

# CALTECH NEWS

Volume 18, No. 6, December 1984

## Three corporations join Caltech in program to pioneer new technologies

Three major corporations—Aerojet General, GTE, and TRW—have pledged \$3 million to a new five-year project at Caltech that is expected to advance high technologies on a variety of critical fronts.

"With our new Program in Advanced Technologies, Caltech expects to contribute to the enhancement of scientific and engineering progress in a wide range of industries. We foresee that these technological advances will become a vital resource to the nation over the next several decades," said Caltech President Marvin L. Goldberger in announcing the project. The Caltech program will conduct research to:

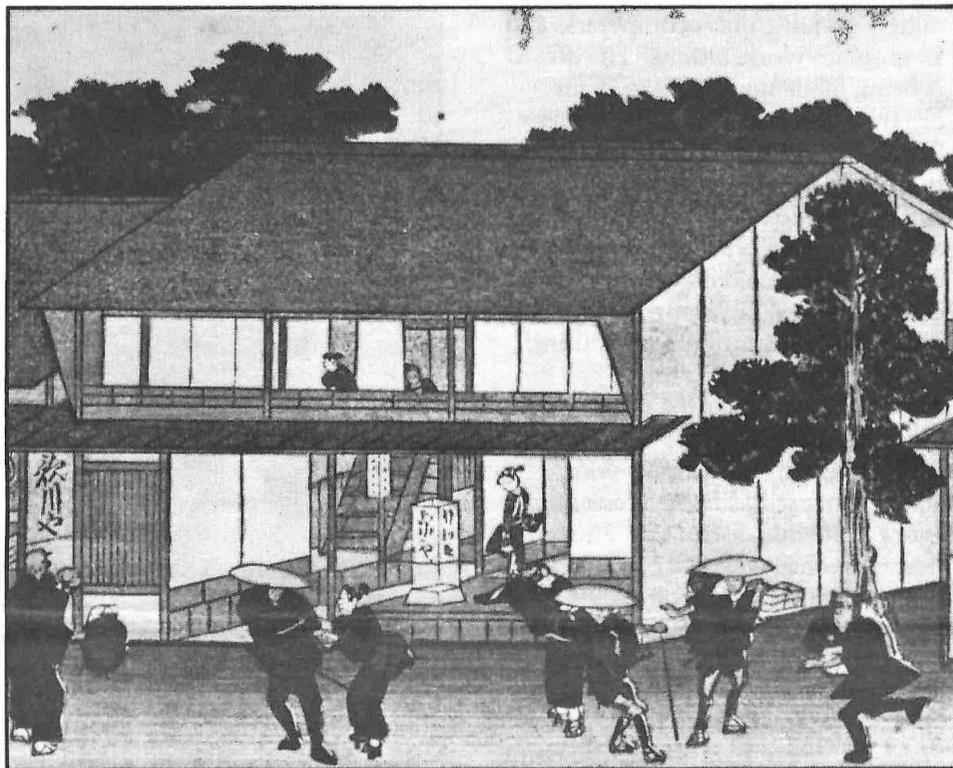
—Discover new approaches to materials science that should impact the metal, semiconductor, and energy industries.

—Improve theories of fluid dynamics and their applications in fields such as lasers, combustion, rocket engines, and aerospace.

—Develop advanced electrical power processing and signal processing systems for the electronics industry; explore new control methods for robotics and space structures; utilize coding techniques to reduce errors in computers and microwave communications; and advance the art in optical, digital, and microwave electronic devices.

"Clearly the aerospace, communications, and computer industries—as well as many others—could benefit enormously from the advances we believe we can make in the laboratory," said Goldberger. "Many of those advances require bridging gaps between traditional scientific and engineering disciplines, which the Caltech faculty is eminently capable of doing.

"The participation of Aerojet General, GTE, and TRW is extremely valuable," Goldberger continued, "because it assures first, that the



Yellow pigments in this half-plate reproduction of a Japanese woodblock print by Hiroshige faded noticeably when exposed to ozone for 95 days in a light- and air-tight chamber.

## More ozone damage revealed — this time to artists' pigments

Atmospheric ozone has been cited as a culprit in a number of troublesome situations. For example, it may cause respiratory ailments, cracks in rubber, and plant damage. The product of photochemical reactions between hydrocarbons and oxides of nitrogen, ozone is now proving itself destructive in yet another sphere. Its powerful oxidizing effect on organic materials makes it a threat to certain artists' pigments—and to the art works that they create.

Determining the degree of risk to art works from ozone, and learning how to protect art from photochemical air pollution, is the focus of research being conducted by Glen Cass, Caltech assistant professor of environmental engineering, and his colleagues. In this work, Cass has

entered into a research agreement with the Getty Conservation Institute of Malibu, an affiliate of the J. Paul Getty Museum. The Getty Institute has launched a major program for the preservation and restoration of art works.

"In the past," says Cass, "conservation scientists looked extensively at the effect of light on art works and—especially in Europe—at the effects of sulfur oxides air pollution. But until recently, very little thought had been given to the effects on art of photochemical pollution in smoggy areas like Los Angeles County." Cass points out that ozone contamination is not confined to Los Angeles. In the United States, 538 counties are in violation of the National Ambient Air Quality Standards for ozone in the atmosphere: 0.12 ppm (parts per million).

As Cass began his research, the initial goal was to learn what impact ozone would have on pigments in artists' paints. He and his colleagues, Cynthia Shaver Atherton and James Druzik of the Los Angeles County Museum of Art, prepared two sets of common artists' watercolor pigment samples and applied these to watercolor paper. One set was kept in a dark place as a control and the other was placed in a chamber devoid of light, where it remained for 95 days at constant humidity and temperature and was exposed to 0.40 ppm ozone. Two Japanese woodblock prints received the same exposure.

After the three months, the scientists found that several of the pigments had faded dramatically: a widely used red pigment, alizarin crimson, and two of its relatives, crimson lake and purple lake. They also observed a change in hue from purple to bluish in a mauve pigment, and fading in yellow pigments in the Japanese prints. They estimate that it would take three years outdoors, or six years in an unprotected building, to equal the ozone exposure in their experiments.

Having established that ozone can damage works of art, Cass is attempting to learn how widespread the problem of damage due to ozone pollution is, and how to prevent it. He and his colleagues are examining the detailed mechanism of pollutant pigment interaction and they are in the process of defining the concentrations of pollutants inside museums.

As he discusses the current pigment analysis, Cass explains that many older art works contain pigments that are no longer used because they became too expensive. One of the present goals is to determine the chemical composition of these pigments, to analyze their vulnerability to air pollution, and to determine the path of potential breakdown—that is, what chemical interactions cause the deterioration.

(For example, in the case of the crimson lake and purple lake pigments, which consist of anthraquinone bound to different metal compounds, the scientists suspect that the breakdown takes place

## GM's Roger Smith new Caltech Trustee

Roger B. Smith, chairman and chief executive officer of General Motors Corporation, has been named to the Caltech Board of Trustees, Chairman R. Stanton Avery has announced.

Smith, who assumed the chairmanship of GM in 1981, is also chairman of the corporation's Finance Committee and a member of its Executive and Administration Committees. Before he was elected its chairman, he had been an executive vice president and member of the GM Board of Directors. He joined GM in 1949 as a general accounting clerk in the Detroit central office.

Smith was born in Columbus, Ohio, in 1925. He received a bachelor's and a master's degree in business administration from the University of Michigan and, from 1944 to 1946, he served in the U.S. Navy.

A member of the President's National Productivity Advisory Committee, he is also the national chairman for the 1984 U.S. Savings Bond Volunteer Committee, and he has served as director of the Detroit Economic Growth Corporation, Detroit Renaissance, and New Detroit, Inc., and as chairman of the United Foundation in Detroit.

He is a member of the Advisory Council of the Graduate School of Business of Stanford University and a trustee of the Cranbrook Educational Community and of the Michigan College Foundation, Inc.

## Caltech receives computer grant from DEC

Digital Equipment Corporation of Maynard, Massachusetts, has awarded Caltech an educational research grant of \$1,270,500 worth of computer equipment for the Institute's educational computing program.

The equipment consists of five superminicomputer VAXes, approximately 50 DEC microcomputers, and 12 graphics workstations. The award is being made under DEC's PEER program (Partners for Engineering Computer Science Education and Research).

Geoffrey Fox, dean for educational computing and professor of theoretical physics at Caltech, said that the equipment will be important to many of Caltech's educational computing activities.

He said that, over the next five years, "we expect to see a revolution in teaching on the campus, with computers used as tools in essentially every academic discipline." He noted that Caltech is well placed to be a leader in educational computing, because of its strengths in scientific and engineering education and research.

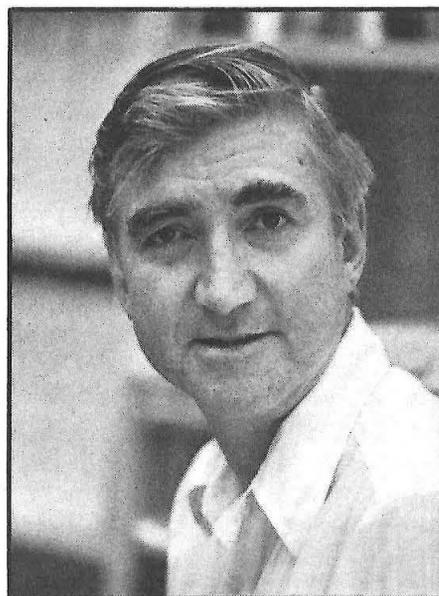
"Caltech has already made considerable progress toward computerizing its courses," he said. "Computer courseware is in use or under development in all of the Institute's divisions and in 50 courses." He pointed out that the campus computer network, crucial to the educational computing project, has been installed, and that the link to the student houses was completed over the summer.

Fox envisions that the Caltech educational computing project will include more than 800 workstations when it is fully implemented during the next three years. These workstations, linked by the campus network, will consist primarily of clusters of 10 or 20 machines in classroom areas, laboratories, the computing center, and libraries.

Faculty and teaching assistants will have individual workstations to prepare courseware, and students will have network outlets in their dormitories if they want to communicate with the campus system using their home computers. Portable

computers will be available to be checked out by students and faculty.

Caltech has made a major commitment to educational computing, designating \$850,000 for the project over the past year. In addition, the Institute has received pledges of cash and equipment from computer vendors of more than \$7.5 million for educational computing, in addition to the DEC grant.



## Anson named division chairman

Fred C. Anson (BS '54), professor of chemistry, has been named chairman of Caltech's Division of Chemistry and Chemical Engineering. He succeeds Harry B. Gray (the Arnold O. Beckman Professor of Chemistry), who is returning to full-time research and teaching.

Anson earned his MS and PhD degrees from Harvard and joined the Caltech faculty in 1957 as instructor. He was named to a full professorship in 1968.

In 1983 he was the first recipient of the David C. Grahame Award of the Physical Electrochemistry Division of the Electrochemical Society, Inc. He was elected a Fellow of the American Association for the Advancement of Science in 1980 and he has been a Fulbright-Hays Research Scholar, an Alfred P. Sloan Foundation Research Fellow, and a Fellow of the John Simon Guggenheim Foundation.

Among his research interests in electrochemistry and electroanalytical chemistry are the mechanisms of electrode reactions, the role of adsorption on metallic electrodes in electrode reaction mechanisms, ligand bridging in electrode reactions, and oxide film effects on the electrochemical behavior of metallic electrodes.

## Ozone damage

*Continued from page 1*

through ozone's cleavage of the anthraquinone molecular ring structure.)

Until now, the researchers have only studied the effects of ozone on art works. But Los Angeles smog contains several different air pollutants, and the research team plans to take a look at their effects as well. For example, nitrogen dioxide affects some textile dyes, and thus may affect artists' pigments.

