 48
Paul E. Jones	BS 37	Roy G. Killian	BS 45
Thomas N. Shaw	MS 37	Jonathan F. Rice	BS 45
Ellis W. Shuler	MS 37	Necat Turkbas	MS 45
Clark H. Wiget	BS 37	Charles W. Allison, Jr.	BS 46
Hyman D. Goodman	MS 38	Khosrow Behroon	MS 46
Arthur G. Gross	BS 38	Harvey H. Brinkhaus	BS 46
Arnulfo G. Gutierrez	MS 38	Ke-Yuan Chen	MS 46
Frank C. Lowe	BS 38	Robert H. Conradt	BS 46
Noble R. Maines	Ex 38	Jerome P. Dyson	BS 46
William Rhett	BS 38	David R. Esner	BS 46
Chi-Cheng Tsao	MS 38	Hassan F. Fateh	MS 46
	BS 38	R. Bruce Foster	MS 46
	MS 38	Luis E. Freire	MS 47
	BS 38		MS 47
James W. Watson	MS 39	George S. Gill	BS 46
Winthrop G. Jones	BS 39	Benjamin S. Hayne, III	BS 46
Spencer W. Oakley	BS 39	H. T. Huang	BS 46
Arthur M. Compton	BS 40	Frederick J. Lewis	MS 46
R. Adm. W. Gentner	MS 40	Stanley R. Nixon	BS 46
Arville C. Gibson	MS 40	K. V. Krishna Prasad	MS 46
William J. Green	MS 40	Carl K. Salbach	MS 46
Ruhollah Y. Karubian	MS 40	Elmer R. Shepard	BS 46
Adolph Lovoff	MS 40	Lt. Col. Harvey F.	
Luigi Menis	BS 40	Smith	MS 46
Norman L. Peterson	MS 40	Yu-Sin Tung	MS 46
Tsung-Su Wang	MS 40	Thomas F. Weldon	MS 46
James M. Watkins, Jr.	BS 40		Eng 47
Morris R. Clark	BS 41	Rolland S. Asher	BS 47
Samuel J. Easley	MS 41	Adolfo J. Atencio	MS 47
Glyn Frank-Jones	BS 41	Ta-San Chung	MS 47
Robert C. Geitz	BS 41	Fredric B. Clarke	Eng 47
Donald L. Harvey	BS 41	Hugh H. Collins	Eng 47
George I. Reimers	BS 41	Brian D. Dagnall	MS 47
Frederick G. Robinson	BS 41	Eric Gillam	MS 47
C. B. Stadum	BS 41	Walter Harrington	MS 47
Clyde T. Standridge	MS 41	Ea-Qua Huang	MS 47
Robert L. Weaver	MS 41	Fiorello Leo	MS 47
Colman Zola	MS 41	James S. Lesko	MS 47
Mehmet F. Bebe	Eng 42		Eng 48
Orhan M. Emre	Eng 42	John Manoukian	MS 47
Frank I. Given	BS 42	Michael K. Molloy	MS 47
Chong-Hu Go	MS 42	Basil E. Moorehead	BS 47
Victor H. Martinez	MS 42	Raymond L. Olson	BS 47
Kenneth E. Anspach	BS 43	John L. Orr	MS 47
James M. Brown	MS 43	Russell A.	
Ted L. Crosthwait	MS 43	Thompson, Jr.	Eng 47
Benjamin A. Daleon	MS 43	George R. Vanden	
Warren V. Eaton, Jr	MS 43	Heuvel	MS 47
Robert H. Koch	MS 43	Pao K. Wan	MS 47
William L. Leeds	MS 43	Alonzo H. Wellman, Jr.	Eng 47
Roland E. Lundquist	MS 43	Clifford M. Wimberly	MS 47
Klaus Mampell	PhD 43		
Fred D. Roberts	MS 43		
Dan R. Scholz	MS 43		

