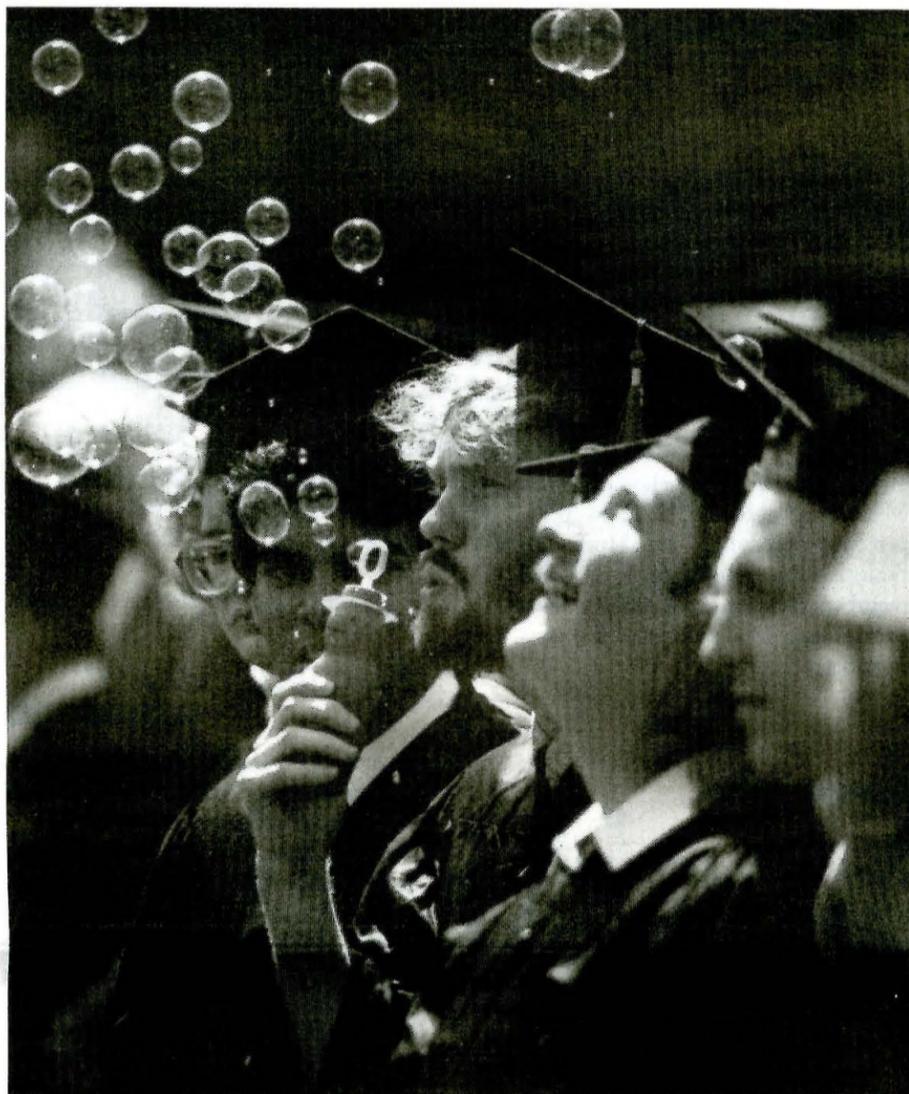


Volume 22, No. 4  
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Joel Hamkins  
adds a special bit  
of buoyancy to  
commencement.

## *The answer — versus the solution*

Persons of scientific and technological backgrounds are sure that the great problems facing humanity can only be solved by more knowledge, and by better science and engineering, Robert L. Sinsheimer, visiting associate in biology and former chancellor at UC Santa Cruz, told graduates at Caltech's 94th annual commencement.

But, he went on to warn the graduates, "The answer is not necessarily the solution.

"As a scientist or an engineer, you may derive the optimal, analytically effective answer to a problem," Sinsheimer told them. "But in reality, the answer may not be optimal, because it may simply not be politically or socially feasible in our time. And then one must fashion a solution — an alternative answer to the problem — that is attainable.

"And that requires that you comprehend other perspectives and points of divergence from your own."

Sinsheimer pointed out that advances in science and technology have "released or even engendered vast forces in our society." Consequently, he said, all the major problems of our time have a significant scientific or technological component — from Star Wars; verification of arms reduction; high tech industry; the challenges of AIDS, drug addiction, cancer, and mental disorders; to environmental problems — pollution, the greenhouse effect, and the depletion of the ozone layer.

As a result, he noted that ethics has become increasingly relevant to many scientific and technological issues — for example, such as how we shall best manage our new ability to intervene at the genetic level in the living world.

"Those of our persuasion are sure that these problems can only be solved by more knowledge, by better science and engineering," Sinsheimer told the graduates. "But others who would somehow selectively retreat from today's reality will argue that we will merely compound the problem.

"Scientists must remember that all of these problems have other nontechnical components as well — other important, very human dimensions, and economic, ethical, ethnic, racial, religious, and political dimensions that may involve the thrust of ego and the lust for power.

"As custodians of the cumulative knowledge of science it must be your responsibility in our society to provide the voice of that knowledge — to project the voice of reasoned wisdom into the din of special pleadings and the often fantastic views so abundant in today's society."

But to do so with any effect, he warned the graduating students, they

## *President Everhart welcomes new alumni*

Caltech President Thomas E. Everhart welcomed 184 new BS, 123 MS, and 146 PhD degree recipients at his first commencement at the Institute. Of the BS degree recipients, Everhart said that 95 out of 155, or 52 percent, were graduating with honors, indicating an average of B+ or better.

Degrees were about equally distributed between engineering and the sciences, with a few in the humanities and social sciences.

Everhart presented the third annual Mabel Beckman Prize to Nicole Vogt. This honor is bestowed upon a woman student completing her junior or senior year with excellent academic credentials, outstanding character and leadership, and contributions to the Institute community.

Vogt graduated in physics with a 4.1 grade point average. She was praised for her work as an officer of the Board of Control, her contributions as an officer in her student house, and her work on faculty-student committees — and for tutoring in physics and being a leader in popularizing intramural volleyball.

The Frederic W. Hinrichs, Jr., Memorial Award was dually presented to David Bruning and Christopher Nolle. This award is given to the senior or seniors who have shown outstanding qualities of leadership and character, and made the greatest contributions to the

welfare of the undergraduate student body.

Bruning received praise for his work as treasurer of the student body, for his contributions as the principal organizer of the Student Faculty Conference, and as team captain in both water polo and baseball.

Nolle was lauded for his efforts as president of Lloyd House, and as a student member of the Committee on Undergraduate Academic Standards and Honors. He also drew praise as a talented musician and competitor in interhouse sports.

Jean-Laurent Rosenthal received the Milton and Francis Clauser Doctoral Prize for the PhD thesis with the greatest degree of originality. The prize carries an award of \$1,500.

The thesis, submitted in the Division of the Humanities and Social Sciences, was entitled "The Fruits of Revolution; Property Rights, Litigation and French Agriculture 1700-1860."

In his remarks to the undergraduates, Everhart noted that, in earlier times, commencement was taken to mean the completion of academic study and the commencement of work. But today, he said, the world is changing at a faster pace than at any time in history, and the human race is more dependent on

Due to the early production schedule of *Caltech News*, the story on page 2 announcing recipients of the Schuster Memorial Prize was unable to note the tragic death of Peter Lindstrom, one of the outstanding chemistry students awarded this prize. A member of the class of 1989, Peter died in a traffic accident on July 1, 1988. A memorial service for students and faculty is planned for the fall.

## FRIENDS

### *Consortium formed for chemistry*

The formation of the Caltech Consortium in Chemistry and Chemical Engineering has been announced by President Thomas E. Everhart. Three corporate sponsors — E. I. du Pont de Nemours and Company, Inc.; Eastman Kodak Company; and Minnesota Mining and Manufacturing Company — and one nonprofit philanthropic foundation — the Shell Oil Company Foundation — will each contribute \$1 million over a four-year period as Consortium members.

The Consortium will support research by Caltech faculty members in broad areas of chemistry, chemical engineering, and related sciences.

In making the announcement Everhart said, "Our guiding principle is to create a true partnership between Caltech and industry in which the partners are bound together by common purposes: education of the best students in the country, vigorous pursuit of fundamental research, and the opportunity for industrial researchers and Caltech scientists to work together.

"If the United States is to maintain its competitiveness in international markets, such industry-university partnerships will need to become increasingly common."