A final aspect of Cass's research will involve what he terms a "wrap-around study" of a wide variety of measures that could be used to protect works of art: the redesign of air conditioning systems to reduce ozone pollution, the effectiveness of enclosures around certain type of art works, the protective effects of binders that could be mixed with the pigment particles, the use of coatings such as varnish on oil painting, and the creation of new ozone-resistant artists' pigments, for example.

Conserving art in a contaminated environment is a potentially serious problem, but Cass believes that with a modest amount of understanding and precaution, the problem can be brought under control.

## Corporations join in pioneering new technologies

*Continued from page 1*

research will be done, and second, that the results will be transferred directly to industries that can use them.

"The new program will also prove a vital resource to promising young faculty members. It is extremely difficult to get funding for revolutionary research, even when it is done by young engineers and scientists as talented as those Caltech attracts," Dr. Goldberger said.

Aerojet General, GTE, and TRW have agreed to provide \$1 million apiece to support the new Program in Advanced Technologies over the next five years. Caltech plans to add two more companies to the program's roster, bringing the total number of participants to five.

The sponsoring companies will participate with Caltech faculty in considering research projects to be undertaken. They will maintain a close liaison with Caltech researchers and may send representatives to participate in the work being done in the Institute's laboratories.

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Arden Albee



Gary Lorden

## New deans settle in at Parsons-Gates:

### Albee for graduate studies

Arden L. Albee, professor of geology, has been named dean of graduate studies, with responsibility for administering Caltech's graduate program.

Albee previously served as academic officer for the Division of Geological and Planetary Sciences, and as chief scientist at JPL. He is project scientist for the Mars Observer Mission, slated for 1990.

He earned his BA, MA, and PhD degrees from Harvard University and was a geologist with the U.S. Geological Survey before joining the Institute in 1959.

### Lorden as dean of students

Gary Lorden (BS '62), professor of mathematics, has been named the Institute's new dean of students. He succeeds David B. Wales, professor of mathematics, who is returning to full-time duties in research and teaching.

As dean, Lorden will advise and counsel undergraduate students on academic and extracurricular matters, and will be concerned with the overall undergraduate program and curriculum.

The new dean earned his PhD degree from Cornell University in 1966 and returned to Caltech in 1968 as an assistant professor. He was appointed professor in 1977.

For more than a decade, he was coach of Caltech's team in the William Lowell Putnam mathematics competition. During this period, the Institute won the championship five times. Recently he has been graduate option representative for mathematics.

## Frosh Camp 1984: too late to turn back now

by Heidi Aspaturian

Somewhere in the mists of Caltech's history is the name of the unsung genius who first realized that it would take more than the light of Pasadena's full moon to transform gifted innocents straight out of high school into creatures of the California Institute of Technology. To the protean minds of the Institute, the solution could not have been long in arriving.

The formula: Take approximately 200 students willing to spend four years at perhaps the most demanding undergraduate institution in the U.S. in exchange for a three-day vacation, and mix well with knapsacks, guitars, duffel bags, snorkeling equipment, frisbees, portable food freezers and other recreational gear. Isolate for 48 hours on a rugged, unspoiled and rocky bay on Catalina Island, and surround with enough faculty, administrators, upperclassmen, graduate students, and staffers to cut off all available avenues of escape. Give the experience a name that recalls a beloved institution of childhood: Freshman Camp.

The carefree freshmen boarding the launch at San Pedro harbor on Thursday, September 20, had, of course, no idea what was in store. A few may have become suspicious when their boat ran into what their captain called "some choppiness, folks," forcing many unhappy passengers to begin their higher education enduring a two-hour lesson on the nature of turbulence. Others spent the trip getting acquainted with one another, faculty, and upperclassmen, and discussing some of the implications of attending Caltech.

"From everyone I've talked to," said one perceptive new student, "it sounds like we all think we're going to be campus stars in theoretical physics. I think some of us are in for a big shock."

Once the barge docked however, it was obvious that subtle minds had selected the Freshman Camp site to encourage students to imagine other options and to face the future with confidence. Named for its foxes and domestic cats that are mistaken for foxes, Camp Fox has all the right properties: a wealth of cliffs, rocks, and hills, and a stony beach just a few million years short of sandy perfection, to tempt prospective geologists; abundant flora, as well as foxes, cats, chickens, goats, hogs,

and an occasional roach, to awaken the interest of potential life scientists; outdated starry nights to remind future astronomers of the Institute's more sophisticated approach to studying the cosmos; a malfunctioning loudspeaker, insufficient hot water, precarious sound system, broken faucets, stopped sinks, and numerous other snares to lure the applied scientist; endless games of softball, football, frisbee, and volleyball to keep born mathematicians too busy calculating trajectories to think of anything else; windy surf to give swimmers much needed practice in keeping their heads above water; and food carefully prepared to stimulate the hunger for knowledge that marks every trueborn scientist: "What do you suppose THAT is?"

Orientation sessions were held on Thursday and Friday to give freshmen greater insight into such aspects of Caltech as the honor code, health services, career development, the Y, rotation, social activities, and the crucial significance of free coffee and doughnuts in the life of the Institute.

Then the listeners broke into smaller groups made up of fellow freshmen, upperclassmen, faculty, and staff for a round of substantive and enlightening discussion. ("Now, do you feel you really understand what the honor code is all about?" / "Yeah." / "Sure." / "Uh-huh." / "What happens if you get caught?")

The easygoing interaction among students and faculty members at camp also provided impressionable newcomers with models of the dedicated researcher in action. They met faculty too weary from their duties at the Institute to stay awake during the orientation sessions, professors whose zest for their subject matter never faltered ("That's an interesting shell you've got there. You can tell by looking at it that the original owner was eaten"), and still others who reminisced casually about their illustrious colleagues. ("Yes, I was acquainted with him at Cornell. This was before he got involved with television, and as I recall, still knew something about his subject.")

The high-water mark for investigative daring was reached quite literally by Professor of Chemical Engineering Fred Shair, who dislocated his shoulder while exploring the mouth of a watery cave at rising tide. Helped to safety by Professor of Mathematics David Wales, he was ferried ashore by a freshman Good Samaritan illegally out alone in a rowboat as the loudspeaker scratchily commanded, "Turn back; do not beach your craft."

Shair was whisked away to Avalon Hospital. He returned later that evening, the shoulder back in place,

to assure relieved colleagues that his recovery had proceeded "exponentially."

As Friday afternoon rolled around, the metamorphosis of the freshman class into Techers was well under way. A clear sign came when all 23 freshmen found it necessary to meet privately with upperclasswomen and female staffers to discuss the complexities and problems of attending a school with a superabundance of men. In their comments, the authentic voice of the Caltech woman could be heard. ("I blocked a serve in volleyball, and the guys started shouting, 'Hey! can you really do that?' Then the other side smashed one at me, and they started yelling, 'You smashed her! She's a girl! That's not fair!'") / "As a new RA, I can tell you always to expect the unexpected. It took me ten minutes this morning to realize I was taking a shower with a man I had never seen before in my life, who was in the girls' bathroom." / "The number of my escorts is increasing exponentially. What should I do?")

By the time of the traditional camp talent show Friday night, Caltech's latest arrivals had abandoned all critical judgment about everything having anything to do with the Institute and were applauding all performances, good, bad, and beyond description. The next morning, after tossing the president of ASCIT, Paul Graven, off the dock, where he disappeared with a wave and a smile, they obediently boarded the boat to return to the mainland.

Compared to the boat ride out, the return to civilization was uneventful. The ocean was calm, leaving the captain with nothing to say, and after 48 hours on Catalina, the majority of freshmen no longer thought of Dramamine as hedonistic. As the launch glided back into San Pedro, most of them were yawning, dozing, or fast asleep. Freshman Camp had taken effect, and it was time for a rest. In two days the class of '88 would line up without resistance for registration and the real trip would begin.

*Heidi is an editor in Caltech's public relations office, and visited Freshman Camp for the first time this year.*

## Shoemaker, Stevenson honored for research

Eugene M. Shoemaker and David J. Stevenson are 1984 recipients of the Kuiper and Urey prizes awarded annually by the Division for Planetary Sciences of the American Astronomical Society, the nation's leading professional organization for planetary science.

Shoemaker (BS '47, MS '48), Caltech professor of geology and planetary science and a geologist with the U.S. Geological Survey, received the Kuiper Prize (awarded to a senior scientist) for "contributions to understanding the geological histories of solid bodies in the solar system," and for research on the mechanics of meteor impact and explosion craters, geological field investigations in Apollo lunar landings, and for his role in initiating the telescopic search for earth-approaching asteroids, now under way at Palomar Observatory.

Stevenson, associate professor of planetary science, was awarded the Urey Prize (given to a scientist under the age of 36) "for broad achievement in planetary physics, especially concerned with planetary formation and planetary interiors," and for investigations into planetary atmospheres, tidal mechanisms, and magnetic fields that have helped to open new frontiers in planetary research.

## Joint U.S.-Chinese quake project a success

An array of strong-motion seismographs installed in 1983 in several earthquake-prone regions of China has proven a highly successful joint U.S.-Chinese project, according to one of the project leaders, Wilfred D. Iwan, professor of applied mechanics at Caltech.

The 40-instrument array, designed to accurately monitor large, damaging earthquakes, includes a unique feature that allows the study of earthquakes in three dimensions, using seismographs installed deep in several Chinese coal mines.

The instruments in one part of the array near Tangshan have already recorded more than 40 earthquakes

of magnitude greater than 4 on the Richter scale. Most of these events are considered aftershocks of the disastrous 1976 Tangshan earthquake. The largest of the aftershocks was a magnitude 5.3 earthquake in 1982. Records for this quake were obtained as close as two miles to the fault.

At magnitude 7.8, the Tangshan earthquake was one of the largest ever to strike a heavily populated area. It caused several hundred thousand deaths.

Installation of the array marked a significant increase in the number of strong-motion instruments in China. Before its installation, only about 100 strong-motion seismographs existed in that country, compared with almost 3,000 in the U.S.

"We've been extremely impressed by the commitment of the Chinese to this project," said Iwan. "They established a major center in Beijing which supports it, and have staffed it with highly competent technicians." The Chinese technicians that operate the array itself were trained in the United States at Caltech, USC, and the U.S. Geological Survey.

The strong-motion array is designed to be highly mobile, and can be redeployed within days to the site of a major earthquake to measure aftershocks, or in response to a predicted earthquake.

When not deployed for special studies, the majority of the instruments are in a dense "parking" array in a seismically active area west of Beijing, straddling the Baboshan Fault. This array runs along a line perpendicular to the fault, and ends in a two-dimensional array of instruments near a medium-rise apartment building, which is also instrumented.

"With such an arrangement, we hope to obtain three kinds of large-earthquake measurements," said Iwan. "The line of instruments will give us information about the attenuation of ground motion with increasing distance from the fault. The two-dimensional array will tell us about the coherence of ground motion over a relatively small area. The building instruments will tell us how all this relates to the response of a typical building structure."

Two separate instrument networks are in seismically active areas in Sichuan Province, near Kangching, and in Yunnan Province near Xiaguang. Chinese seismologists expect these sites to yield a magnitude six or greater earthquake in the near future.

A third group of instruments is near the site of the Tangshan earthquake, including three instruments

installed deep within coal mines, up to 900 meters below the surface.

"We believe that the three-dimensional array is the only one of its kind," said Iwan. "We have a unique situation here, where coal mines and earthquakes are found in the same region. This allows us to place the instruments at significant depths without having to drill special holes or design special instruments."

Installation of the instruments was completed in the summer of 1983.