Edward B. Winters, Jr.	BS 47	Norton L. Moise	MS 59
Lai-Chao Ying	MS 47	Stanley Roth	PhD 63
Yin-Ching Au	BS 48	Joseph M. Cauley	BS 59
Capt. J. Bunce	MS 48		BS 60
Tao-Hung Chu	MS 48		MS 61
	Eng 49	Alain N. Genko	MS 60
Albert R. Clark	MS 48	Ernest A. Isaacs	BS 60
Burgess F. Collins	BS 48	Pierre E. Joffres	MS 60
Robert J. MacNeill	MS 48	William A. Sinoff	BS 60
Herman A. Mason	BS 48	Paul R. Widess	BS 60
Col. Albert E.			MS 61
McCollam	MS 48	Roland Kitten	MS 61
George W. Roe, Jr.	BS 48	Etienne Macke	MS 61
John T. Slusher	MS 48	Dwain J. Reed	BS 61
John S. Swain	BS 48	Lewis L. Smith	MS 61
Robert K. Swank	MS 48	Clement C. Audet	MS 62
James E. Whitney	MS 48	Michel M. Cousin	MS 62
Robert S. Winiford	MS 48	Michel D'Arbaumont	MS 62
Thomas E. Allen	Eng 49	Jean-Pierre Dorlhac	MS 62
Thomas J. Andrews	MS 49	Jean C. Dubois	MS 62
Laurence I. Baumann	BS 49	Larry D. Fitzgerald	MS 62
John R. Brown	Eng 49	Peter W. Hammond	BS 62
Harold D. Cooper	MS 49	Barry N. Pines	BS 62
Harold W. Davidson	MS 49	Robert C. Ruddick	BS 62
	Eng 51	Pierre J. Facon	MS 63
Francis C. Foster	Eng 49	Richard W. Griffith	BS 63
Jarvin R. Heiman	BS 49		PhD 69
Frank G. Hylton	BS 49	Robert K. Keenan	MS 63
Fred E. Krasin	BS 49	Lee W. Samuelson	Ex 63
Max Krauss	PhD 49	Will G. Spiegelman	BS 63
Pierre J. Leroux	MS 49	John Y. Wu	BS 63
	PhD 51		MS 64
Dan M. Parker	MS 49	Eudoxia Aliferis	MS 64
Thomas G. Petrusas	BS 49	Tze-Ching Chang	MS 64
Charles C. Petty	MS 49	Jean-Marie F. Grange	MS 64
William C. Roesch	PhD 49		Eng 66
Salim Solomon	MS 49	Takehiko Ikeda	MS 64
	Eng 51	Karl H. Kanus	MS 64
John W. Wilkening	Ex 49	Chung-Mo Kwok	BS 64
Jean F. Wiren	BS 49	Jacques A. Parisot	MS 64
Joseph B. Alexander	MS 50	Harold P. Waits	PhD 64
Weldon O. Bergreen	BS 50	Philippe R. Chalier	MS 65
Julian Brody	BS 50	Inder Cheema	MS 65
Robert McMillan	MS 50	Ronald E. Hutton	BS 65
Robert W. Paulson	MS 50	Michel A. Lagorce	MS 65
Howard R. Schmidt	MS 50	William P. O'Neill	BS 65
William P. Schneider	MS 50	Robert L. Peterson	PhD 65
Robert S. Welte	BS 50	Samir D. Sayegh	MS 65
Norris D. Whitehill	BS 50	Bernard C. Solelhac	MS 65
Ricardo M. Arosemena	MS 51	Melvin M. Stephens, II	BS 65
Howard C. Goodell	MS 51	Matias J. Turteltaub	MS 65
Jacob P. Lafdjani	MS 51		PhD 68
Joseph E. Padgett, Jr.	MS 51	Philippe Vidal	MS 65
Allan J. Summers	MS 51	Robert T. Barron	MS 66
Albert E. Van Hise	BS 51	Harold T. Couch	PhD 66
	MS 52	Alan K. Eris	MS 66
Paul E. Arbo	Eng 52	Dario Iaculli	BS 66
Smith V. Bucy	MS 52	Robert E. Serafin	BS 66
Basil R. Parnes	BS 52	Surendra N. Adodra	MS 67