Among the benefits to the corporate members of the Consortium will be early access to Caltech research ideas, the opportunity for visits by company scientists to Caltech laboratories to participate in ongoing research, reciprocal visits of Caltech scientists to companies' laboratories, and yearly reviews of research supported by the Consortium.

The Shell Oil Company Foundation is a nonprofit philanthropic organization, and as such will not receive any direct benefits.

Fred C. Anson, professor of chemistry and chairman of the Division of Chemistry and Chemical Engineering, announced the appointment of Ahmed H. Zewail, professor of chemical physics, as chairman of the Consortium Board, which is advisory in nature.

### *Reunion gifts announced*

Classes holding reunions this year contributed a total of more than \$136,000 in gifts to the Institute.

The class of 1938, whose reunion gift committee was headed by Richard Rosencranz, contributed \$40,342 with 71 percent participation. The class of 1943, with 53.2 percent participation, contributed \$43,065. Its chairman was David Arnold. The class of 1953, with Rolf Hastrup as its reunion gift chairman, contributed \$19,721 with 53.1 percent participation.

Harold Haskins headed the reunion gift committee for the class of 1963, which contributed \$13,289 with 44 percent participation. Ray Morris was chairman for the class of 1978, whose members contributed \$20,100. Participating were 33.2 percent of the class members.

### *Caltech receives neuroscience fellowship grant*

Caltech has received a gift of \$375,000 from the Del E. Webb Foundation of Wickenburg, Arizona, to sponsor postdoctoral fellowships in neuroscience. The Institute will use the funding to offer support to outstanding young researchers in molecular and developmental neuroscience and in computational neuroscience.

The contribution is the third in a series of grants for postdoctoral work, now totaling \$775,000, that the Del E. Webb Foundation has extended to Caltech in the last 10 years. The foundation promotes and engages in programs relating to medical services and medical research in Arizona, California, and Nevada.

### *Schuster prizes announced*

Peter Lindstrom, a junior majoring in chemistry; Karen Oegema, a junior majoring in chemistry; and Eric Scharin, a graduating senior majoring in chemistry, are this year's recipients of the Schuster Memorial Prize. The prize is awarded annually to junior or senior students in chemistry or chemical engineering who have shown good academic promise.

The late Richard Schuster (BS '46, BS '49), was Caltech's director of development when he was killed in a plane crash outside Chicago while on business for the Institute. The Richard P. Schuster Memorial Prize fund was established by his family, friends, and colleagues in 1985.



**Mrs. Doris Everhart and Leroy Hood greet Mrs. Keith Kieschnick (right), president of The Blue Ribbon of the Music Center. More than 100 members and guests of the organization visited Caltech for morning and afternoon programs.**

### *Beckman wins ACS Parsons Award*

Arnold O. Beckman, chairman of the Caltech board of trustees, emeritus, has been named recipient of the 1989 Charles Lathrop Parsons Award, which recognizes public service by a member of the American Chemical Society. Beckman will receive the award in September at the ACS national meeting in Los Angeles.

Says one distinguished chemist of Beckman, "The work of no other single man has more greatly changed chemistry and related fields for the better. It is possible with his instruments to attack problems that could not be studied previously or could only be done by extremely laborious methods."

Beckman first came to Caltech in 1923 to work on his doctorate in photochemistry. He served on the Caltech chemistry faculty until 1940 when he left the teaching profession to devote full time to developing and manufacturing scientific instruments.

Through the Arnold and Mabel Beckman Foundation, his contributions have made possible Beckman Auditorium, the Mabel and Arnold Beckman Laboratories of Behavioral Biology, the Arnold and Mabel Beckman Laboratory of Chemical Synthesis, and most recently, the Beckman Institute, for which ground was broken this spring.

### *Ground broken for observatory headquarters*

Ground has been broken for the Waimea, Hawaii, headquarters of the W. M. Keck Observatory. The observatory — which will be home to operations for the largest telescope in the world — is a joint project of Caltech and the University of California. The project is being funded with a \$70 million gift from the W. M. Keck Founda-

tion, one of the nation's largest charitable organizations. The first payment was made in July 1985 and the last in July of this year. The grant is the largest private gift ever given for a scientific project.

President Thomas E. Everhart expressed his appreciation to Howard B. Keck, chairman and president of the Keck Foundation, and to members of the board, for the gift and for the "splendid partnership that has existed throughout the course of this project."

Taking part in the groundbreaking ceremony were President Everhart, University of California President David P. Gardner, and representatives from the Keck Foundation, the Smart Trust, and the California Association for Research in Astronomy.

The 16,000-square-foot headquarters building is scheduled for completion early next year. It will house the project staff during the observatory's construction, and its administrative and technical staff after operations begin early in the 1990s.

Construction of the observatory, near the summit of Mauna Kea, began in 1985 and is on schedule. It will feature 36 hexagonal-shaped viewing mirrors that will form a mosaic much like tiles on a floor. Each segment will have a separate motor and will be controlled to one-millionth of an inch of accuracy. The overall viewing surface will be 10 meters (33 feet) across, twice as big as any telescope now operating in the world.

### *Paul History Prize supports SURF student*

Established in 1987, the Rodman W. Paul History Prize Fund honors the late Professor Paul's 35 years of teaching and scholarship at Caltech. Paul was the Edward S. Harkness Professor of History. This year the prize was awarded to help fund a SURF (Summer Undergraduate Research Fellowships) project in history. Typically, the award will be used to recognize a graduating senior who has shown unusual interest in and talent for the study of history. Currently, the prize fund generates approximately \$600 a year in income.

Fashion-conscious modern ladies, confused about whether to bottom off their skirts at lower mid-calf or upper mid-thigh, face scant problems when compared to their counterparts for the 1850s and 1860s.

Just what the women of that era endured to please Dame Fashion is recounted by Heidi Anderson, a senior at the California Institute of Technology, in the report on her Summer Undergraduate Research Fellowships (SURF) project. Working under the supervision of Eleanor Searle, the Edie and Lew Wasserman Professor of History, Anderson traveled to England last summer to probe the role of the crinoline and its cousins in the expansion of women's skirts during the last century.

The trend toward the bouffant look in skirt fashions began with crinoline, a kind of fabric made partially with horsehair and used in the construction of bonnets and as a stiffener for ladies' petticoats, Anderson relates. As new methods for holding out the bottom of skirts were developed, the term "crinoline" came to be applied to any petticoat worn specifically to add bulk and shape to a dress.

At the start of the 1850s, it was standard practice for a fashionable lady to wear a number of petticoats in addition to her crinoline. By 1856, even fashion journals were astounded at the number of muslin, starched flannel, and crinoline *sous-jupes* that needed to be worn to support the width of the elegant dresses that set the style. *The Ladies Cabinet of Fashion and Romance* reported that "many belles wear fourteen [petticoats] in evening dress."

One of the problems with this method of supporting the huge dresses, known as *jupons bouffants*, was that the layers of petticoat were inelastic. As soon as the wearer sat down, the fabrics would compress and wrinkle so that the effect of the toilette was ruined.

Another problem was the fact that a lady found herself overwhelmed by the sheer mass of her clothing. An attempt was made to solve the problem by inventing skirt supporters that would shift most of the weight of the skirts from the waist to the hips. But without reducing the number of skirts, nothing could really be done to lessen the burden. Back problems were not uncommon.

By 1856, reports Anderson, the size of ladies' skirts had reached overwhelming proportions. "Fashionable gowns were becoming too wide to be supported by fabric alone. Either skirt sizes had to decrease, or some other method of distending them needed to be found."

Yankee ingenuity had already solved the problem. In 1855, *Harper's Monthly Magazine* reported, "Long tottering on the Brink of Hoops, Fashion has at length taken the plunge."

The skirts were constructed by suspending a number of hoops of graduated diameters from a waistband by means of six or eight fabric tapes. The entire skirt could bend under pressure and rebound to its original shape. Although whalebone was used in the



By 1856, the size of ladies' skirts had reached overwhelming proportions. Either skirt size needed to decrease, or some other means of supporting them needed to be found.

# Crinolines

By Winifred Veronda

construction of some hoop-skirts, the hoops generally were made of watch-spring steel, initially developed for use as piano wire.

Meanwhile, as Americans adopted the hoop-skirt, Europeans launched into a craze for a different type of crinoline. The *jupon bouffant* gave way to what Anderson points out was called a *jupon balloonee* — a blow-up petticoat.