## Prion's major component analyzed

A major protein component of a mysterious organism called a prion, which is involved in several degenerative diseases, has been analyzed by scientists at UC San Francisco and at Caltech. In the journal *Cell*, the scientists report on structural and compositional studies of the major protein in the prion that causes scrapie—a fatal degenerative neurological disease in sheep and goats. The findings provide for the first time a chemical basis to begin studying how prions replicate. The scientists are Stephen B. Kent (senior research associate in biology) and Leroy E. Hood (Ethel Wilson Bowles and Robert Bowles Professor of Biology) of Caltech, and Stanley B. Prusiner, Darlene F. Growth, and David C. Bolton of UCSF.

Prions produce a number of human neurological diseases, including kuru, Creutzfeldt-Jakob disease, and Gerstmann-Straussler syndrome. These diseases often do not appear until years or even decades after infection.

Although these illnesses have been known for centuries, it was not until 1982 that Prusiner and his colleagues at UCSF theorized that they were caused by a kind of pathogen composed largely of protein. They coined the term "prion" for the infectious particle. Scientists have yet to identify a DNA or RNA that might provide its basic genetic blueprint.

In earlier work, Prusiner and his UCSF colleagues purified the infectious scrapie prion and isolated from it a major protein molecule—PrP 27-30.

In the *Cell* article, they report a determination of the amino acid composition of the protein and the sequence of 15 amino acids near one end of the protein chain. They used an advanced automated protein sequencer developed at Caltech for structural studies.

Their analysis of the results showed that PrP 27-30 constitutes the

single major protein found in scrapie prions. Additionally, comparison of the 15-amino-acid sequence with other known sequences indicates that PrP 27-30 is unlike any other protein known. But the scientists said that since the 15 amino acids represent less than 10 percent of the total molecule, they will need more information before they can be certain that PrP 27-30 is as unique as it initially appears. They added that spectral analysis of PrP 27-30 showed no significant DNA or RNA attached to the protein.

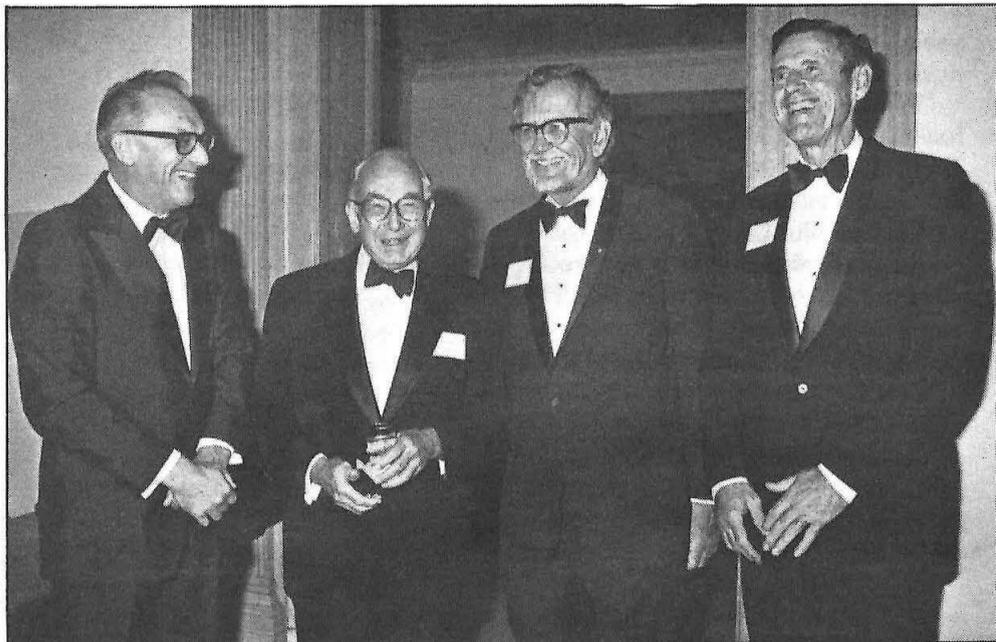
Although their research did not show how scrapie prions replicate, the scientists said that their studies were able to eliminate two important theories of replication. Some scientists had suggested that prions are small nucleoproteins linked with DNA, and that the DNA portion of the molecule would code for the protein portion. But the Caltech/UCSF analysis showed no evidence of such linkages.

Another theory of prion replication holds that prion proteins may be constructed by combinations of enzymes without direct participation of nucleic acid. In such cases, the protein might consist of a simple repeating sequence of a few amino acids.

But the scientists said that the amino acid analysis of PrP 27-30 showed at least 17 naturally occurring amino acids, too many for the protein to consist of a series of very small repetitive units.

The most important implication of the research is that the new findings have opened the way for new and potentially definitive approaches to the study of prions, according to the scientists. First, researchers can use the PrP 27-30 sequence information to build synthetic proteins that can be used to produce antibodies when injected into laboratory animals. These antibodies can be isolated and employed to help the scientists track the prion protein and to study how it affects the cell.

The scientists can also use their protein sequence information to deduce the structure of a portion of the original DNA blueprint for PrP 27-30. Using the automated DNA synthesizer, they can then construct this DNA segment and use it as a probe to fish out of prion-infected cells the entire prion gene. According to the scientists, both these efforts are now under way.



Caltech's four provosts: Drs. Rochus Vogt, Robert Bacher, John Roberts, and Robert Christy.



President Goldberger (right) with (left to right) Olavee Martin, Mark Taper, and Merle Kingsley.



Trustee Fritz Larkin and his wife, Fran Larkin, with Associates President Berneice Anglea and Thornton Ladd.



Planetary Scientist Eleanor Helin presents the President with a plaque showing the Asteroid Goldberger.

## Associates told of today's "Golden Age of Science"

Following a sluggish period of technological advancement in the 1970s, the United States is now resuming a strong leadership in a second "industrial revolution," former presidential science adviser Frank Press told Associates at their 58th annual dinner, held at the Athenaeum on October 30.

Press, who was director of Caltech's Seismological Laboratory from 1957 to 1964 and science adviser to President Carter, became president of the National Academy of Sciences in 1981.

He pointed out that science and technology have changed the way the world does business, and that national borders have become transparent to scientific advances. Leadership among countries will depend on national policies that foster innovation as well as on a technological base and an ability to transfer new knowledge to the marketplace.

Although the U.S. is ahead in this area, during the previous decade it was perceived as doing poorly because of the great proportion of imported goods. And basic research was shortchanged during that time because the tax structure made capital less available. Although that has changed, this country still needs to concentrate on a plan of new strategies for a global economic system, Press told his audience.

But the forces are gathering for

this new industrial revolution as financial, educational, and industrial policies reflect a new commitment to scientific and technological advancement.

The evening's program also featured JPL planetary scientist Eleanor Helin's announcement that asteroid 1978gb, which she discovered six years ago, was being renamed 3101 Goldberger. Asteroid Goldberger, the audience seemed pleased to learn, has the characteristics of "high profile and low eccentricity."

The asteroid's namesake was on hand to introduce the evening's speaker, and Associates president Berneice Anglea presided over the evening's events.



Speaker Frank Press

## Toby gives Tech folk music legacy

By Phyllis Brewster

Brian Toby has a mission to fulfill in this, his fifth and last year as a doctoral candidate at the California Institute of Technology. And that is to find his successor as mainstay of the Caltech Folk Music Society, which he helped to establish just two years ago.

This fall, two seasons after its inauspicious beginning, the society presented a three-concert fall schedule that included Thom Moore and Janie Cribbs with Geoff Bartley; Carla Sciaky; and Don Lange, Bill Griffin, Bob Franks, and Dick Pinney.

Over the past two years, the non-profit society, without regular funding, has mounted 20 folk music concerts covering a wide variety of styles—Irish, British Isles, European, women's, blues, flash guitarists, introspective songwriters, and even jazz—with attendance as high as 660. Fifty percent of the audiences have been Caltech-connected, but the other half has included a following that comes from areas ranging from San Diego to Ventura.

When Toby arrived on the Caltech campus in 1980 to begin his graduate studies, he expected to earn his PhD in chemistry. He didn't expect that he would also acquire confidence in himself as an organizer, risk-taker, and entrepreneur, and a deep affection for folk music and for the people who play and sing it.

One of his most cherished memories is of the Stan Rogers concert. Learning that the Canadian singer-songwriter was going to be in Los Angeles, Toby shot for the moon, and got it. A year later the experience took on an added dimension of value tinged with loss when he learned of Rogers's death in a plane accident. Among his frustrating experiences, Toby recalls the night that the main performer had two blow-outs and was stranded in the desert—unable to reach a phone—while an increasingly nervous Toby waited for the musician who never arrived.

"But even that worked out all right," he says, "because the second-line performers on the program filled in and gave a full concert."

The existence of the Caltech Folk Music Society is a tribute of Toby and to Simon Davies, his colleague in its organization, who left Caltech when he completed his PhD last summer. But it is also an example of what many students say is a special administrative climate at Caltech that makes it possible for enterprising students, while attending classes,

conducting research, and writing papers, to make something happen besides science.

With Toby, that something has been folk music. But he says that the enterprise came about slowly and somewhat to his own surprise. "I never planned on getting this involved," he says. "I just gradually became addicted."

Toby developed an interest in folk music when he was an undergraduate at Rutgers, but he never dreamed of being more than a spectator. Then, as a first-year graduate student at the Institute, he was dismayed to find that there was no place east of Santa Monica where he could go to hear folk musicians perform.

So in January 1983, he began to make plans to bring Joanna Cazden



Brian Toby adjusts the microphone before a performance by folk musicians Carla Sciaky, who plays the gudulka, a Bulgarian fiddle, and harpist Kim Robertson.

to the campus. He had heard her on the radio and thought that her songs—about such topics as sex discrimination—would be listened to with interest on campus.

"I didn't know what I was doing," the quiet-spoken graduate student recalls. "I just called her up. We've since become good friends."

Toby learned as he went along—about business arrangements, publicity, staging, lighting, and particularly about sound. He is currently one of three broadcast engineers for KPFK's "FolkScene." Although he seems faintly perplexed even as he says it,

Brian declares that during the two years of his involvement, he hasn't made any serious mistakes.

"We've developed a reputation for having well-run productions," he says. "There is a lot of risk-taking, and very few organizers get this far without a failure or two. Now, the performers call me". But there are weaknesses in the operation, and the one currently causing him the most concern—especially since Davies left—is that he has been doing almost everything singlehandedly.

"I've got to learn to ask for more help," Toby says, explaining that he has done things himself because he's a perfectionist. But he also knows that if he doesn't start giving other people responsibility, the society may cease to exist when he leaves campus.

While he acknowledges his role in the genesis of the Folk Music Society, he gives substantial credit for its success to its Caltech connection. "At first it really surprised me how much initiative the administration allowed students to have," he says. "At any other school, we'd have had to have five forms filed in five different offices before being allowed to start planning." Caltech, he declares, is the most red-tape-free campus in the country.

The combination of Institute connections and Toby's productivity has produced what he calls "the best college folk music concert series in southern California, and among the top two or three in the Los Angeles area. No doubt about it!" Now what folk music devotee would not like to inherit that package?

## 1984-85 Alumni Fund area chairmen

Alumni Fund area chairmen for 1984-85 are listed below, in order of their geographic regions: Region 1, Caltech and vicinity, Charles B. Thoele, BS '72, Alhambra/South Pasadena; Eugene Dryden, BS '55, MS '56, San Marino; Brian Muirhead, MS '82, South Central Pasadena; Robert Brydolf, BS '44, East Pasadena; Sidney K. Gally, BS '41, Northeast Pasadena; Frank D. Dryden, BS '54, MS '57, Arroyo; Raymond L. Heacock, BS '52, MS '57, JPL; Harold B. Crockett, MS '40, La Canada/Crescenta Valley; Robert M. Worlock, PhD '58, Altadena; David C. Kofahl, Ex '43, Arcadia/Sierra Madre, William A. Fowler, PhD '36, Caltech.