William C. Robison	MS 52	Philippe J. Blondy	MS 67
	Eng 53	James R. Boyd	MS 67
Donald E. Sutton	BS 52	John B. Davies	MS 67
Richard W. Weeks	BS 52	Jerry L. Dessinger	BS 67
Howard E. Wilson	MS 52	Michel P. Dupont	MS 67
Charles A. Davies	BS 53	Robert E. Goldwasser	MS 67
Stuart G. Lennox	MS 53	Eitan Gonen	MS 67
Nobuyoshi Takahashi	BS 53	G. Laurie Hatch	PhD 67
Jassim M. El-Hussaini	MS 54	Charles T. Molloy	BS 67
Wesley R. Guebert	MS 54	Jean M. Moysan	MS 67
Irvin G. Henry	MS 54	Robert C. Neveln	BS 67
Herberto Jimenez	MS 54	John C. Perrin	MS 67
Berdine H. Rogers	MS 54	Michel A. Scavennec	MS 67
Francis F. Scott	BS 54	Vivian L. Steadman	MS 67
Herbert H. Winters	MS 54	Duke A. Sun	BS 67
Alain Brethes	MS 55	Alain A. Artaud	MS 68
William E. Huber	MS 55	Gerald M. Coteau	MS 68
Donald E. Welch	BS 55	Jacques P. Fleuret	MS 68
Allen D. Diercks	BS 56	David M. MacKenzie	BS 68
Robert W. Edwards	MS 57	Brian M. Schaefer	MS 68
Jacques Feige	MS 56	Conrad M. Swartz	MS 68
E. Mark Gold	BS 56	James P. Cerne	MS 69
Maurice Granier	MS 56	Mark P. Goldstein	MS 69
David W. Hill	MS 56		PhD 71
Lt. Col. W. Hugh		Richard L. Sweet, III	MS 69
Jenkins, Jr.	MS 56	William E. Wright	MS 69
James L. Kelly	MS 56		PhD 73
Duncan E. MacDuffie	BS 56	David Boss	MS 70
William N. Spence	BS 56	Richard F. Doyle	BS 70
John F. Edsforth	MS 57	George P. Drake	BS 70
Alan E. Farley	BS 57	Helio Fagundes	MS 70
Douglas B. Holdridge	MS 57	Atef I. Girguis	MS 70
Wolfgang Rock-		Bruce Hoeneisen	MS 70
enhausner	MS 57		PhD 72
Joseph E. Stuteville	BS 57	James D. Hutchinson	MS 70
Andre A. Treyer	MS 57	Nicole H. Imbert	MS 70
John C. Uthoff	MS 57	Juan E. Leon	MS 70
Ray H. White	BS 57	Isaac A. Majerovicz	BS 70
David G. Byles	BS 58		MS 71
John L. Gardner, Jr.	MS 58	Denis R. Rydjeski	MS 70
Jean P. Lacrouts	MS 58	Ralph B. Graham	BS 71
Hugh D. Palmiter	Ex 58	Jean-Marie Quitin	MS 71
Gerald M. Pjerrou	BS 58	Robert M. Westervelt	BS 71
Gunnar E. Stenberg	MS 58	Kostia Bergman	PhD 72
Victor Baekelandt	MS 59	Eric R. Boissaye	MS 72
Chai B. Byun	BS 59	Robert L. Derham	MS 72
Clark E. Carroll	BS 59	Andrew H. Lo	BS 72
Ronald A. Christensen	MS 59	Frederick H. Auld, Jr.	MS 73
Thomas E. Dawson	Eng 59	Vijay Chatoorgoon	MS 73
Andre J. Fossard	MS 59	Kar-Shing S. Lee	BS 74
Michel P. Guillemet	MS 59	Howard C. Morris	PhD 74
Armando Hamel	MS 59	Vinod Shekher	MS 74
Richard E. Hem-		Chiu-Yuen J. Ng	BS 76
mingway	Eng 59	Yuk-Sun Chan	BS 78
Ronald B. Leonard	BS 59	Kenji Shintani	MS 78
		Ahmad F. Khorrani	MS 79
		Charles R. Nichols	BS 81