Two designs were registered with the British Patent Office in 1847 for inflatable skirt-supporters, which were made by passing tubes of Mackintosh rubber-coated fabric around the bottom of a cloth skirt. However, the designs do not seem to have enjoyed much success, according to Anderson.

But in 1856, a Frenchman was granted a British patent for an inflatable crinoline — a "collapsible petticoat" expressly designed so that its wearer could sit without irrevocably damaging her costume. Tubes around the bottom had two valves, one for inflation and the other for automatic deflation when the wearer sat down.

The patent specified that the skirt was to be inflated by means of a "minute pair of bellows of very slender horn." Anderson reports that there were no instructions for gracefully reinflating it in polite company, or suggesting how a lady could settle into a chair without making embarrassing noises.

*Harper's* subsequently devoted half a page to the story of an unfortunate woman whose maid accidentally mistook a bottle of hydrogen gas for the air needed to inflate her mistress's petticoat. The dress inflated far beyond its ordinary circumference, and the dismayed

woman found herself floating off into orbit, the magazine reported.

Meanwhile, by 1857, European ladies were welcoming the steel crinoline, and *Punch* reported that 40 tons of steel had been ordered from a firm in Sheffield for the manufacture of hoop skirts.

Certain properties of the crinoline were either positive or negative, depending on one's personal point of view, Anderson points out. For example, the hoops could camouflage almost any figure defect. *Punch* went so far as to suggest that the crinoline had been invented by women with club feet.

But *Punch* was mistaken, because the crinoline brought into view a region of a woman's body that had been hidden for 20 years — the leg. One report noted that two young ladies' crinolines tilted up in the air to the point that 18 inches of their legs, encased in open-worked silk stockings, were exposed.

Anderson points out that the English get credit for one of the most practical of the 1850s skirt inventions, which also helped to reveal women's legs. By 1856, skirts were so long that they dragged in the mud. To solve this problem, the *Porte Jupe* was devised. By running several cords from the waist to the hem of the outer skirt, a contraption was rigged by which the skirt could be raised and held up off the ground. Underneath, a much shorter petticoat would be visible, usually red with black bars or checks.

There was one problem with the crinoline that nobody could ignore: the garments enlarged a lady. "It took only three women to fill a drawing room,"

notes Anderson. One lady of the time outlined the problems that crinolines created: "How to travel? How to lie down? How to rock one's children? And how to take hold of their hands when out for a walk?"

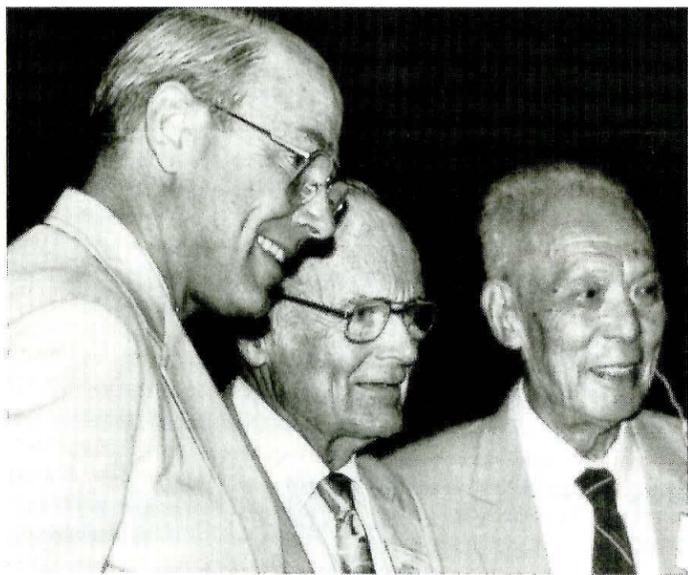
The spreading skirts caused other problems. *The Englishwoman's Domestic Magazine* noticed that accidents caused by fire increased during the holiday season when more crinolines were worn. Even if a woman noticed that her skirts had caught fire, she was too encaged by them to save herself. As a prevention, 20,000 extra brass fireguards were sold in England.

Although the hoops themselves were relatively inexpensive, the amount of fabric required to cover them could exceed 15 yards. Those who were wealthy could afford the dresses, but middle-class families were hard-pressed to do so. In an article called "Shall we wear Crinoline?" *The Englishwoman's Domestic Magazine* warned women against "voluntarily relinquishing an extra servant," removing their children from good schools, or reducing the household allotments of meat and fuel, so that they could wear fashionable clothing.

Rumors of the crinoline's demise were perpetual, but the garment would not be pushed into an early obsolescence. It was believed doomed in 1859, but returned in 1860. It disappeared for a season in 1866, 10 years after its invention, but was resurrected in 1867 in the form of a *half-jupon*. Only the back part of the hoops remained and the front was completely open. This type of skirt developed into the bustle of the 1870s and 1880s.

Even today the crinoline cannot be counted out. The fashion section of the *Los Angeles Times* reported that most of the evening gowns shown in Milan for the 1988 spring season "were embellished with crinoline petticoats, hoops, or such items as silk roses nestled in little beds of black tulle." Anderson concludes, "Hoops can still be found under wedding gowns and prom dresses, or at any modern occasion reminiscent of the hoop-skirt's most recent domain, the elegant social gatherings of the mid-nineteenth century."

# Seminar Day



President Everhart with two of Caltech's new distinguished alumni — William Sears and Hung-Chang Yin.

## 1,200 attend Seminar Day

Research seminars and exhibits, a picnic lunch served to the music of the Caltech Brass Quintet, a president's reception, dinner at the Athenaeum, and the Caltech Glee Clubs' annual home concert filled the day for 1200 alumni and guests who converged on the campus for the 51st annual Seminar Day.

Coming from farthest away was Hung-Chang Yin (PhD '37), who arrived from Shanghai to receive the Distinguished Alumni Award. The honored visitor, who had not visited the campus nor spoken English in 50 years, delighted guests with his warmth — and his good command of the language after so many years. Escorting Dr. Yin were two of his grandchildren — one of them a student at UC San Diego and the other a resident of Santa Barbara.

Enjoying his first Seminar Day was President Thomas E. Everhart, who attended a full schedule of seminars (where he took notes) and the Glee Club Concert. Everhart pronounced the Seminar Day experience "a special pleasure" as he presented the Distinguished Alumni Awards.

John D. Baldeschwieler emerged as a popular favorite among the speakers for his seminar on "Cancer Diagnosis and Treatment: New Technology." Other favorites were David Van Essen, who

talked on "How the Brain Interprets What We See" and Henry Lester, whose topic was "How the Brain Communicates: A Molecular View."

Episodes of Caltech's award-winning course in physics, "The Mechanical Universe and Beyond"; a JPL space exhibit featuring the Galileo and Magellan projects; equipment demonstrations by members of the Caltech amateur radio club, station WGUE; a chess-playing display by the hypercube supercomputer; and a tour of Caltech's mineral and gem collection were among the offerings for alumni at breaks and lunchtime. The bookstore was open all day and drew throngs of customers.

Several high school students admitted to next year's freshman class came to Seminar Day, hoping to broaden their perspective on what Caltech is all about.

Some alumni took time out to visit their old houses, and others stopped in during the afternoon for refreshments at the coffeehouse in the student activities center.

A chance to talk with President Everhart at a late-afternoon reception pleased alumni, who went on to enjoy dinner at the Athenaeum. The Glee Club concert put a finishing touch on the day. Many stayed over to participate in Homecoming Sports Day on Sunday, when students, faculty, and alumni took part in soccer, basketball, softball, water polo, tennis, and other informal sports events.

"Thank you for making Alumni Seminar Day great!" wrote one alumnus, and that seemed to sum up visitors' feelings about the whole event.

## NASA's Fletcher alerts alumni

Eleven years ago, skill and ingenuity found a way to save the grand tour of the outer planets when NASA's budget for this project received inadequate funding, James C. Fletcher, administrator of NASA, recalled at the general session on Seminar Day. But he asserted that the same strategy can't work today.

When Congress failed to appropriate money to build new space vehicles for the grand tour of Jupiter, Saturn, Neptune, and Uranus, NASA decided to modify existing spacecraft, and, within two months, a low-cost alternative was available, Fletcher pointed out. Named Voyager, this mission's spacecraft have been busy examining 15 or more bodies in the solar system, and Voyager 2 will fly by Neptune in August 1989. The mission's total data yield will require more than 20 years to interpret.