Region 2, South Coast counties, Calvin E. Kempton, BS '46, Laguna Beach; James L. Higgins, BS '56, South Laguna Beach; Frances E. Janssen, BS '75, MS '77, Huntington Beach; Dwight L. Carey, BS '72, Fullerton; Walter B. Fillippone, MS '44, Anaheim/Orange; George B. Harr, BS '41, Newport; Jerry F. L. Aldrich, MS '47, Irvine/El Toro; Paul Tuinenga, BS '77, MS '78, Santa Ana; Byrwec Ellison, BS '79, Long Beach; Michael R. Sperry, BS '70, Artesia/Westminster; William H. Bond, BS '44, Downey/Whittier; David B. McCarroll, BS '66, Covina; Donald Stewart, Jr., BS '47, Pomona/Claremont; Frank Fleck, BS '42, Desert; F. Barton Brown, MS '46, Riverside/San Bernardino.

Region 3, West Los Angeles, Reinaldo V. Gutierrez, BS '54, Palos Verdes; Paul Dergarabedian, PhD '52, Aerospace Corporation; to be filled, Torrance; Alfred P. Fay, BS '48, TRW; Patricia J. Stoddard, BS '82, Marina del Rey; Gene H. Beisman, BS '58, Santa Monica; David S. Rathje, BS '51, Los Angeles/Brentwood; James W. Workman, BS '57, MS '58, Los Angeles/Beverly Hills; Gordon B. Weir, BS '40, MS '41, Los Angeles/Hollywood; David S. Rathje, BS '51, Los Angeles/Downtown; Mark J. Abramson, BS '71, UCLA.

Region 4, Central Coast counties, Raymond G. Richards, BS '40, East San Fernando Valley; Satish V. Desai, MS '65, PhD '69, South San Fernando Valley; G. Richard Morgan, BS '49, West San Fernando Valley; George Watts, Eng '62, North San Fernando Valley; Howard L. Crowwhite, BS '54, Ventura/Thousand Oaks; Nigel P. Brown, MS '51, Santa Barbara; Waheed K. Ghauri, BS '52, Bakersfield; Daniel Markoff, BS '50, San Luis Obispo.

Region 5, San Francisco, Donald L. Cleveland, BS '34, Monterey/Santa Cruz; Murray K. Hill, MS '69, PhD '73, San Jose; Charles C. Young, BS '73, Santa Clara; Boyd P. Israelsen, BS '52, MS '53, Los Altos; Gregory W. Evans, BS '69, Sunnyvale; Donal B. Duncan, BS '45, PhD '51, Palo Alto; Holt Ashley, Ex '44, Stanford; Joseph D. Kinkade, BS '67,

Menlo Park; Melvin N. Levet, BS '39, MS '40, San Mateo; Ronald Findlay, BS '64.

Region 6, East Bay-Northern California, Daniel W. King, BS '49, Marin County; Perry H. Brown, BS '39, Napa North Coast; Ben Burke, BS '61, MS '62, North East Bay; Shelton E. Steinle, BS '43, Berkeley; Cheryl J. Robertson, BS '83, Oakland/South East Bay; Norman Bulman, PhD '52, Contra Costa; David C. Oakley, BS '50, MS '52, PhD '55, Livermore; R. Donald Denney, Ex '44, Sacramento; Clinton L. West, BS '57, Sierra.

Region 7, Southwestern Sun Belt, George F. Beardsley, MS '39, Rancho Santa Fe, John H. Loo, BS '77, North San Diego County; George P. Rigsby, BS '48, MS '50, PhD '53, San Diego; Douglas W. Gage, BS '66, South Bay San Diego; Mabry Van Reed, BS '35, La Jolla; Leighton G. Wong, MS '80, Hawaii; Larry G. Whitlow, BS '57, Phoenix; Edward A. Hayes, BS '33, Tucson; Clay T. Smith, BS '38, MS '40, PhD '43, Albuquerque; John S. Rinehart, MS '37, Los Alamos.

Region 8, Northwest, Rik Smoody, Ex '74, Portland; John J. Deniston, BS '47, Corvallis/Eugene; Gilbert B. Peppin, BS '53, East Seattle; Frederick W. Thiele, BS '41, West Seattle; Craig Zumbrunnen, MS '68, University of Washington; Frank A. Woodward, Eng '52, North Sound, Alaska; John R. Thomas, BS '57, Boeing; Frederick M. Mann, PhD '75, Eastern Washington/Oregon; Donald M. Lilienthal, BS '48, Big Sky; Eliot A. Butler, BS '52, PhD '56, Utah; Harold Leinbach, MS '50, Boulder; Robert E. Zartman, MS '59, PhD '63, Denver; Jacque G. Bourque, BS '68, South Colorado.

Region 9, South, David B. Atkinson, BS '75, Oklahoma/Arkansas; Richard Forester, MS '71, PhD '75, Dallas; James R. Lloyd, BS '56, MS '57, PhD '62, Houston; Dean A. Rains, BS '50, MS '51, PhD '54, Louisiana; Walter P. Eatherly, BS '48, MS '49, Tennessee/Alabama; D. M. W. Lindquist, Eng '60, Florida North; Arthur S. Bolles, BS '47, Florida South; H. Archie Corriher, Jr., MS '50, Georgia; William V. Wright, BS '51, PhD

'55, North Carolina.

Region 10, Midwest, Raymond Cosner, PhD '76, Missouri/Southern Illinois; George R. Dubes, PhD '53, Central Plains States; Peter A. Howell, BS '50, Minnesota; John S. Mathis, PhD '56, Wisconsin; Roger Brandt, BS '42, Northeast Chicago; Robert D. Levin, BS '65, Southwest Chicago; Allen I. Ormsbee, PhD '55, Champaign/Urbana; James H. Koontz, BS '56, Indiana; Michael J. Otto, MS '80, Western Michigan; Thomas B. Stoughton, BS '76, Eastern Michigan; David B. Peisner, BS '74, Cleveland; John S. Jackson, Jr., BS '45, MS '54, Cincinnati; John F. Kostelac, BS '49, Western Pennsylvania.

Region 11, Mid-Atlantic, Frederick C. Brunner, BS '40, MS '41, Baltimore; Brian C. Belanger, BS '63, West District of Columbia/Maryland; Philip D. Harriman, BS '59, East District of Columbia/Maryland; Lawrence C. Baldwin, Eng '55, Northwest Virginia; Raymond Cromley, BS '33, Northeast Virginia; Paul W. Utterback, Eng '60, South Virginia; William M. Hardam, PhD '65, Wilmington/Philadelphia; A. Frederick Thompson, MS '65, PhD '68, Eastern Pennsylvania/Southern New Jersey; John J. Walden, MS '59, Princeton; Alfred B. Brown, Jr., MS '47, PhD '50, Northern New Jersey; Kenneth F. Drake, Jr., BS '71, Central New Jersey.

Region 12, New York and New England, Andrew H. Lo, BS '72, Manhattan; K. Norman Easley, MS '60, Long Island; Ronald S. Douglass, BS '66, MS '67, Southeastern New York; Don P. Clausing, MS '62, PhD '66, Western New York; Delbert C. McCune, BS '56, Central New York; Robert N. Hall, BS '42, PhD '48, Eastern New York; Bernard M. Malofsky, BS '59, Connecticut; J. Kelly Beatty, BS '73, Northeast Massachusetts; Christina A. Harrington, BS '74, Southeast Massachusetts; Norton Starr, Ex '58, Massachusetts/Rhode Island; Walter R. Larson, BS '40, Upper New England; John P. Cannady, BS '74, Ontario; Donald L. Strange, PhD '72, Ontario.

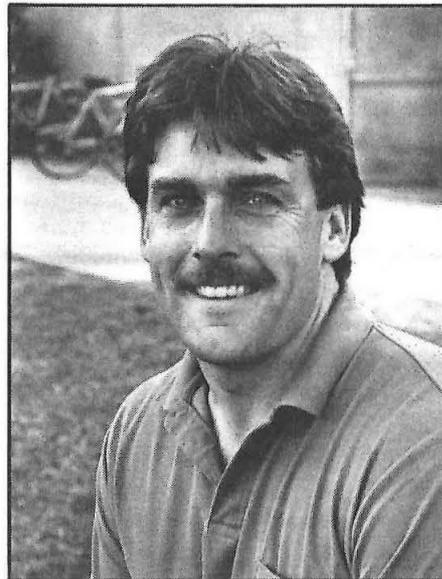
Region 13, International: Lawrence C. Widdoes, BS '41, Central/South America; H. Kirk Lewis, BS '47, Far East.

## Bridges new baseball coach

"Trophies and medals are fine and everyone likes winning, but the intrinsic rewards of participation in team sports makes everyone winners."

This is the philosophy of Caltech's new baseball coach, Dan Bridges. Bridges joined the Institute's athletic and physical education staff this fall and took over the additional responsibilities of defensive coordinator in football. He also teaches badminton and volleyball.

The new Caltech coach considers himself first and foremost a teacher, and his long-range goal is administration of physical education, a field in which he earned a master's degree from Cal State Long Beach in 1982. He plans to enroll in the doctoral program in that area of education at USC in the spring.



Bridges' athletic career began at St. John Bosco High School in Bellflower, California, where he played baseball (catcher) and football (defensive linebacker and offensive guard), and was named all-CIF (California Interscholastic Federation) in both sports.

At Cal State Long Beach he concentrated on baseball, majored in physical education, and received his degree in 1977.

Bridges' move to Caltech brought him close to two of his professional goals—teaching on the university level and having the opportunity to work with relatively inexperienced athletes.

"At schools like UCLA," Bridges says, "coaches inherit top notch athletes because that's the kind they recruit. Although strategy, organization, and recruiting are major components of coaching at that level, in

terms of the individuals, a coach can't do much more than suggest minor adjustments in the players' physical techniques. With less experienced players, you can achieve more obvious improvements."

"I don't de-emphasize winning," Bridges explains, "but a team doesn't need to win to be successful."

What is more important, he feels, is that the players and the coach "learn a lot about baseball and about working together, that they care about each other as a team, that they give it their best, and, not the least, that they have a good time.

"If we can say all that, then we are successful," he believes.

Personally, Bridges is accustomed to a degree of success, however. He came to Caltech from Brentwood (California) High School, where he was director of athletics and physical education. He also coached baseball for five of his seven years there and his teams scored an overall 68-12 win-loss record. In 1982 he coached the UCLA junior varsity baseball team for a season, achieving a 24-14 win-loss record—the best in the history of JV baseball at the university.

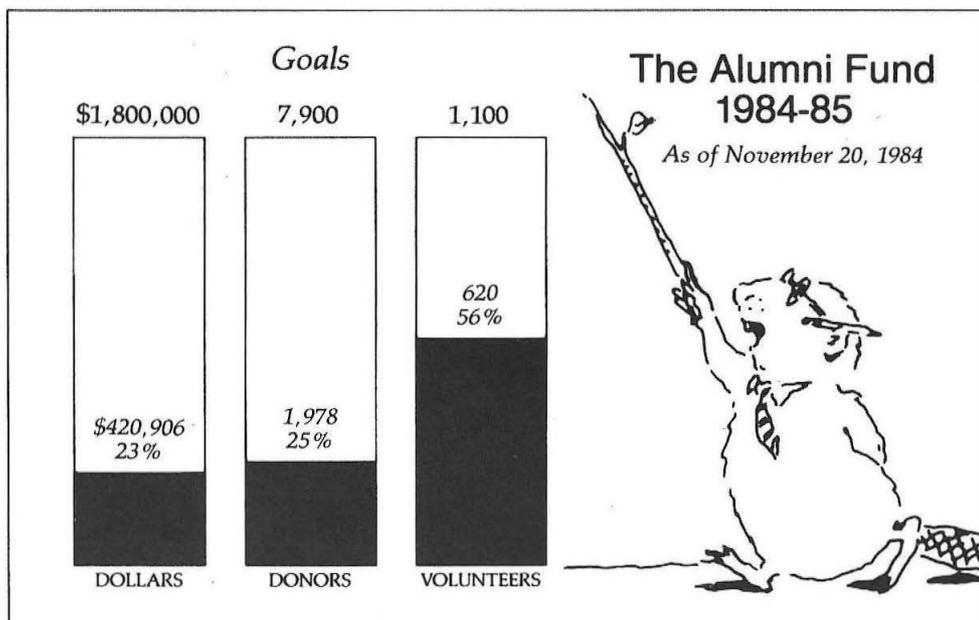
## Tournament Park given facelift

Tournament Park, the site over the years of many a student picnic and frisbee game, has been given a facelift. During the fall, the park received new lawns, a new automatic sprinkler system, a redesigned playground area with new equipment, new barbecue and picnic facilities, bicycle parking, and refurbished restrooms.