ALUMNI ACTIVITIES

January 1
Annual Rose Parade Special.
Continental breakfast in the Athenaeum, 7:30-9:30 a.m.; walk to Colorado Boulevard and view the parade from reserved seats, 9:30-11:15 a.m.; buffet lunch in the Athenaeum or bus to the Rose Bowl with box lunch, 12 noon. Prices to be announced.

January 22
Tour of the Huntington Library. Meet at the library at 9 a.m. for three-hour tour and lecture. An optional buffet will be served at the library at 12 noon for \$8.50. Registration fee for the tour: \$5.

March 24-31
Hawaii Volcanus Expedition with Robert Sharp and Dan Dzurisin.

May 21
Alumni Seminar Day, the Caltex campus.

June 4
Class of 1933 reunion: Half-Century Club reunion-luncheon in the Athenaeum.

June 19-26
Yellowstone and Grand Tetons Expedition with Lee Silver and Robert Sharp.

Alumni Fund announces additional area chairmen

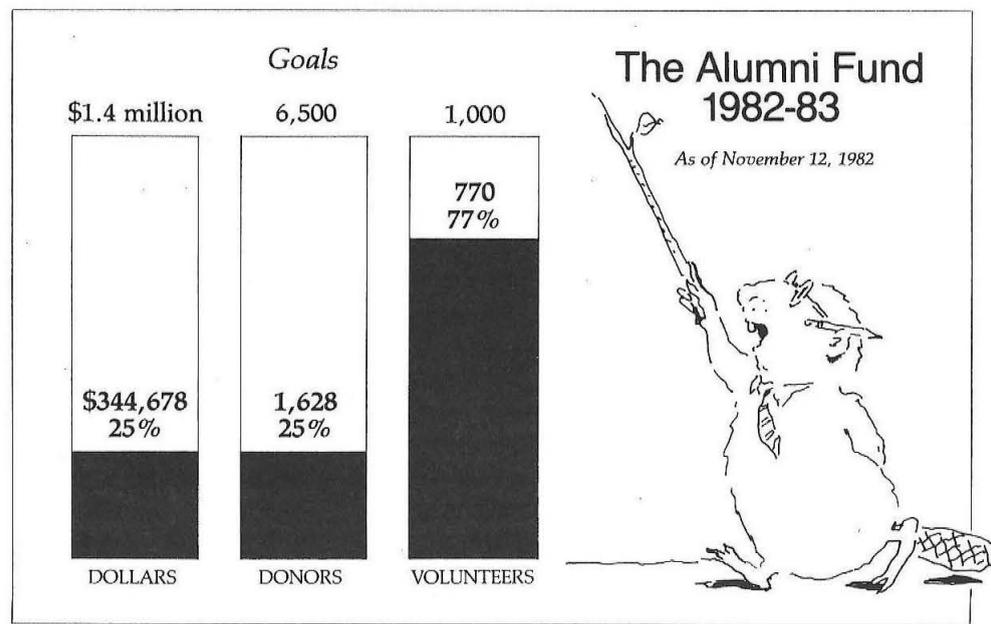
The Alumni Fund has selected 13 additional new area chairmen for 1982-83: Max Kreston, BS '50, Riverside-San Bernardino; Robert O'Connell, BS '51, North San Fernando; Robert Ross Staley, BS '42, MS '43, Palo Alto; Thomas Tarbet, BS '31, MS '32, Marin County; Jerard Adams, BS '76, Portland; Craig Zumbrunnen, MS '68, University of Washington; Frank Woodward, Eng '52, North-Sound/Alaska; Frank Albini, BS '58, MS '59, PhD '62, Big Sky; Tom Bjorklund, BS '60, Denver; David K. Erwin, PhD '79, Tennessee-Alabama; Stanley Dunn, BS '43, Wisconsin; Frederick Tenney, BS '43, Princeton; K. Norman Easley, MS '60, Long Island.

Obituaries

1920
VERNON ORR, Ex, in April. He was retired from his Newport Beach firm, Vernon Orr Service.

1922
DWIGHT A. DEGNAN, Ex, on August. He was retired as a writer for Republic Corporation in Culver City, California, had been living in Fallbrook, California.

1924
EMMETT M. IRWIN on September 11. He had retired from his position as president and chairman of the board of Induflux, Inc., and Irwin Laboratories, Inc., in Los Angeles.



1926

C. LEROY ASHLEY on September 2 after an extended illness. He was living in La Jolla, California, following his retirement as manager of the rate department at Southern California Edison in Los Angeles.

1929

JOHN W. DALY, MS '31, on August 23. He and his wife, Audrey, were both killed when, as a result of his sudden heart attack, their car went off a steep embankment in the Rockies, where the couple was vacationing. Daly was a consulting geophysicist and geologist in Midland, Texas. He is survived by two sons, Patrick and Timothy.

EMERSON M. PUGH, PhD, in July 1981 in an auto accident. He was professor emeritus of physics at Carnegie-Mellon University in Pittsburgh.