Thus NASA succeeded with the Voyager project by using skill, ingenuity, and resourcefulness. But these will not be enough to save the civilian space program today if it is funded at the levels currently recommended by Congress—or by the Senate, where recommendations for funding are even lower, Fletcher stressed.

Issuing a warning, Fletcher said, "The civilian space program, which represents the American spirit, is fighting for its life this year.

"Just when we're poised to move out and build our greatest future in space, the program is facing the greatest threat of its 30-year lifetime," he emphasized. "Why so grim a view? Because if NASA is funded at the level recommended by the Senate, we will have to stop development of the manned space station, which is the key to our future in manned spaceflight. Meanwhile, the Soviets will continue to expand the space station they already have in orbit and to press forward with manned space exploration.

"If this delay occurs, we will have to abrogate major commitments to our partners in Europe, Japan, and Canada who plan to use the space station. Our partners have already contributed \$1 billion and they plan to contribute \$8 billion more."

There will be serious repercussions "if we pull the rug out from under them at this stage of the game," said Fletcher, adding that to do so would strengthen a perception on the part of some of our allies that the U.S. does not honor its commitments.

Moreover, Fletcher continued, if the NASA budget falls short of initial NASA requests, then there will be a drastic slowdown in Space Shuttle missions in the coming years, seriously compromising the ability of the United States to launch major planetary missions such as Magellan, Galileo, and Ulysses—all JPL programs. Also jeop-

ardized by cuts in the number of Space Shuttle missions would be national security payloads necessary to verify treaties—payloads that can only be launched on the Shuttle.

Undermined as well would be our country's ability to service the great space observatories — for example, the Hubble Space Telescope. Due to be launched in 1989, it will have viewing capacity in visible and ultraviolet light. Additionally threatened would be the existence of two proposed telescope facilities—the gamma-ray observatory and the advanced X-ray astronomy facility, planned for development in the 1990s.

Fletcher explained that the Congressional Budget Office has concluded that Congress faces a fundamental choice: either to increase civilian-space-program resources as needed to accomplish the present core program and move on to achieve future goals; or to redirect NASA's goals and programs and thus to accomplish much less.

One alternative postulated by the CBO would require stretching NASA's current programs out well into the next century, deferring the space station and other advanced programs for many years. The second alternative would be to restructure NASA's current program toward unmanned activities in favor of a "less ambitious but more concentrated effort.

"Skilled and talented people are sitting at their computers and their drawing boards, plotting voyages of exploration that could dwarf our country's past achievements in space," Fletcher continued. "We've set a new goal of human expansion into the solar system. But skill and ingenuity won't do it. We need adequate funding.

"But given the reverberations, there is a real chance that adequate funding will not be provided for any of the technical programs. NASA budget recommendations by Congress are far below requests, and the Senate threatens even deeper cuts. If the budget is approved at the Senate level, it will mean curtains for the U.S. space program. The United States will remain a nation with a great past in space—and a dismal future.

"What's at stake," said Fletcher, "is not only our international prestige but our role as a leader in science and technology—a role that is critical to economic growth.

"Speak up!" he urged. "Call people you know in Congress. Let them know that Americans want their civil space program to continue. We have lost several battles and the war is being lost. But we are a pragmatic and visionary people. It is not in our natures to stand back and lose what we have achieved over seven decades, when we know that, looking ahead, there's no limit to what we can accomplish."



Collis H. (Hunt) Holladay, Jr., and Janet Holladay with David J. Harper and Sara Harper at Seminar Day.

*Caltech  
confers the  
Distinguished  
Alumni  
Award on  
four graduates on  
Seminar Day.*

## Distinguished Alumni

Caltech conferred its highest honor—the Distinguished Alumni Award—on four graduates on Alumni Seminar Day. Recognized were:

—Benoit B. Mandelbrot, Abraham Robinson Adjunct Professor of Mathematical Sciences at Yale University, who developed the theory of fractal geometry of nature, which gives insight into the complex shape and structure of the natural world;

—William R. Sears, distinguished aeronautical engineer, who led in the development of a sequence of notable military aircraft at Northrop Aircraft Corporation and went on to found the Graduate School of Aeronautical Engineering at Cornell University;

—Hung-Chang Yin, director emeritus of the Institute of Plant Physiology, Academia Sinica, People's Republic of China, who established a world center of plant biology where major contributions to China's achievement of food self-sufficiency have been made.

—Robert W. Zwanzig, Distinguished Professor of Physical Science at the University of Maryland, who has achieved worldwide renown for his contributions to nonequilibrium statistical mechanics at the deepest fundamental level.

Mandelbrot, who recently was awarded the Barnard Medal for Meritorious Service to Science by Columbia University for his contribution, has developed a body of work that gives insight into such natural-world phenomena as the turbulence of liquids, the symmetry of living forms, the branching of crystals or rivers, or the fluctuations of radio static.

Fractal geometry embodies the notion of geometric self-similarity—the tendency of natural forms to repeat themselves—for example, as in the resemblance in shape between a tree's large branches and small twigs. The new geometry is being applied in many fields: aerodynamics, art, astronomy, biology, chemistry, linguistics, meteorology, physics, physiology, among others.

Mandelbrot is a Fellow of the American Academy of Arts and Sciences and is winner of the 1986 Franklin Medal for signal and eminent service in science. He earned his MS degree from Caltech in 1948, and his Eng degree in 1949. He also earned a PhD degree in mathematics in 1952 from the University of Paris.

William R. Sears is noted as one of the most distinguished students of Theodore Von Kármán, director for many years of Caltech's Graduate Aeronautical Laboratories. As the chief of aerodynamics at the Northrop Air-

craft Corporation, he claimed a major responsibility for development of a sequence of military aircraft, the best known being the P-61 Black Widow fighter and the Northrop Flying Wing.

After World War II he founded, and was for 28 years director of, the Graduate School of Aeronautical Engineering at Cornell University. The graduate school quickly became highly influential in its field. At Cornell, Sears was also instrumental in founding and developing the School of Engineering Physics, and he was founder and director of the Center of Applied Mathematics.

In 1974 he moved to the University of Arizona, where he became the guiding force behind the development of an outstanding graduate educational and research center in aeronautics and aerospace.

While at Cornell, he held almost every distinguished lectureship in aeronautics, including the oldest established lectureship—the Lanchester Memorial Lecture of the Royal Aeronautical Society. He is a member of both the National Academy of Sciences and the National Academy of Engineering.

He earned his PhD degree from Caltech in 1938. He also holds a BS degree from the University of Minnesota.

Hung-Chang Yin received his PhD degree in plant physiology from Caltech in 1937. He returned to China and was selected to become director of the UNESCO Southeast Asian office in New Delhi.

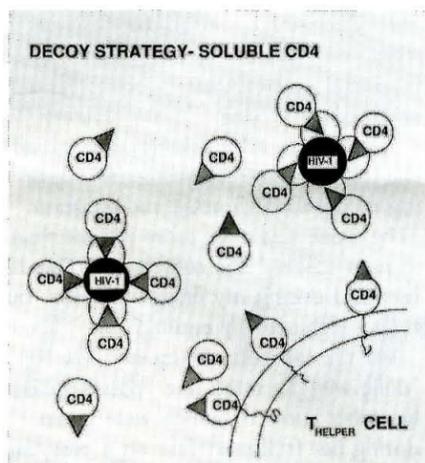
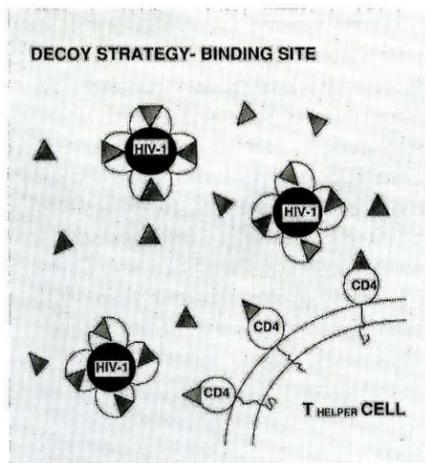
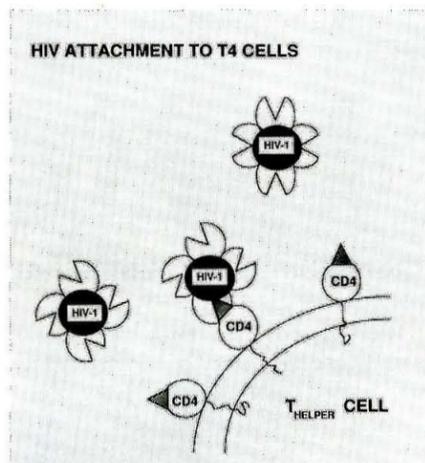
In 1950 he returned to China where he became director of the Institute of Plant Physiology, Academia Sinica, a center for research on plant hormones, bacterial genetics, and plant tissue culture, in Shanghai. There he became well known in scientific circle for his work on the nonbiophysical aspects of photosynthesis. He retired as director of the Institute in 1986 for health reasons.