A popular spot with both students and staff, Tournament Park was officially conveyed to Caltech by a grant deed of the city of Pasadena in 1980. Its history goes back to the turn of the century, when it included the area that now encompasses the Caltech soccer and baseball fields, and was used for bicycle races, polo matches, and tugs of war that followed the Tournament of Roses parade.

In 1901 the Tournament of Roses Association bought the land, and the following year staged the first "Rose Bowl" game there. Subsequent New Year's Day games were held in that location until 1923, when the crowds reached the 50,000 mark and a new and larger stadium was needed.

Caltech bought the playing field areas of the park in 1949, and in 1967 another parcel was purchased. The rest remained a city site until 1980, when it came into Caltech ownership.



## Alumni head for autumn colors, Appalachian spring

### Michigan ore

The Keweenaw Peninsula of upper Michigan is rated by travelers as one of the most scenic sections of the midwestern United States—especially in early October when the woods are ablaze with fall colors. To this region—rich in human history and in geological interest—Robert Sharp (the Sharp Professor of Geology, Emeritus) will lead a group of alumni on a field trip beginning October 4, 1985.

Leaders, along with Sharp, will be Douglass McDowell (MS '62, PhD '67) and Theodore Bornhorst of the Michigan Technological University faculty.

The Keweenaw Peninsula is the site of the world's greatest deposit of native (elemental) copper, a resource that was mined extensively from 1845 to 1968. Here, one-billion-year-old Keweenawan lavas and conglomerates produced the more than 11 billion pounds of unusually pure copper that were taken from the ground during this interval.

Field-trip participants and guests will converge on October 3 in Houghton, Michigan, and travel by bus to points of scenic, historic, and geological interest between Houghton and Copper Harbor—including the copper-deposit region described above. After a night in Copper Harbor on October 4, they will return, by way of similar interest points, to Houghton on October 5. The group will disband on October 6.

The Alumni Association is eager to hear from alumni interested in this trip. Persons wishing to register or seeking more information are asked to return the coupon below to the Caltech Alumni Association, 1-97, Pasadena, California, 91125:

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_ Please register \_\_\_\_\_ persons for the trip  
to \_\_\_\_\_ Keweenaw Peninsula  
\_\_\_\_\_ Central Pennsylvania

\_\_\_\_\_ Please send more information about the field trip  
to \_\_\_\_\_ the Keweenaw Peninsula  
\_\_\_\_\_ Central Pennsylvania

### Pennsylvania lore

A three-day field trip to central Pennsylvania is planned by the Alumni Association for June 1985, with Robert Sharp (Robert P. Sharp Professor of Geology, Emeritus) and Lauren A. Wright (PhD '51) of Pennsylvania State University as leaders.

Beautiful rural countryside, historic buildings, small villages, prosperous farms, and Amish establishments add charm to the geology of this Appalachian region.

The travelers will meet at noon on Friday, June 14 in Hershey, Pennsylvania, and will travel that afternoon by bus to Cornwall, Harrisburg, and Boiling Springs, staying overnight at the Allenberry Resort Inn.

On Saturday they will tour the classical valley and ridge province of the folded Appalachian mountains as they move along the Susquehanna River to Lewisburg, west to Centre Hall, and south to Gettysburg on Highway 34. Exploration of a limestone cavern to collect fossils, and inspection of classical Appalachian landforms will be featured events.

Says Sharp, "The villages, old buildings, prosperous farms, and Amish establishments add charm and variety to the basic geological story to be told by the trip leaders." Dinner, before an overnight stay in Gettysburg, will be at Hickory Bridge Farm.

The explorers will spend Sunday morning on the Gettysburg battlefield, paying special attention to the role of the topography in the Union victory. The group will return to Hershey for lunch, concluding the field trip. Persons wishing to register or seeking more information should clip the coupon below.

## 1985 Alumni Activities

### January

*January 10* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*January 11* — Luncheon for Sacramento alumni, 12 noon, Rosemont Grill, Folsom Boulevard at 31st Street. Contact George Langsner for reservations. Future luncheons at the same time and place on February 8, March 8, April 12, May 10, and June 14.

*January 17* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

### February

*February 9* — Private tour of the Norton Simon Museum in Pasadena, conducted by art historians. Tour: 10:30 a.m. to 12:00 noon. Cost: \$10.00 per person. Reservations required.

*February 14* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*February 21* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

*February 22* — Opening night of the student musical, *The Mikado*. Dinner at the Athenaeum followed by the performance in Ramo Auditorium and a party at the Athenaeum, attended by the cast in costume. Reservations required.

### March

*March 8 and 15* — Wine tastings, featuring California wines; program by Bruce Hotra of Huntington Market. Program, 8 p.m., wine tasting, 8:30. Reservations required.

*March 14* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*March 21* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

*March 24-30* — Caltech Glee Club tour of the Northwest. Dates and locations of concerts to be announced. Alumni wishing to help find locations for performances, or accommodate members overnight, may contact the Alumni Association, 818-356-6594.

### April

*April 11* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*April 18* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

### May

*May 5* — Laguna chapter meeting, Leisure World, Laguna Hills. Program by the Caltech Glee Clubs.

*May 9* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*May 16* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

*May 17* — Reunion, class of 1960, Caltech campus. Details to be announced.

*May 18* — 48th annual Alumni Seminar Day, the Caltech campus. Reservations required. Details to be announced.

### June

*June 1* — Half Century Club reunion, the Caltech campus. Details to be announced.

*June 13* — Luncheon for Santa Cruz-area alumni, 12 noon, Hollins House, Pasatiempo Golf Course. Contact Don Cleveland for reservations.

*June 14* — Commencement, the Caltech campus.

*June 20* — Luncheon for San Francisco-area alumni, 12 noon, Ming's Restaurant, Palo Alto. Contact Hugh Dubb for reservations.

*June 20* — Alumni Association annual meeting and honorary dinner. The Athenaeum.

# Help us find these lost alumni

Caltech 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.