1931

ARTHUR C. BROOKS on August 7 of complications following an operation for elective hip replacement. Retired in 1972, he had been a teacher and chaplain at The Ashville School in Black Mountain, North Carolina, for 36 years. During that time he taught religion and mathematics and, during World War II, the principles of aviation to potential pilots. He also coached football, basketball, and track, and served as dean of the school. He continued his pastoral work during his retirement. Brooks is survived by his wife, Gertrude, a son, Robert, and three grandchildren.

1932

WILLIAM SCHULTZ, Ex, in November 1979. He had been a reinforcing steel estimator with the Blue Diamond Company in Los Angeles. He was active in the Elks Lodge veterans service committee and worked with patients at the Long Beach Veterans Hospital, for which he received the Book of Golden Deeds Award in 1971 from the Newport Harbor Exchange Club.

1936

WILLIAM E. CAMPBELL. He was living in San Diego, following his retirement as director of reliability and quality control at Aerojet General in Azusa, California.

ALLAN R. McCAULEY, MS. He was retired from his position as meteorologist for the Department of Transportation of Canada, stationed at the Vancouver Airport.

1937

PETER H. WYCKOFF, MS, in December 1981. Before his retirement he had been program manager for weather modification with the National Science Foundation in Washington, D. C., and previously was assistant director of physics research with the Armour Research Foundation in Chicago.

1938

GEORGE G. WALD, JR., MS '39, on September 10. He was chief metallurgist at Lockheed in Burbank, California. His wife survives him.

1946

THOMAS W. KELLY in March 1982. He was an aeronautics research engineer at the U.S. Air Force Cambridge Research Center at L.G. Hanscom Field in Bedford, Massachusetts. His wife, Mary Alice, survives him.

Personals

1914

VIRGIL F. MORSE writes from Granada Hills, California, to share the following: "It has been said: 'A little nonsense, now and then, is relished by the wisest men.' Since Caltech has the 'wisest men,' here is a bit of 'nonsense.' Handle with care, or you may get stuck. People who cannot 'see' a pun say that a pun is the lowest form of wit. But even a poor pun is twice better than a half wit. A pun is often made on the spur of the moment. The difficulty is to find a moment with spurs, and if the spur is not sharp, there is no point to it."

1924

MORRIS K. GOLDSMITH, who is a consultant with Goldsmith-Chi & Associates in Los Angeles, has been appointed president of the Housing and Appeals Board of the Department of Building and Safety of the city of Los Angeles.

1937

MARTIN H. WEBSTER writes, "I have just been elected to my second two-year term as a member of the Board of Advisors of the UCLA Hospital. This is a \$200,000,000 per year facility, having an international reputation, and I find the work challenging and stimulating."

1938

STAN WOLFBERG, vice president of Kapner, Wolfberg & Associates in Van Nuys, California, reports, "I am 'working both sides of the street' — private and public sectors — as a management consultant in the areas of industrial engineering and operations management. I was recently elected president of the California Legislative Council of Professional Engineers (CLCPE). The purpose of the council is to support, develop and protect legislation in the field of professional engineering and land surveying. I am getting an extensive education in responding intelligently (I hope) to the specific needs and personalities of a dozen different professional engineering disciplines, as well as the idiosyncrasies of the politicians and the political system as practiced in Sacramento."

1949

DONALD E. HIBBARD writes, "At the recent national meeting of the American Association of Petroleum Geologists in Calgary, it was like old home week at Caltech for our geology class of 1949."

MANNY BASS (now at Chevron Research in Fullerton) and BILL MUEHLBERGER (chairman, department of geology, University of Texas at Austin) were there, and both looked like they could still play football as well as they did at Tech 33 years ago. PAUL HARRIS (assistant manager, exploration — Texaco in Tulsa) and RAY HEGGLAND (v.p. — Conoco in Denver) were also there, as was Dick Johns, our geology prof, now at Stanford. All looked fit and were enjoying life. We had a great time talking about the old days at Tech and finding out what has happened to everyone. As for myself, I am living in Sherman Oaks (California) with my wife and family, and doing consulting geological work for MCO Resources in Westwood (MCO Building — Wilshire and Westwood boulevards). I would like to invite any old friends coming over this way to give me a call (213-879-5252)."