Yin is one of the principal policymakers in China concerning agricultural research and is one of a few people principally responsible for a large increase in food production in China during the last 25 years.

Robert W. Zwanzig has achieved worldwide renown, along with Onsager and Kubo, for his contributions to nonequilibrium statistical mechanics at the deepest fundamental level.

He has received numerous honors and awards in recognition of his contributions, including membership in the National Academy of Sciences and the American Academy of Arts and Sciences. He has been a recipient of awards from the American Chemical Society—both the Peter Debye Award in Physical Chemistry and the Irving Langmuir Award in Chemical Physics. During the past academic year he has been on leave from the University of Maryland, where he is Distinguished Professor of Physical Science, to be Fogarty Scholar-in-Residence with the National Institutes of Health.

He earned his PhD degree from Caltech in 1952, his BS degree from Brooklyn Polytechnic in 1948, and his MS degree from USC in 1950.



**Top: HIV-1 virus infecting a T-cell. In order to enter the cell, the virus attaches itself to a cell-surface protein called CD4. Part of the virus's outer coating is shaped so that it fits onto a specific piece of CD4—the binding site (shaded triangle). Middle: A flood of synthetic binding sites overwhelms the virus, tying up all its recognition sites before it can bind to CD4. Bottom: CD4 can be prepared in soluble form. A CD4 solution also overwhelms the virus, leaving the T-cells unmolested.**

lead to an AIDS treatment."

Previously, other researchers have determined that the initial step in AIDS-virus infection is the binding of HIV-1 to susceptible cells. Many scientists believe that one of the main causes of cell death following infection is the fusion of virus-infected cells with uninfected cells, and this fusion also depends on the attachment of viral proteins to specific binding sites on the cell surface. If researchers could synthesize large quantities of a protein fragment that includes the binding site, for example, these might be made to act as decoys, overwhelming AIDS-virus particles and already infected cells, and preventing them from infecting other cells. For these reasons, there has been an international effort to come up with ways of understanding the binding process and interfering with it.

This is precisely what the *Science* article reports. It was authored by Bradford A. Jameson, research fellow in biology at Caltech; Patricia E. Rao of ORTHO Pharmaceuticals; Lilly Kong, Beatrice Hahn, and George Shaw of the University of Alabama at Birmingham; Leroy E. Hood, the Ethel Wilson Bowles and Robert Bowles Professor of Biology and chairman of the Division of Biology at Caltech; and Stephen B. H. Kent, senior research associate in biology and the leader of the Caltech research group.

## New insight into AIDS

Researchers at the California Institute of Technology have identified a specific binding site on the cell-surface protein that the AIDS virus (HIV-1) must latch onto before infecting a cell. In addition, the researchers created a synthetic version of that binding site and have demonstrated that this synthetic protein fragment acts as a decoy to prevent the virus from infecting cells in test tubes.

The research was carried out by Bradford A. Jameson, working with Stephen B. H. Kent, in collaboration with other researchers at ORTHO Pharmaceuticals and the University of Alabama. The scientists reported their research in an article published in the journal *Science*.

"We don't want to give people false hope. This isn't a cure for AIDS," cautioned Stephen B. H. Kent, the leader of the research group. "Nevertheless, we believe this to be a significant advance not only in AIDS research but in virology in general. This is the first time that the binding site for any virus has been identified with this degree of precision. At best it is one possible step on one possible road that may possibly

## A new look for Caltech News

Beginning with this issue, *Caltech News* appears in a new, redesigned format. The contents are *not* changing, and the publication will continue to contain news and features about campus events and people, alumni and Associate programs, fund-raising accomplishments, sports, Personals, and Obituaries. We hope you enjoy the new look.

## Youngest freshman sets own pace

Ruchira Datta is unimpressed by her status as Caltech's youngest student. After all, she finished elementary school in three years and entered high school at the age of 10.

Datta, who turned 15 in June, began skipping grades as soon as she entered elementary school. With the help of her mother, she had already taught herself to read, and her father had taught her math, and the school psychologist at the public school in Denver that she entered as a first grader suggested she should go to a private school where she could be in classes closer to her own ability level.

Datta then enrolled in the third grade at the MacIntosh Academy, where each level consisted of two grades. She went on to finish the third and fourth grades in one year, and did the same for grades five and six, and seven and eight.

She found entering Kent-Denver School at the age of 10 to be her greatest challenge — "difficult, but not traumatic. I had never been in school before with so many people older than I and it took some adjustment. The others weren't unkind or anything, but at first they treated me like an acquaintance, rather than a friend. Finally they got used to me, though." She speaks warmly of her teachers there, and of the support they gave her.

An active student in high school, Datta was news editor of the student paper, and a member of the debate and math clubs. Her skills in math led her to compete in the Colorado Mathematics League and the Colorado State University Mathematics Day competition. The latter activity garnered her a \$1,000 scholarship.

Datta came to Caltech before her junior year for a conference with Stirling L. Huntley, then director of admissions. She was thinking about skipping her senior year in high school, but Huntley encouraged her to take a full four-year program. Datta now says she is glad she did because her senior year was "a lot of fun."

Although she leaned to Caltech, she also applied to Harvey Mudd, Princeton, Stanford, UC Berkeley, MIT, UC Irvine, and Colorado State University, Boulder. She was admitted to all of them except Princeton.

The 15-year-old sophomore says she chose Caltech because "I thought it would give me the best science education," and because of its small size and location. By this time her father, a mining engineer, was working in Orange County while the rest of the family stayed behind in Denver.

Her family has now moved to Pasadena, where Datta lives at home with them. Her father is a branch manager for a geotechnical firm, and her mother works for a video production company. Her eight-year-old sister is

following in the family tradition of skipping grades.

Some qualms did surface about Caltech as a college choice, because Datta had passed eight advanced placement tests, and Caltech would give her credit for none of these. The Institute *did* give her advanced placement in math, based on its own test, however.

Datta entered Caltech on a full four-year scholarship from AT&T. The scholarship also guarantees her a summer internship for four years. This year she will work in Denver in Information Systems Lab, and will also write a summary of what she did, for presentation on SURF (Summer Undergraduate Research Fellowships) Seminar Day.

Although she was four years younger than the vast majority of her Caltech classmates, Datta, poised, mature, and self-possessed, says she had no qualms about entering college so young. "I was used to being the youngest one in my classes," she says, "and besides, people here are accustomed to other bright people. They judge you on the basis of what you can do, not on what your age is. I had no problems in being accepted."

Datta does acknowledge that initially she had "the normal problems" adjusting to the Caltech academic program. "The work was a lot more intense than in high school," she confesses. "This hit me hard during my first two weeks, but then I regained my equilibrium."

At the Institute, Datta says she has "done well" in math and "pretty well" in her other subjects, which were taken during her freshman year on a pass/fail basis. She's found her teachers helpful and interested in her. She plans to earn a double major in physics and electrical engineering, and to go on to graduate school.

A member of Ricketts House, she's found time to write for the *California Tech* and to play the piano in a chamber music group, and during the fall she



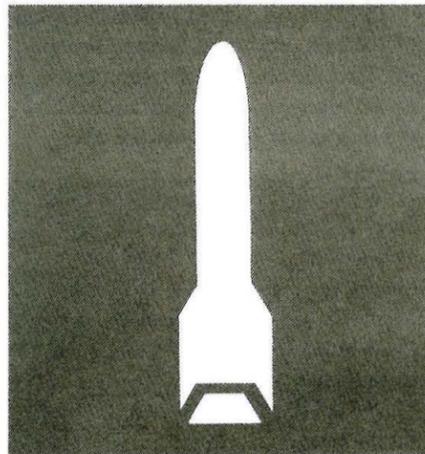
Ruchira Datta

went out for volleyball.

In her scant leisure time, Datta likes to play the piano and read — particularly fiction, religion, and philosophy. She says she used to read a lot of science books for laymen. But she adds that now that she's at Caltech she's getting her fill of science through the

academic program and that recreational reading on other topics seems more inviting.