George R. Vanden Heuvel	MS 47	William J. Green	MS 40	Jerome P. Dyson	BS 46	Jarvin R. Heiman	BS 49	Alan E. Farley	BS 57	Melvin M. Stephens II	BS 65	Bruce W. Bennett	BS 73	Brain T. Lew	BS 79
Blake Beatty	BS 22	Ruhoilah Y. Karubian	MS 40	David R. Esner	BS 46	George M. Hrebec Ret.	BS 49	Douglas B. Holdridge	MS 57	Matias J. Turteltaub	MS 65	Raymond E. Carhart	PhD 73	Paul W. Meyer	BS 79
Robert J. Hammond	BS 23	Luigi Menis	BS 40	Robert W. Foote	BS 46	Frank G. Hylton	BS 49	Robert T. Moore	BS 57	Wolfgang Rockenhauser	MS 57	Vijay Chatoorgoon	MS 73	Jose A. Rial	PhD 79
Hubert Woods	BS 23	Tsung-Su Wang	MS 40	R. Bruce Foster	MS 46	Fred E. Krasin	BS 49	Franklin C. Silvey	Eng 57	Mr. Philippe Vidal	MS 65	Donald A. Herron	MS 73	Helene M. Shapiro	PhD 79
Warren B. Leavitt	BS 24	Watkins Jr.	BS 40	Luis E. Freire	MS 47	Max Krauss	PhD 49	Andre A. Treyer	MS 57	Felix S. Wong	MS 65	Thomas F. Humphrey	MS 73	Tak-Yiu Wong	MS 79
Carl P. Miller	BS 24	Morris R. Clark	BS 41	George S. Gill	BS 46	William E. Lamb	Eng 49	John C. Uthoff	MS 57	Robert T. Barron	MS 66	Xavier F. Lagarde	MS 73	Roland L. Bouchard	MS 80
Willard H. Tracy	BS 24	Samuel J. Easley	MS 41	Benjamin S. Hayne III	BS 46	Pierre J. Leroux	PhD 51	Ray H. White	BS 57	Joe Ching	MS 66	Richard A. Shaw	BS 73	Reda Abdu E. El-Damak	MS 80
Wilfred G. Thompson	BS 25	Glyn Frank-Jones	BS 41	H. T. Huang	BS 46	Dan M. Parker	MS 49	David G. Byles	BS 58	Harold T. Couch	PhD 66	Wayne K. Warzech	MS 73	Peter M. Goodwin	BS 80
Conrad J. Waller	BS 25	Robert C. Geitz	BS 41	Frederick J. Lewis	MS 46	Thomas G. Petrus	BS 49	John L. Gardner Jr.	MS 58	Robert E. Serafin	BS 66	Neil S. Berkey	BS 74	Jeffrey B. Johnson	MS 80
Riley L. Gilbert	Ex 26	Donald L. Harvey	BS 41	Norman J. MacDonald	BS 46	Charles C. Petty	MS 49	Lawrence I. Kittiver	MS 58	Surendra N. Adodra	MS 67	Ernest Ying-Chee Chung	BS 74	Charles S. Reynolds	BS 80
Nathan F. Scudder	BS 26	George I. Reimers	BS 41	Stanley R. Nixon	BS 46	William C. Roesch	PhD 49	Jean P. Lacrouts	MS 58	Philippe J. Blondy	MS 67	John E. Geltosky	PhD 74	Charles S. Slater	MS 80
Lewis E. Medlin	BS 27	Frederick G. Robinson	BS 41	K. V. Krishna	MS 46	Dale D. Ryder	BS 49	Hugh D. Palmiter	Ex 58	Cpt. James R. Boyd	MS 67	Paul B. Gloger	Ex 74	Horace R. Drew III	PhD 81
Frank F. Peterson	BS 27	Stanley E. Sohler	BS 41	Prasad	MS 46	Salim Solomon	MS 49	Gerald M. Pjerrou	BS 58	John B. Davies	MS 67	Joseph F. Karnicky	PhD 74	John P. Huber	BS 81
Francis C. Martin	MS 28	C. B. Stadium	BS 41	Carl K. Salbach	MS 46	John W. Wilkening	Ex 49	Victor Baekelandt	MS 59	Payton D. Fuller	MS 67	Kar-Shing S. Lee	BS 74	Luen-Hin Kwok	MS 81
Kam H. Lau	BS 29	Clyde T. Standridge	MS 41	John W. Sease	PhD 46	Jean F. Wiren	BS 49	Sam M. Berman	PhD 59	Robert E. Goldwasser	MS 67	Michael J. Mariani	BS 74	Charles R. Nichols	BS 81
Julius Nelson	BS 29	Robert L. Weaver	MS 41	Elmer R. Shepard	BS 46	Joseph B. Alexander	MS 50	Chai B. Byun	BS 59	Eitan Gonen	MS 67	Howard C. Morris	PhD 74	Paul N. Spathis	BS 81
True W. Robinson	BS 29	Colman Zola	MS 41	Col. Harvey F. Smith	MS 46	Weldon O. Bergreen	BS 50	Clark E. Carroll	BS 59	C. Laurie Hatch	PhD 67	Vinod Shekher	MS 74	Daniel H. Turnbull	MS 81
Willem Uyterhoeven	PhD 29	Mehmet F. Bebe	Eng 42	Yu-sin Tung	MS 46	Julian Brody	BS 50	Ronald A. Christensen	MS 59	Louis Kircos	MS 67	Bon H. So	BS 74	Linda B. McAllister	BS 82
Donald K. Allison	BS 30	Orhan M. Emre	Eng 42	Thomas F. Weldon	MS 46	Kenneth J. Hammond	BS 50	Charles K. Daniels	BS 59	Duane P. McClure	BS 67	1/Lt. Donald J. Sullivan	MS 74	John Y. Ngai	BS 82
William Keiley	BS 30	Frank I. Given	BS 42	Rolland S. Asher	BS 47	Robert McMillan	MS 50	Thomas E. Dawson	Eng 59	Jean M. Moysan	MS 67	Melvin J. Knight II	PhD 75	Michael L. Pearson	BS 82
Lorenz D. Huff	PhD 31	Chong-Hu Go	MS 42	Adolfo J. Atencio	MS 47	Robert W. Paulson	MS 50	Andre J. Fossard	MS 59	Robert C. Neveln	BS 67	Vincent K. Leung	MS 75	Remy D. Sanouillet	MS 82
William T. West	MS 32	Victor H. Martinez	MS 42	Paul K. Charlu	MS 47	Howard R. Schmidt	MS 50	Michel P. Guillemet	MS 59	John C. Perrin	MS 67	William J. Sharman	BS 75	Liem T. Tran	BS 82
Carl K. Yoshicka	BS 31	Russell Rhyne	MS 43	Ta-San Chung	MS 47	Robert S. Welte	BS 50	Jay H. Harris	MS 59	Steadman	MS 67	James W. Deusch	PhD 76	Walter A. Coole	BS 83
Thomas C. Burk	Ex 33	Kenneth E. Anspach	BS 43	Hugh H. Collins	Eng 47	Norris D. Whitehill	BS 50	Richard E. Hemmingway	Eng 59	Duke A. Sun	BS 67	Mohammad A. Hamzavi-Abedi	MS 76	David J. Muraki	MS 83
A. Arthur Koch	MS 33	James M. Brown	MS 43	Brian D. Dagnall	MS 47	Ricardo M. Arosemena	MS 51	Gordon F. Hughes	MS 60	Alain A. Artaud	MS 68	Chiu-Yuen Jng	BS 76	Jonathan E. Parker	BS 83
William A. Larsen	MS 33	Mr. Ted L. Crosthwait	MS 43	Richard H. Davis	MS 47	Howard C. Goodell	MS 51	Young C. Kim	MS 64	Gerald M. Cotreau	MS 68	Lewis S. Proudfoot	BS 76	Gabriel M. Rebfi	MS 83
Edwin B. Michal	MS 33	Benjamin A. Daleon	MS 43	Eric Gillam	MS 47	Jacob P. Lafdjian	MS 51	Ronald B. Leonard	BS 59	William J. Driskell	MS 68	Stephen R. Roe	BS 76	Ilene M. Reinitz	BS 83
Winston H. Rice	BS 33	Warren V. Eaton Jr.	MS 43	Walter Harrington	MS 47	Joseph E. Padgett Jr.	MS 51	Stanley Roth	BS 59	Jacques P. Fleuret	MS 68	Andrew Bewsher	MS 77	Brian D. Wilson	MS 83
Maple D. Shappell	BS 34	Oleg C. Enikeieff	BS 43	Ea-Qua Huang	MS 47	Allan J. Summers	MS 51	Joseph M. Cauley	MS 61	Jay R. Freeman	BS 68	John M. Lehman	BS 77	Reazuddin A. Chaudhuri	MS 78
Robert A. Dietrich	BS 34	Leon Katz	PhD 43	Fioello Leo	MS 47	Albert E. Van Hise	BS 51	Jacques J. De Barbeyrac	MS 60	Dr. Frederick J. Hollander	BS 68	David M. MacKenzie	BS 68	Siranush Papazian	MS 78
Roland J. White	MS 34	Edward G. King	MS 43	James S. Lesko	Eng 48	Paul E. Arbo	Eng 52	Ernest A. Isaacs	BS 60	Flouder	BS 68	Brian M. Schaefer	MS 68	Jack Powell	MS 78
Edward A. Bertram	MS 35	Robert H. Koch	MS 43	John Manoukian	MS 47	Smith V. Bucy	MS 52	Pierre E. Joffres	MS 60	Dr. Frederick J. Hollander	BS 68	James B. Andrew	BS 69	Kenji Shintani	MS 7
Harrison Evans	BS 35	William L. Leeds	MS 43	Michael K. Molloy	MS 47	Frank C. Lang Jr.	BS 52	William A. Sinoff	BS 60	Ender M. Kaya	MS 68	Jean-Henry Barth	MS 69	Ping Y. Chiu	BS 79
Paul F. Genachte	PhD 35	Roland E. Lundquist	MS 43	Basil E. Moorehead	BS 47	Basil R. Parnes	BS 52	Paul R. Widess	MS 61	John M. Lehman	BS 68	Thomas D. Baze	BS 69	Bo H. Cho	MS 80
Fun-Chang	MS 35	Klaus Mampell	PhD 43	Raymond L. Olson	BS 47	William C. Robison	MS 52	Roland Kitten	MS 61	David M. MacKenzie	BS 68	J. Brantner	MS 69	Fred J. Crimi	BS 79
Huang	MS 35	Fred D. Roberts	MS 43	John L. Orr	MS 47	Donald E. Sutton	BS 52	Etiene Macke	MS 61	Ernest A. Isaacs	BS 60	Thomas E.	MS 69	Frederick S. Grennan	BS 79
Harry M. Koons Jr.	BS 35	Carlos A. De Medeiros	MS 44	Patrick M. Quinlan	MS 47	Richard W. Weeks	BS 52	Dwain J. Reed	BS 61	Pierre E. Joffres	MS 60	Henri M. Horgen	MS 69		
Dagoberto Rivas	BS 35	E. J. Goehring	Ex 44	Guruvayur S. Ramaswamy	MS 47	Howard E. Wilson	MS 52	Lewis L. Smith	MS 62	William A. Sinoff	BS 60	PhD 75	MS 69		
Neil W. Snow	MS 36	Charles P. Harrison	MS 44	Francis D. Sullivan	BS 47	Stuart G. Lennox	MS 53	Nazeer Ahmed	Eng 65	Paul R. Widess	MS 61	PhD 75	MS 69		
Larry L. Young	MS 36	Mr. Robert F. Laabs	BS 44	Russell A. Thompson	Eng 47	Nobuyoshi Takahashi	BS 53	Clement C. Audet	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Thomas R. Burnight	BS 37	Mr. Robert F. Laabs	BS 44	Pao K. Wan	MS 47	David S. Twining	BS 53	Michel M. Cousin	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Ju-Yung Cheng	MS 37	Edward B. Winters Jr.	BS 47	Alonzo H. Wellman Jr.	Eng 47	John T. John T.	MS 54	Michel	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Roderic C. Davis	MS 37	Lai-Chao Ying	MS 47	Clifford M. Wimberly	MS 47	John T. John T.	MS 54	D'Arbaumont	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Robert M. Dreyer	MS 37	Yin-Ching	BS 48	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Jean C. Dubcis	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Anthony Easton	MS 37	Capt. J. Bunce	MS 48	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Larry D. Fitzgerald	MS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Paul F. Jones	MS 37	Tao-Hung Chu	MS 48	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Peter W. Hammond	BS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Thomas N. Shaw	BS 37	Albert R. Clark	MS 48	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	James D. Klett	BS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Ellis W. Shuler	MS 37	Bargess F. Collins	BS 48	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Barry N. Pines	BS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Clark H. Wiget	BS 37	Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Robert C. Ruddick	BS 62	Paul R. Widess	MS 61	PhD 75	MS 69		
Hyman D. Goodman	MS 38	Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	John E. Baldwin	PhD 63	Paul R. Widess	MS 61	PhD 75	MS 69		
Arthur G. Gross	BS 38	Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Michael F. Behrens	BS 63	Paul R. Widess	MS 61	PhD 75	MS 69		
Arnulfo G. Gutierrez	MS 38	Irvin G. Henry	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Pierre J. Facon	MS 63	Paul R. Widess	MS 61	PhD 75	MS 69		
Frank C. Lowe	BS 38	Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Anthony S. Lau	BS 63	Paul R. Widess	MS 61	PhD 75	MS 69		
Noble R. Maines	Ex 38	Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Lee W. Samuelson	Ex 63	Paul R. Widess	MS 61	PhD 75	MS 69		
William Rhett	BS 38	Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	John Y. Wu	BS 63	Paul R. Widess	MS 61	PhD 75	MS 69		
Chi-Cheng Tsao	BS 38	Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Eudoxia Aliferis	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
James W. Watson	BS 38	Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Eliot B. Bradford Jr.	BS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Andrew Fejer	PhD	Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Tzeu-Ching Chang	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Winthrop G. Jones	MS 39	Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Jean-Marie F. Grange	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Spencer W. Oakley	BS 39	Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Takehiko Ikeda	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Lester G. Zukerman	BS 39	Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Karl H. Kanus	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Arthur M. Compton	BS 40	Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Chung-Mo Kwok	BS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Radm. W. Gentner	MS 40	Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Jacques A. Parisot	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
Arville C. Gibson	MS 40	Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Andreas Puhl	MS 64	Paul R. Widess	MS 61	PhD 75	MS 69		
		Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Harold P. Waits	PhD 64	Paul R. Widess	MS 61	PhD 75	MS 69		
		Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Raymond P. Cej	MS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Philippe R. Chalier	MS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Inder Cheema	MS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Peter K. Clark	BS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Wesley R. Guebert	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Ronald E. Hutton	BS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Herberto Jimenez	MS 54	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	Michel A. Lagorce	MS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Phillip D. Potter	MS 55	Edward B. Winters Jr.	BS 47	John T. John T.	MS 54	William P. O'Neill	BS 65	Paul R. Widess	MS 61	PhD 75	MS 69		
		Wesley R. Guebert</													

## ALUMNI ASSOCIATION FINANCIAL STATEMENTS

ALUMNI ASSOCIATION  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
Pasadena, California

## BALANCE SHEET

June 30, 1984

ASSETS	
Cash on Hand and in Bank	\$ 29,824
Investments:	
C.I.T. Consolidated Portfolio	794,862
Money Market Funds	108,986
Investment Income Receivable	13,000
Other Receivables	5,561
Advance for Landscaping Costs	12,297
Deferred Program Expenses	3,990
Postage Deposit and Other Deferred Expenses	1,840
<b>TOTAL ASSETS</b>	<b>\$970,360</b>

LIABILITIES, RESERVES AND SURPLUS	
Accounts Payable	\$ 41,006
Deferred Income:	
Annual Membership Dues Paid in Advance	12,520
Investment Income from C.I.T. Consolidated Portfolio	37,000
Program Income	5,100
Life Membership Reserve	798,372
Reserve for Directory	16,486
Reserve for Student Support and Educational Programs	14,427
Surplus	45,449
<b>TOTAL LIABILITIES, RESERVES AND SURPLUS</b>	<b>\$970,360</b>

STATEMENT OF INCOME, EXPENSES AND SURPLUS  
For the Year Ended June 30, 1984

INCOME	
Dues of Annual Members	\$ 64,650
Investment Income:	
C.I.T. Consolidated Portfolio	46,000
Money Market Funds	9,612
Net Income from Publication of <i>Legends of Caltech</i>	12,175
Net Income from Annual Seminar and Other Alumni Programs	2,697
<b>TOTAL INCOME</b>	<b>\$135,134</b>

EXPENSES	
Publications	\$ 12,000
Net Expenses of Class Reunions	8,145
Net Expenses of Chapter Meetings	3,940
Student Support	16,360
Undergraduate Admissions Support	2,732
Administration	45,847
Membership	8,563
Allocation for Reserve for Directory	9,000
Allocation for Reserve for Student Support and Educational Programs	14,427
<b>TOTAL EXPENSES</b>	<b>\$121,014</b>
<b>EXCESS OF INCOME OVER EXPENSES</b>	<b>\$ 14,120</b>
Surplus, June 30, 1983	31,329
Surplus, June 30, 1984	\$ 45,449

## 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, 1984, 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 financial statements referred to above present fairly the financial position of the Alumni Association, California Institute of Technology at June 30, 1984, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Calvin A. Ames  
Certified Public Accountant

October 18, 1984

Hoffman named  
Howard Fellow

Philip T. Hoffman, associate professor of history and social science, is recipient of a George A. and Eliza Gardner Howard Foundation Fellowship to enable him to pursue research on "French Rural Society in the Early

## Modern Period."

Hoffman will travel to France in January, and will spend March through September there, conducting research in archives in Paris, Leon, and Metz on the period 1500 to 1800.