DON E. SIX reports, "Late last year I was loaned to Aramco by Texaco for assignment in Saudi Arabia as vice president, exploration, in a newly formed U.S. shareholders' organization called STEMCO (an arrangement that is a bit confusing to everyone but gradually getting sorted out). Ruth and I live in Al-Khobar, outside the Aramco camp at Dharhan, and have found both the people and country warm and interesting. The opportunity for travel has so far resulted in our ending a photo-safari being stranded in Nairobi, Kenya, during the recent military coup attempt but we are undaunted and looking forward to new adventures in this fascinating part of the world."

1958

PETER R. SMITH, MS '59, sends the following: "After spending 11 years in Florida working on several of this country's space programs, I have been asked to return to Minnesota to lead the engineering activity for Honeywell's military avionics operation. No one in the family wanted to leave sunny Florida, but what can you do after the company 'splains' it to you."

1960

MARSHALL LAP, PhD, acting manager of the combustion unit at the General Electric Research and Development Center in Schenectady, New York, has been elected a Fellow of the Optical Society of America.

1967

N. C. NIGAM, PhD, reports, "I have recently moved from the Indian Institute of Technology Kanpur to take over the responsibilities of the founder director of the Thapar Corporate Research & Development Centre at Patiala. The Centre has been set up by the Thapar Group of Industries, which constitutes the third largest industrial house in India. I am also holding the responsibilities of the director, Thapar Institute of Engineering and Technology, Patiala. This Institute was set up by the Thapar Group 25 years ago. The Institute is making a major effort to become one of the foremost centres of education and research in our country."

1968

ARAKALI L. RAVIMOHAN, MS, PhD '71, who works with Associated Cement Companies Ltd. in Maharashtra, India, writes, "I have been recently named head of our chemicals division, which manufactures synthetic zeolites. The division also markets drying and purification systems. I have been married since 1976 to Shalini and have a lovely three-year-old daughter, Amrita."

1969

JEFF HECHT writes from Auburndale, Massachusetts, "The popular-level book I coauthored on lasers, *Laser: Supertool of the 1980s*, is going into a second printing; Spanish and Japanese rights have been sold, and it was reviewed in August in the *Wall Street Journal* (favorably, even!). I'm cofounder of, and contributing editor to, a new laser trade magazine, *Lasers & Applications*, which began publication this month. I've been writing regularly on various areas of science and technology for *High Technology*, *Omni*, and *New Scientist*. One of my (fiction) stories ended up in *The Year's Best Horror Stories; Series X*. And I've got my fingers in enough other things to more than keep me out of trouble."

1972

JEFFREY K. OCHSNER, Ex, sends this update: "After leaving Caltech in 1969, I spent my next four years at Rice University in the school of architecture, and I later returned to obtain my Master of Architecture in 1976. Currently I live in Houston, where I have just been named architectural design coordinator for the entire new rapid rail transit project which we are designing. I also teach part-time in the school of architecture at Rice. MIT Press has announced that my book, *H. H. Richardson: Complete Architectural Works*, was released on 6 September 1982. It is available in bookstores which stock architectural books."

1973

MARVIN R. MANDELBAUM, a consultant with Data Architects, Inc., in Waltham, Massachusetts, and his wife, Elizabeth, announce the birth of a son, Jonathan Stuart, on August 14.

1974

GREGORY A. NELSON has completed a postdoctoral fellowship in the department of pathology at Harvard Medical School and in May joined the genetic technology group at JPL as a member of the technical staff.

1977

JOHN W. HICKS, MS, reports from Tehachapi, California, "After a fascinating two and a half years as an exchange scientist, working and living in Germany, my family and I are back home in California."

ED REA and BECKY HARTSFIELD REA, BS '78, announce the birth of their second child, Anthony Steven, on August 3. The Reas are both graduate students at Stanford, Ed in mechanical engineering and Becky in applied earth science.