Has she missed anything by completing elementary school in three years, and entering high school at age 10 and college at age 14? Datta doesn't think so. "What would have made me most unhappy," she says, "would have been not being able to learn at my own pace."



## Three students win grand prize in "software chase"

A team of three Caltech undergraduates won the grand prize in the "Race for Space Software Chase," cosponsored by the Smithsonian's National Air and Space Museum, and by Apple Computer, Inc.

The goal of the contest was to develop an interactive software program, using the Macintosh II computer, "that demonstrates how computers can give wings to aeronautical ideas that otherwise might not get off the ground." The winning program will go on display in the National Air and Space Museum's new Aerospace and Computing Gallery, scheduled to open in 1989; the program lets the person playing with it design a rocket and launch it on the computer.

The program was designed by three Caltech undergraduates. Pierce T. Wetter III, a junior in electrical engineering, was team captain and designed the program's simulation sections. Glenn C. Smith, a sophomore in physics, designed the program's color graphics. Michael Meckler, a sophomore in physics, designed and implemented the program's user interface.

The grand prize includes 11 Macintosh II computers and, for one of the team members, a \$5,000 summer internship at the National Air and Space Museum. The team members kept three of the 11 computers and the remaining eight became part of Caltech's Macintosh lab.

## Telecourses collect more awards

*The Mechanical Universe*, an introductory college-level physics telecourse, and its successor series, *Beyond the Mechanical Universe*, have won their second international award in less than a year, as well as their second prestigious national honor in the same period.

Early this spring, the International Film and TV Festival of New York presented the "Maxwell's Equations" episode of *Beyond the Mechanical Universe* with its silver medal. Last fall, *The Mechanical Universe* won another notable international award. In Tokyo, the episode entitled "The Lorentz Transformation" was awarded the Japan Prize, the highest honor presented in the 16th Japan Prize International Educational Program Contest.

More recently, this same episode was the recipient of the National Educational Film & Video Festival's Gold Apple award for 1988. And last fall, "The Atom" episode received another distinguished national honor, when it was chosen as winner of the Silver Cindy award, an Association of Visual Communicators honor that is considered to be the Oscar of the audio-visual industry.

"The awards bestowed on *The Mechanical Universe* and *Beyond The Mechanical Universe* demonstrate the quality that can be achieved when the private sector joins forces with institutions of higher learning to produce educational programming," said Thomas E. Everhart, Caltech president. "This entire telecourse project is also a timely reminder that many different media can and should be utilized to attract American youth to the study of science. Nothing less than our nation's ability to compete in an increasingly technological world is at stake."

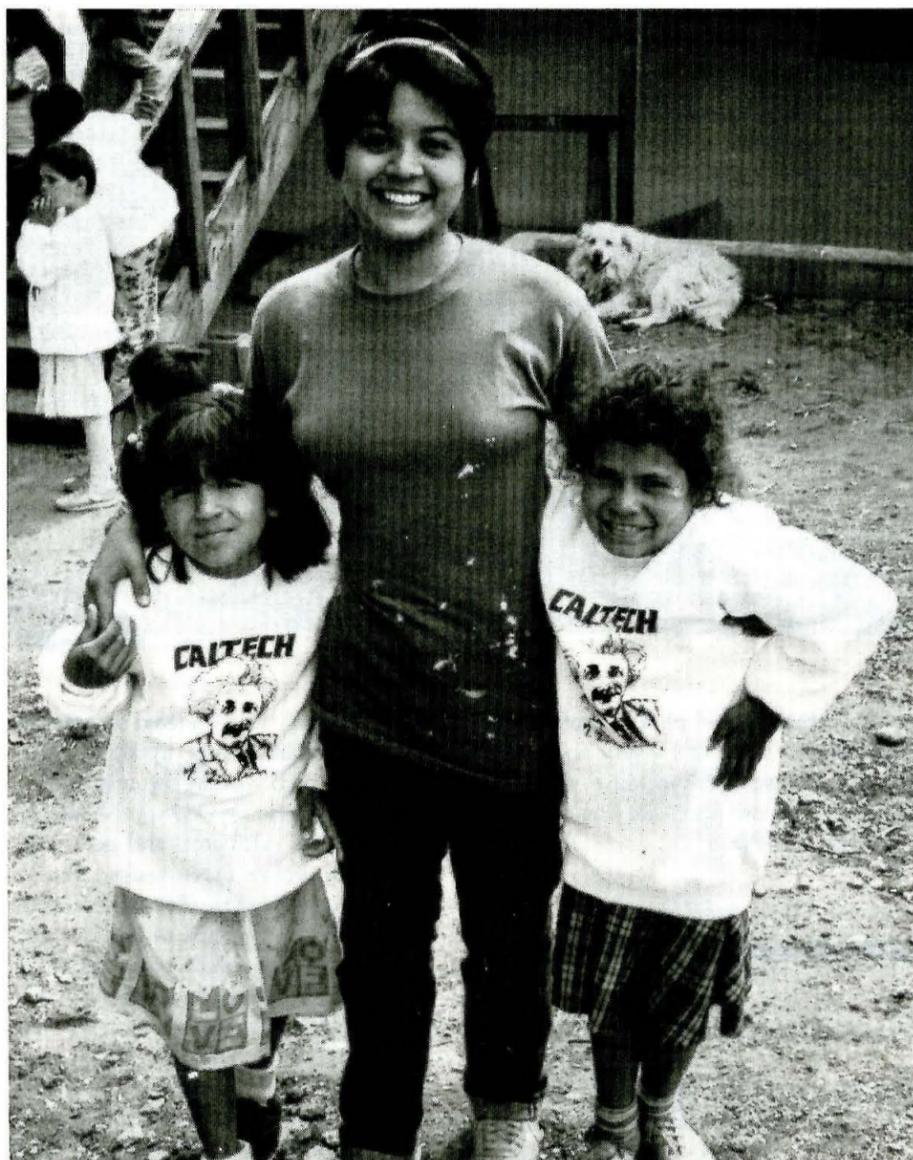
The series was sponsored by the Annenberg/CPB Project and co-produced by Caltech and the Southern California Consortium.

## Carlson honored

The late Chester Carlson (BS '30) has been posthumously inducted into the Informant Hall of Fame in Dallas. Informant's Information Processing Hall of Fame was formed in 1985, to recognize individuals who have made significant scientific, technological, and business contributions to information processing.

The recognition of Carlson's contribution to the dissemination of information occurs during the 50th anniversary of his invention of xerography. His induction ceremonies will take place in Dallas on February 8.

*Spring break is the time when most students go for surf and sun and a few days of hedonistic recreation. But on the Caltech campus, a few students had other ideas this year.*



**Caltech student Sauri Desai makes new friends at El Rancho Milagro orphanage.**

Spring break is a time when most students go for surf and sun and a few days of hedonistic recreation. But on the Caltech campus, a few students had other ideas this year: They packed three vans with painting supplies, donated clothes (including 60 Caltech sweatshirts), some toys and athletic equipment, and plenty of food and bottled water. Then they headed across the border to El Rancho Milagro, an orphanage in Baja, California, where they would be involved in a work project — and where they would meet 64 youngsters who would capture their hearts.

The Alumni Association, ASCIT, the Caltech Y, the Deans' Office, the Master of Student Houses' Office, and an off-campus sorority, Beta Sigma Phi, with an on-campus member, Helen Burrus, made contributions. Their funding (just under \$1400) almost precisely matched expenses.

Once at the orphanage, they applied sealer to a new building to prepare it for painting, cleared weeds that represented a fire hazard, and played frisbee, volleyball, baseball, and soccer with some of the most appealing kids they'd ever encountered. When it was time to come home, most were ready to plan a return trip.

The project was the brainchild of Geoff Pilling, who had been part of church-group work projects at the orphanage when he was in high school. He thought it would be fun to involve Caltech students in a similar endeavor. Well before spring break, Pilling visited each student house and made an announcement during dinner about the trip to the orphanage. Initially 51 volunteers signed to go but in the end, 15 (including 12 male and two female students and one staff member) actually showed up to take part in the Baja adventure. As it turned out, 15 was enough to handle the group's work assignment comfortably.

The destination, El Rancho Milagro, is a Catholic orphanage that receives some support from the state. Many of its 60-some charges have at least one

# Time out for friendship

By Winifred Veronda

living parent, but one who is financially unable to provide for the child.