The fellowship is awarded to a promising researcher between the ages of 30 and 40 to enable him or her to conduct independent work.

## Alumnus earns Emmy

Daniel M. Nosenchuck (MS '77, PhD '82), a former research fellow in fluid mechanics at Caltech, has received an Emmy for his work in special effects for the ABC Television movie *The Day After*. The 29-year-old engineer was instrumental in creating the mushroom clouds and missile launches used in the film that portrayed the effects of a nuclear attack on the United States.

Nosenchuck was a research fellow at Caltech in June 1982 when the head of Praxis Film Works, a special effects studio in North Hollywood, approached him for technical assistance in making the mushroom clouds.

Nosenchuck had done extensive modeling of flows, including flows over flat plates, in a water tunnel using dyes. This kind of simulation is used extensively in the aerospace industry to help understand the behavior of air flows over aircraft wings and fuselages.

In creating the clouds for the movie, Nosenchuck made a simple vortex ring that resembled a cloud cap by using a piston to inject dye into a water tank. This was followed by an additional flow of dye from jets on the top of the piston. These created the stem of the cloud. Nosenchuck also provided calculations for the trajectories of missile contrails used in the film. The contrails were generated in a water tank.

Nosenchuck is assistant professor of mechanical and aerospace engineering at Princeton. His research focuses on the active control of fluid flows, with the ultimate goal of reducing drag on vehicles.

It would have been nice to know if our students had asked questions like "Why are there microphones in our hotel rooms?" I have no desire to prevent our students from expressing dissatisfaction with U.S. foreign policy as they see it—for I feel, too, that it is not perfect. But I also feel that its track record on the whole is better in the direction of supporting human freedom than the Russian foreign policy.

It would be well if the next group of 40 undergraduates would reflect on what academic freedom of study and self-expression would be allowed Caltech students if the U.S. had the same atmosphere that exists behind the Iron Curtain.

I wish that you could show this letter to the students of the trip, and possibly to Dr. Goldberger. I am certain that, with his views on security and cultural exchange among the members of the scientific community, he cannot but agree that our Nobel Prize winners are certainly better treated than those of Communist countries.

Very sincerely,  
J. B. Stevens (BS '40)

## OBITUARIES

## 1921

H. IRVING SCRIBNER, July 22, on his 87th birthday. He was living in Pasadena, where he had retired from his position as engineer in the propulsion division of the U.S. Naval Ordnance Test Station. He is survived by his wife, Mary.

## 1922

JOHN HONSAKER. He had been retired for many years and was living in Laguna Hills, California. He is survived by his wife.

## 1923

DOUGLAS G. KENDALL, on June 26, at his home in Laguna Hills, California, where he had been retired from his job as sales executive with Square D Company in Los Angeles. He is survived by his son, Jerrold, and one grandson.

## 1926

ROBERT C. BURT, PhD, age 87, on August 30, of a massive heart attack following a car accident, while returning from an inspection of his air-driven "Burtmobile" at San Diego State University. The president of Burt Energy Research Corporation, he was also the inventor of the Burt photoelectric cell, the Burt ultraviolet photometer, an air-drive transmission for automobiles, and numerous other devices designed to conserve scarce energy resources. He had been living in San Marino, California.

## 1927

BORICE Z. BORIS (formerly BORIS V. ZBRADOVSKY), age 78, on July 7. He had been retired since 1968 as an engineer with Bechtel Corporation in South Africa, and after many years of world traveling was living San Luis Obispo, California. He is survived by his wife, Bobbie, one daughter, one son, and five grandchildren.

## LETTERS

Continued from page 9

have been as much to the point to say "many people don't like what the Russians are doing to Afghanistan. "Neither relates to the ideology of the U.S. going into Vietnam.

It would have been more to the point to say that the basic ideology of the U.S. is to inhibit forms of government that imprison and execute persons who do not agree with that government's doctrines. There is ample evidence that governments sponsored or supported by the Communist do just that—without propaganda, or with it.

**RAY E. COPELAND**, age 79, on August 2, of a heart attack, at his home in Laguna Hills, California. Formerly sales manager with the Davis Walker Corporation, he had been an engineering consultant to the firm until his retirement in February 1984. His daughter, Barbara, survives him.

**CHARLES A. SWARTZ**, PhD '31, on August 25, 1984. He had been retired for many years as a geophysicist for the United Geophysical Company in Pasadena, and had continued as consultant to the firm. He is survived by his wife, Marion.

**1931**  
**LORENZ D. HUFF**, PhD, age 78. He had been professor of physics, emeritus, at Clemson University in Clemson, South Carolina, where he served as head of the department of physics and astronomy from 1946 to 1967 and oversaw establishment of the department's graduate program. He is survived by his wife, Rose, three sons, and a daughter.

**1932**  
**JOHN B. MILLER**, Ex, in April, at the age of 83. He had been retired as professor of physics at Bucknell University, where he taught from 1927 to 1966, and had been president of the Wycoff-Bent Corporation, a New York City real estate holding company. He had also worked for the Pennsylvania Game Commission, and had retired as deputy game protector in 1980. He is survived by his wife, Edith, three sons, seven grandchildren, and four great-grandchildren.

**1938**  
**ROBERT S. CUSTER**, age 68, on August 30, of cancer, at his home in Cupertino, California. He had been principal engineer for Bechtel Petroleum, Inc., in San Francisco, where he supervised and designed chemical processing units for the past 35 years, and was a member of the American Institute of Chemical Engineers for more than 20 years. Custer also served as scoutmaster of a Boy Scout troop. He is survived by his wife, Julia, two sons, four daughters, four step-daughters, and seven grandchildren.

**1940**  
**CLINTON T. NEWBY**, MS '41, age 66, on September 5, of liver and kidney failure. He had been retired from his job as head of the loads and dynamics section, airframe division, for the Navy's Bureau of Aeronautics, and divided his time between Jensen Beach and Hutchinson Island, Florida. He is survived by his wife, Billye, whom he had known since junior high school, two sons, and six grandchildren. The family asks that in lieu of flowers, memorial contributions be sent to the Caltech Alumni Fund.

**1949**  
**GERALD P. BREAUX**, MS, in June 1983. He was living in Fort Worth, Texas, where he worked as an independent consultant.

**CHARLES E. KUCHAR**, MS, age 58, on July 6. He had been assistant project engineer with General Dynamics Corporation in Fort Worth, Texas. His wife, Barbara, two daughters, and his mother, Mrs. Ruth Kuchar, survive him.

**1957**  
**STANLEY G. TAYLOR**, in June. He had been an attorney in Fairfield, Connecticut.

**1971**  
**MICHAEL E. RASSBACH**, PhD, age 39. He had been president of Elogic, Inc., a computer software company he founded in 1976, and was living in Houston, Texas. He is survived by his wife, Wendy, two sons, one daughter, and his father.

## PERSONALS

**1936**  
**THOMAS E. BROWNE, JR.**, PhD, writes from his home in Pittsburgh, where he has retired from his position as consultant to Westinghouse Research & Development Center, that he has edited and co-written a book entitled *Circuit Interruption*, published in July 1984.

**1945**  
**WALLIS T. FLEMING** writes from Avondale, Arizona, "On January 20, I retired after more than 27 years in the engineering department of Garrett Pneumatic Systems Division in Phoenix. At the time of my retirement, I was supervisor of engineering publications."

**1946**  
**JULIAN D. COLE**, MS, Eng, PhD '49, professor of mathematics at Rensselaer Polytechnic Institute in Troy, New York, has been awarded the 1984 Theodore von Kármán Prize by the Society for Industrial and Applied Mathematics in recognition of "his inventive development of mathematical techniques, his wideranging and perceptive use of mathematics in the understanding of scientific phenomena and technological questions, and for his dedicated contributions to the education of applied mathematics." Only three other recipients have been awarded the prize since it was established in 1971. A member of both the National Academy of Sciences and the National Academy of Engineering, Cole served as a member of the Caltech faculty from 1951 to 1969. In 1971, he received the Institute's Distinguished Alumni Award.

**1948**  
**HAROLD S. JOHNSTON**, PhD, professor of chemistry at UC Berkeley, has been named the 1985 winner of the American Chemical Society's Award in the Chemistry of Contemporary Technological Problems for "his studies of the stratosphere and of high-altitude pollutants. He was the first to realize and warn of the possibility that stratospheric contaminants might jeopardize the ozone layer, which is essential to life on Earth." He will receive the \$5,000 award next April at the Society's 189th national meeting.

**1949**  
**MYRON LIPOW** sends word from Rancho Palos Verdes, California: "After 25 years, I retired from TRW and promptly joined the software engineering laboratories at Hughes Radar Systems Group as project manager. To celebrate, I and my wife of 34 years, Susan-Lee, went on a three-week tour of Israel, which was both very educational and emotionally fulfilling. Susie had taken a month's refresher in Hebrew prior to our tour. As a result, she was successfully able to describe to a sports store clerk in Jerusalem an (unmentionable) as 'something Myron wears under his bathing suit, but is not underwear.' On our last day I played 18 holes at the only golf course in Israel, at Caesaria, fulfilling a long-time desire."

**WALTER G. PREVOST** sends word from Cebu City, Philippines, that he joined the Cebu Bible Seminary as missionary and teacher in August and began teaching in early November, when the second semester of the school year began. He writes, "It will be good to renew acquaintance with friends. I am hopeful that I will have opportunities to join Filipino brethren in evangelistic efforts."

**1952**  
**BERNI J. ALDER**, PhD, group leader and physicist at the Lawrence Livermore Laboratory, University of California, is the 1985 recipient of the American Chemical Society's Joel Henry Hildebrand Award in the Theoretical and Experimental Chemistry of Liquids for "his pioneering work with computer simulation of the equilibrium and transport properties of liquids." He will be presented the \$3,000 award at the Society's 189th national meeting next April.

**1960**  
**ELI RESHOTKO**, PhD, professor of mechanical and aerospace engineering at Case Western Reserve University in Cleveland, has been elected a member of the National Academy of Engineering, the highest professional distinction that can be conferred upon an engineer. Reshotko was named for his pioneering research on compressible boundary layers.