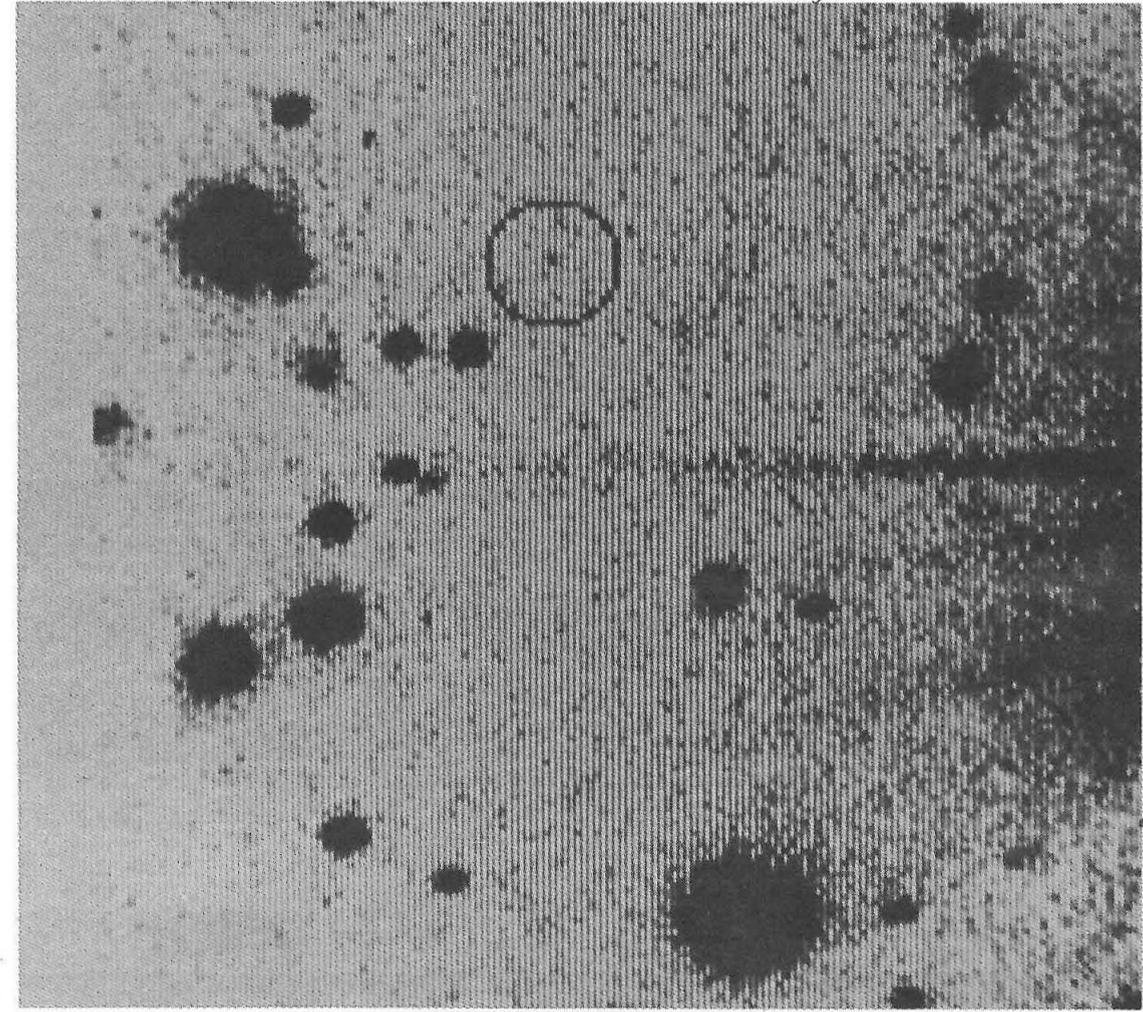
1980

ALAIN DELSUPHEXHE, MS, was married to Sophie Boisseau de Roehrer on October 23 in Paris, France.

FRANK M. WEYER, MS, is serving as a Peace Corps volunteer in Lesotho in southern Africa. As a mechanical engineer he is training local people to design solar ovens and fuel-efficient stoves.

1982

CAROLINE LAMBERT, MS, and DAVID SQUIRES, MS '81, were married on August 28 in Big Basin State Park, California. The couple lives in Palo Alto, and David works at National Semiconductor in Santa Clara.



Halley's Comet — last seen in 1910 — was sighted for the first time on its return trip through the solar system by two Caltech astronomers, staff astronomer G. Edward Danielson and graduate student David C. Jewitt. Circled in the photograph above, the comet was detected on October 16 with the 200-inch Hale Telescope at Palomar Mountain and an extremely sensitive electronic camera. About a billion miles away when it was sighted, it will pass within 90 million miles of Earth in 1986, becoming one of the most brilliant objects in the sky.

CALTECH NEWS

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CALTECH NEWS



Freshman Tom Tucker determines the melting point of a compound as he settles into Chemistry 3A in the new Clifford S. and Ruth A. Mead Memorial Undergraduate Chemistry Laboratory. (See page 1.)

December 1982