El Rancho Milagro is located in a valley on the old road between Tijuana and Ensenada. Its setting is one of low brown hills and grassy plains with mountains in the distance. A stream cuts through the property. Chickens, pigs, dogs, and ducks roam over the land; and Geoff Pilling can still point with pride to a large garden that his church group started several years ago.

Pilling explained that the children — most of whom are between 4 and 12 — are bussed to Ensenada, where they attend school from 1 to 5 p.m. At the orphanage, they sleep in low, concrete dormitories with room under their beds for their personal belongings. When they are old enough, they leave to find jobs, and some return to their parents when they can support themselves.

For several of the Caltech students, this was their first visit to Mexico, and for others, the first time they had been there other than as tourists.

"It was a lot of fun and I'd like to go back," said John Gehring. "I was

exposed to a life-style and a culture that I'd never known before. The kids were a lot of fun to play games with. They were anxious to make us feel welcome. I'm thinking of coming back for the trip next spring break, even though I'm graduating this year."

"I had never done anything like this before," remarked Joshua Roth. "I'd been to Mexico, but being involved with the people was a different way to see the country. I was eager to find out what the orphanage was all about. Besides, I enjoy doing physical work, and I don't get to do much of it at Caltech, so, for me, doing some painting seemed like a good opportunity.

"They were a wonderful, natural bunch of kids," he added, about the orphans. "Their community reminded me of a kibbutz in Israel where I spent some time a year ago. Maybe we'll be able to go back in the summer and take them some more toys. They really don't have many toys at all."

Roth also said it would be nice to do more work the next time a Caltech group goes down. "We did in a day

and a half what we thought it would take us three days to do," he commented. "Then we tried to find other jobs, but we could have been more help if some other projects had been planned for us."

"The kids were really neat," remarked John Hoskins. "They were fun to play with, and they made the whole trip meaningful. It was fun watching their faces."

Michael Pravica, who had never been to Mexico before and didn't speak Spanish, commented that "you make friends down there. You touch the life of a kid. I want to go back."

Paul Gentieu, who went "because of the chance to help people," said "it really felt good. The kids were very open. They weren't shy and withdrawn at all. They seemed happy, even though they don't have many physical possessions. They liked playing with us. I don't speak Spanish, so I learned a lot about communicating through body language and sign language.

"We played football, catch, soccer, we tossed tennis balls around. I'll definitely go back— maybe just for a couple of days after finals week to play with the kids."

Helen Knudsen, librarian in Robinson Laboratory, signed on to do the cooking. "I can hardly remember having so much fun," she commented. "I love to cook, and on this trip, I had lots of opportunities. Nobody got sick, nobody went away hungry. These Caltech students were good, self-sacrificing kids, willing to stand in line for thirds of chocolate mousse pie; it was hard, but they knew somebody had to do it.

"All of us had good feelings about the reason we went: putting a hand to something useful to help a group of friendly, giggly kids. The Caltech students worked very hard while we were there. When they finished one job they looked for another job to do, and when they finished that one, they looked for something else.

"I've always thought that Caltech kids are super, and this trip confirmed it."

## CALTECH IN THE NEWS

"Thursday was Ditch Day — 'Star Wars' meets 'Animal House,' it's been called — at Caltech.

"It's an occasion for seniors to let off steam from the pressure of academics by locking up their rooms in inventive ways and challenging underclassmen to unravel the secret of gaining entry.

"This year, Marty O'Brien, a sophomore in chemical engineering, showed up at one senior's door to find that it had been replaced by a piece of plywood divided into six miniature doors that were wired into a computer in the doorway. Fragments of the combination for opening the entire door were hidden behind the mini-entrances, each of which could be opened only by answering questions posed by the computer." *New York Times*

"Devastating earthquakes have occurred only every 200 to 400 years on the northern San Andreas Fault, says a study that provides some comfort for San Franciscans worried about a repeat of the deadly 1906 quake. California Institute of Technology geologist Carol S. Prentice . . . said she found evidence of six great or major quakes in the last 2,000 years along a 160-mile stretch of the San Andreas rupture. The last was the 1906 shaker that killed at least 2,500 people." *The Press-Enterprise*

"The California Institute of Technology is poised to give a team headed by Leroy Hood a spacious new facility for developing advanced DNA sequencing technology and exploring the uses of computer chips and neural networks for the analysis of sequence data. Such largess is made possible by the new Beckman Institute to be located on the Caltech campus, where space and money will be available for exploratory research projects and interdisciplinary technology development. The institute [is] financed by a \$50 million grant from the Arnold and Mabel Beckman Foundation and \$10 million in matching funds raised by Caltech." *Nature Magazine*

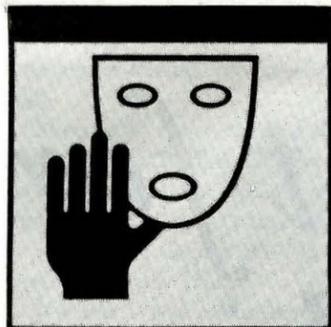
"For the last year a team of Caltech scientists has been studying where the iron in a person's body comes from. No, they aren't doing nutritional research. Rather they're looking at the original source of iron — supernovae. In particular, they're using a gamma-ray camera to study the first supernova that's been visible to the naked eye in 383 years. "The iron in our blood was once part of a star and it was produced



**Andrew Kalunziacki of Ricketts House complies with a Ditch Day mandate to disassemble a Pinto wagon and put it in four 55-gallon drums.**

by a supernova,' said physics professor Tom Prince . . . 'It's a very abundant element and we'd like to know what its origin is and how it's made,' he said." *Pasadena Star-News*

## A rare Stock Company show



The Caltech Stock Company — once described by Professor Kent Clark as "a sturdy band of extroverted eggheads who lead double lives as professors, secretaries, and faculty wives" — has been delighting Caltech audiences with its performances since it presented a show in 1954, "The Road to Stockholm," that celebrated the awarding to Linus Pauling of his first Nobel Prize. Clark was responsible for the lyrics; Elliott Davis wrote the music.

The Stock Company was persuaded to appear in one of its now relatively rare performances at a dinner for The Associates in May. There, in an evening of entertainment, the guests heard favorite stock company songs from bygone years, and sketches from favorite stock company shows. Joining the old-timers were three undergraduates — Heidi Anderson, Joe Beckenbach, and Dave Stevens.

Veteran performers for the evening included, besides Clark, Professor Robert Oliver, Professor David Wood and Connie Wood, Professor Ward Whaling, Robert Burkett (BS '65), Micheal Boughton (BS '55), Sue McCloud-Gibson (a former secretary in humanities), Professor Noel Corngold, and Christopher Harcourt (BS '77).

Clark remarked that, in rereading a 1966 production that honored Wesley Hershey on his 20th anniversary with

the Caltech Y, he wondered whether the script would have to be updated. After all, it had been written before there were undergraduate women at Caltech, before pocket calculators and personal computers, before moon walks. But he said he was happy to observe that nothing in the script needed to be changed: "Caltech remains totally recognizable, an inexhaustible subject for comedy." Stanzas from a few of the popular favorites performed that evening included:

What's a nice girl like you doing in a place like this?

A nice girl like you should be doing something better.

A nice girl like you ought to be free as air.

Waving at a star now, cruising in a car now,

Strumming a guitar now, laughing in a bar now,

Something light and easy, something bright and breezy,

Pleasing a lovely miss.

Never in a place like this.

What's a nice girl like me doing in a place like this?

A nice girl like me happens to be fond of physics,

A nice girl like me wants to be an engineer.

Fond of mathematics, fond of hydrostatics,

Any new dimension, any new invention,

Wild about a proton, gamma ray or photon,

No ton I want to miss

Being in a place like this.

Or this one:

You won't find us crying for the moon.

Our spacemen dried our tears and made us wise.

For when they had surveyed it, with its whites and grays and blacks,

They simply gathered up some moon

And brought it home in sacks.

Or this one (about Beckman Auditorium):

What's a nice place like this doing with a crowd like us?

A nice place like this should be doing something better,

A nice place like this should be full of billionaires.

All the literati, critical and haughty.

Monacles and eyebrows, dowagers and highbrows,

Diamonds to fill a bus,

Never with a crowd like us.

The May show was entitled "Caltech Re-revisited: or Deja, Deja Vu," and transported the audience back to 1966 to the show for Wes Hershey. Then it brought them forward (with a few stops in between) to an evening in 1987 when the Stock Company presented "Troll's Progress" at a Caltech Playreaders' party.