**1969**  
**JEFFREY C. HECHT** writes from Auburn-dale, Massachusetts, "I'm successful enough as a free-lance writer and consultant to buy a new house—a new old house would be more accurate, because the house we are moving into was built in 1897. My first book, *Laser: Supertool of the 1980s*, is now out in paperback in the U.S.; Japanese and Spanish editions are already out, and Dutch and Swedish editions are planned. My second book, *Beam Weapons: The Next Arms Race*, was published by Plenum earlier this year, and negotiations are in progress with French and German publishers for translation rights to that. I'm now working on an engineering book on lasers for McGraw-Hill, plus the usual assortment of magazine articles."

**RICHARD RUBINSTEIN**, principal engineer with Digital Equipment Corporation in Marlboro, Massachusetts, sends word that he, his wife, Barbara, and son, Adam, welcomed a daughter and sister, Beth Crystal, on February 29, 1984.

**1971**  
**MICHAEL D. TEENER**, senior system architect with CXC Corporation in Irvine, California, writes, "I married my long-time friend and current doctor, Jeanne Archer, D.C., and picked up an instant 13-year-old son, Matt, who is also a long-time friend, though of a different variety."

**1972**  
**JOHN H. KONRAD**, MS, PhD '77, project manager for the systems engineering lab with Hughes Aircraft Space and Communications Group in El Segundo, California, has been selected by Hughes Communications and NASA to be a payload specialist on the space shuttle flight scheduled for August 1985. He will participate in the launch of the fourth Leasat communications satellite, which will transmit data and voice signals to the U.S. armed forces.

**1976**  
**HARVEY M. PHILLIPS** writes from Hong Kong, "After spending the last two years in Beijing studying Mandarin, I will begin working this fall in China for Management Technologies International. My work will involve consulting and organizing technological exchanges between the U.S. and China."

**1977**  
**BEN S. FREISER**, PhD, associate professor of chemistry at Purdue University, is the 1985 winner of the American Chemical Society's Award in Pure Chemistry for "his pioneering development of ingenious new methods to solve sophisticated fundamental problems of molecular structure and reactivity. Although only 33 years old, he has had considerable impact on a broad area of

chemistry, including analytical, inorganic, and organic." He will receive the \$3,000 award at the Society's 189th national meeting next April.

**1977**  
**LESLIE A. FROISLAND**, MS, senior applications engineer with Hunter & Ready in Mountain View, California, married Dr. Larry Edwards in March 1984. She will be keeping her own name.

**1978**  
**BERT L. WELLS, JR.**, BS, MS, sends this update from New Haven, Connecticut: "Much has happened to me since the halcyon days at Caltech. As a mathematics graduate student, I spent four delightful years at Oxford, and played the harp, and traveled throughout Europe for entertainment. After receiving my doctorate in 1982, I took a position on the math faculty of Louisiana State University, Baton Rouge. Most recently, I have been working at Bell Communications Research, Murray Hill, New Jersey. I have decided, though, to change the direction of my career, and I am now beginning studies for a J.D. at Yale Law School. Greetings to my many friends from Caltech; I hope our paths cross again soon!"

**1979**  
**DEREK L. DAVIS** writes from St. Quentin-Yvelines, France, "Having spent the last two years as a senior design engineer at Cimatel (an Intel subsidiary) in France, I am now preparing to return to the U.S. at year's end. For vacation this year, I toured Ireland and Scotland for three weeks. It was a very pleasant trip with (amazingly) no rain throughout."

**MICHAEL A. NIMAN**, MS, a member of the technical staff with General Electric in Portland, Oregon, married Brenda R. DeWitz on August 21, 1982.

**1981**  
**MARY A. BOLTON** and **JAY W. PARKER** write, "We are happy to announce our wedding, September 1, 1984, in Los Alamitos, California. We are both pursuing PhDs, Jay in electrical engineering and Mary in chemistry, at the University of Illinois, Urbana-Champaign."

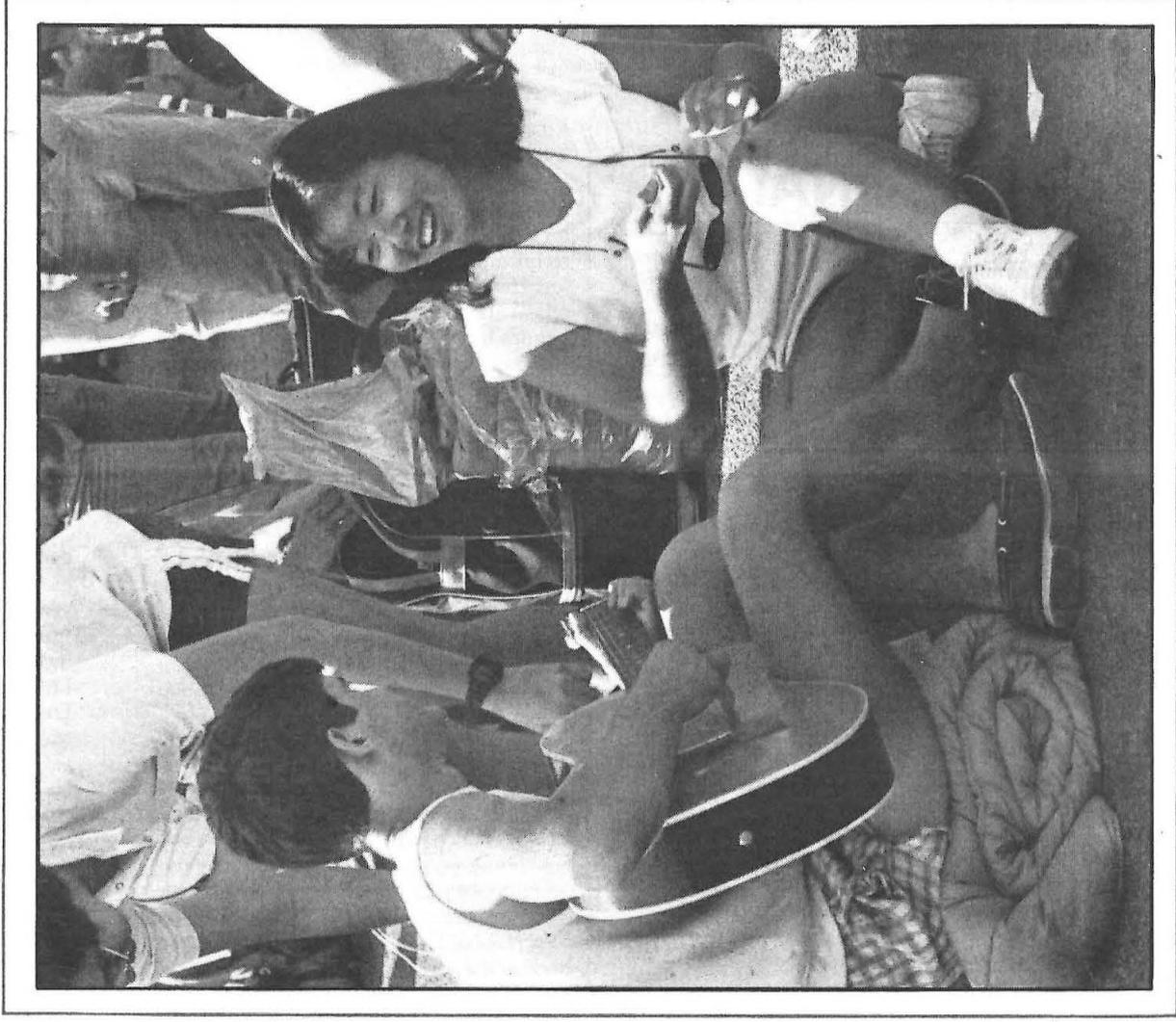
**1982**  
**ANDREW W. MAVERICK**, PhD, writes from St. Louis, Missouri, where he is assistant professor of chemistry at Washington University, "Married Anne Beattie, August 13, 1983. She is a graduate student in English at Washington University."

**1983**  
**ROBERT M. KANNE**, MS, reports from Pasadena, "I was a member of the platform committee at this summer's Democratic National Convention. Being one of the 184 committee members was especially interesting this year because our committee chair was Geraldine Ferraro. When I originally agreed to be Gary Hart's environmental coordinator for California, I never expected it would lead to such an interesting assignment."

**HERVE R. A. LAMBERT**, MS, applications engineer with Thomson Semi-Conducteur in Rousset, France, was married on July 7 to Vicky Curry of South Pasadena. The couple will live in Aix-en-Provence.

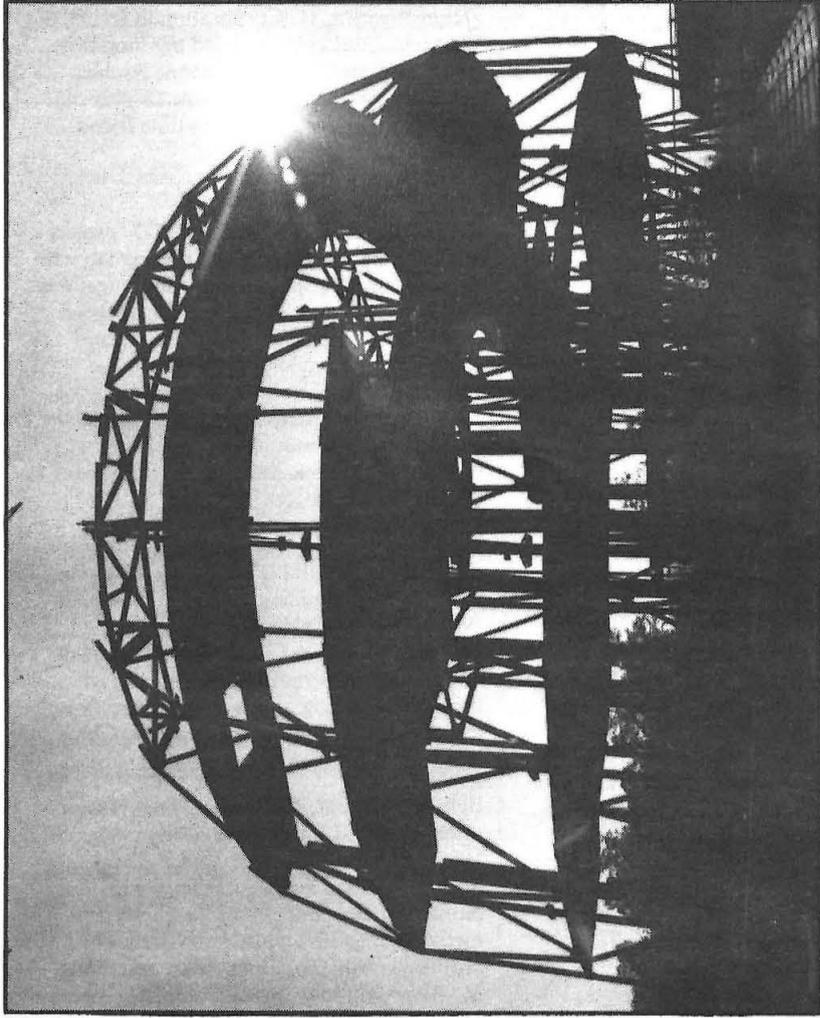
**1984**  
**JORGE SOTO GONZALEZ**, PhD, postdoc in chemistry at UCLA, and his wife, Angel, welcomed a son, Jorge Jr., on September 14, 1984.

# CALTECH NEWS



Freshman Camp: coming of age on Catalina. See page 3.

December 1984



When it is completed, this structure rising next to Caltech's athletic field will be transported to the new observatory on Mauna Kea Island, Hawaii, where it will house a radio telescope designed by Robert B. Leighton (The William L. Valentine Professor of Physics) and Thomas G. Phillips (professor of physics and associate director of Owens Valley Radio Observatory). The telescope is scheduled for installation in late 1985 and will expand Caltech's capability in submillimeter-wave astronomy, in which atomic and molecular particles in interstellar space are identified and studied by observing their characteristic spectral wavelengths.

# CALTECH NEWS

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