But despite women undergraduates, 15 new buildings, landscaping, and a battalion of fund-raisers, Clark found in comparing scripts that "in essentials, beneath the camouflage, the Institute remains unchanged — as time-proof as Shakespeare."

And after the show The Associates agreed they felt that family ties with Caltech — already strengthening — had been firmly cemented.

## New light controls darken Palomar's environment

The future looks darker for Palomar Observatory, but no one is complaining. The Riverside County board of supervisors has unanimously approved an ordinance to substantially strengthen light-pollution controls within a 45-mile radius of the observatory. The board's action, on April 19, marked the end of a yearlong campaign by Caltech and Palomar to persuade county officials to expand outdoor lighting controls originally adopted in 1981. The supervisors' decision is expected to take place later this year.

The earlier, 1981 measure required that all new street lamps within 30 miles of Palomar be low-pressure sodium (LPS) vapor lights, which have the least impact on observatory research. Under the new ordinance, controls will be extended to areas not covered in the original decision, including decorative, billboard, restaurant, parking lot, and security lighting. About 70 percent of light pollution can be traced to those sources.

## Ralph Landau delivers annual Bray Lecture

Caltech trustee Ralph Landau came to campus in April as the Ulric and Evelyn Bray visiting lecturer. Landau led a morning symposium on "Chemical Engineering at Caltech" and delivered the evening lecture on "Global Competitiveness — What it Really Means for the U.S."

The lecture was part of the ongoing Executive Forum series sponsored by the Caltech Industrial Relations Center. In his talk, Landau dealt with the economic factors and policies necessary for attaining a future growth rate that will sustain a satisfactory national standard of living, while remaining competitive in the world marketplace.

Mrs. Evelyn Bray established the Ulric B. and Evelyn L. Bray Visiting Lectureship on the Economic System in 1981. Each year the Bray Lectureship brings to campus outstanding visitors whose research and practical experience enhance an understanding of the U.S. economic system.

Landau is chairman of Listowel, Inc., a private consulting and investment firm which he founded in 1982.

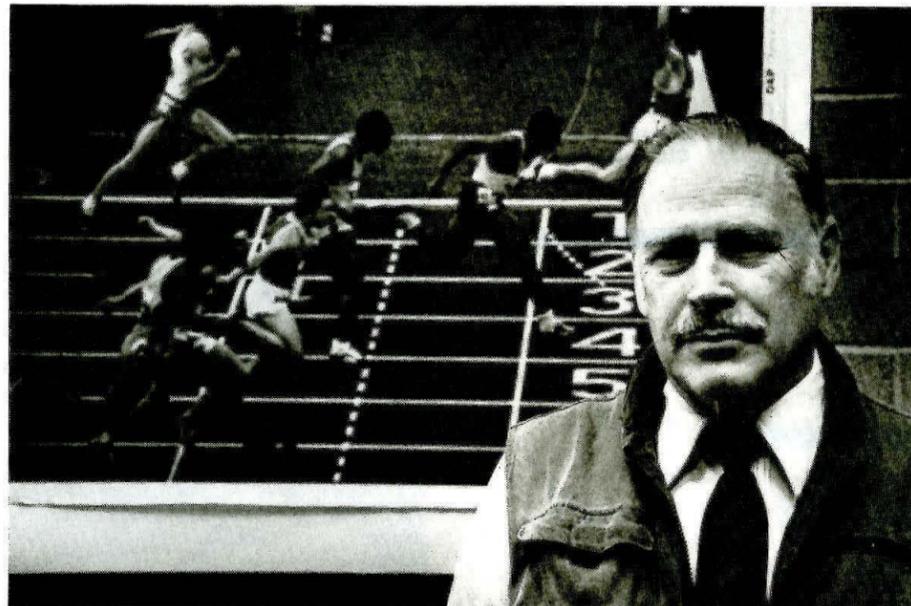
## FACULTY HONORS

Fred Anson, professor of chemistry and chairman of the Division of Chemistry and Chemical Engineering, has been elected a member of the National Academy of Sciences, one of the highest honors that can be bestowed on a U.S. scientist or engineer. Anson's election brings to 57 the number of NAS members currently on the Caltech faculty.

Harry Gray was named the 1988 California Scientist of the Year for making key discoveries regarding how living cells store energy. Gray, the Arnold O. Beckman Professor of Chemistry and director of the Beckman Institute, has been a member of the Caltech faculty since 1966. He received the \$5,000 award from the California Museum Foundation, a nonprofit arm of the California Museum of Science and Industry.

Two members of the Caltech faculty are among 15 outstanding biological scientists to be named 1988 Searle Scholars. They are Howard D. Lipshitz, assistant professor of biology, and Paul W. Sternberg, assistant professor of biology. Each receives a three-year grant of \$180,000 to support his research.

*Potts notes that sports such as baseball have long and well-documented histories, but track and field does not.*



# Statistics on the run

By Winifred Veronda

Why does a man devote hundreds of hours over several decades delving into statistics on the performances of track and field athletes? Why does he spend weekends poring over microfilm, ferreting out obscure records of events that have long passed into history?

"Why do people climb Mount Everest?" responds Donald H. Potts (BS '43, PhD '47), who has been immersing himself in such statistics since high school. "I do it because the challenge is there."

Moreover, he notes, sports such as baseball have long and well-documented statistical histories, but track and field does not. This is one of the things that make the subject fun for someone who likes doing statistical research.

Potts, who is head of the mathematics department at Cal State University, Northridge, began to absorb track records when he was a sophomore in Lincoln High School, Seattle. He was on the track team when he began clipping summaries of the local high school meets from newspapers and filing them in scrapbooks.

Today he is one of the world's leading authorities on performances by track and field athletes and a major resource for *Track and Field News* in its world ranking of performers. He is a former president of the Association of Track and Field Statisticians, and honorary president of the Federation of American Track and Field Statisticians.

But these organizations had yet to be founded when Potts began compiling scrapbooks in 1937. Clipping high school track-event summaries soon expanded to clipping records of college meets — and then he began to wonder what had happened at meets in earlier years.

"I was a Jesse Owens fan," he says. "He retired from amateur track after the 1936 Olympics. I went to the public library and perused bound volumes of local newspapers, working my way back to the early 1930s."

Potts continued these activities over the next 10 years, filling more and more scrap books and composition books with his records. He also began to collect NCAA guides and Spaulding athletic almanacs.

Entering Caltech as a freshman in 1939, he earned varsity track letters for

three years, specializing in sprints and hurdles. As an undergraduate, he was a member of Blacker House. While he was a graduate student, he and his hobby were featured in the Pasadena *Star News*.

"My hobby had no external outlet in those days," he says, "and I never expected that it would have."

Late in 1945, while Potts was continuing his graduate work, he discovered a kindred spirit. He found a list of best-performance statistics in *Amateur Athlete* — some of them unknown to him — and obtained the name of the author, Robert Quercetani, of Florence, Italy.

Thus began a voluminous correspondence — one that averaged 25 letters per year — that led to the joint authorship of a booklet containing the 100 best marks in each track event. The two men met in 1955 and continue to be colleagues and good friends, although Potts says their correspondence diminished after their meeting.

In 1948, the year their booklet was published, *Track and Field News*, the first comprehensive source for track and field statistics, began publication. The editors learned about Potts through "Doc" Floyd Hanes, long-time trainer at Caltech and coach of the track team from 1943 to 1946. Potts and his friend Quercetani became regular contributors to the publication and have remained so. "Finally," Potts says, "we had an outlet for our hobby." Quercetani is now the European editor for *Track and Field News*.

In 1948, Potts and Quercetani began what would become an annual endeavor. They were asked by *Track and Field News* to do the compilations for a world ranking of the top 10 athletes in each track and field event.

By the mid-1970s, the statistics they worked with had become so voluminous that they asked for help. Today, Potts sets up preliminary rankings for five events (generally sprints and hurdles) for which he is primarily responsible. He shares this information with other authorities, considers their opinions, and then does a final ranking. Meanwhile, the other events are ranked by other experts through a similar procedure.

Potts's status in the realm of track and field statisticians has given him

entry to an international circle of friends with similar interests. He meets these friends when he travels to his favorite sporting events — the world championship track and field meets. He has attended these meets in Helsinki and Rome, and will attend the next meets scheduled for Tokyo in 1991.

Although he has attended the Olympics several times, Potts says he doesn't enjoy them very much any more.

"They're very crowded, and there are so many events I'm not that interested in," he says.

"Moreover, they've become very political in the way they're used. And besides, I can stay home and watch the interesting events on television almost as well as if I were there."

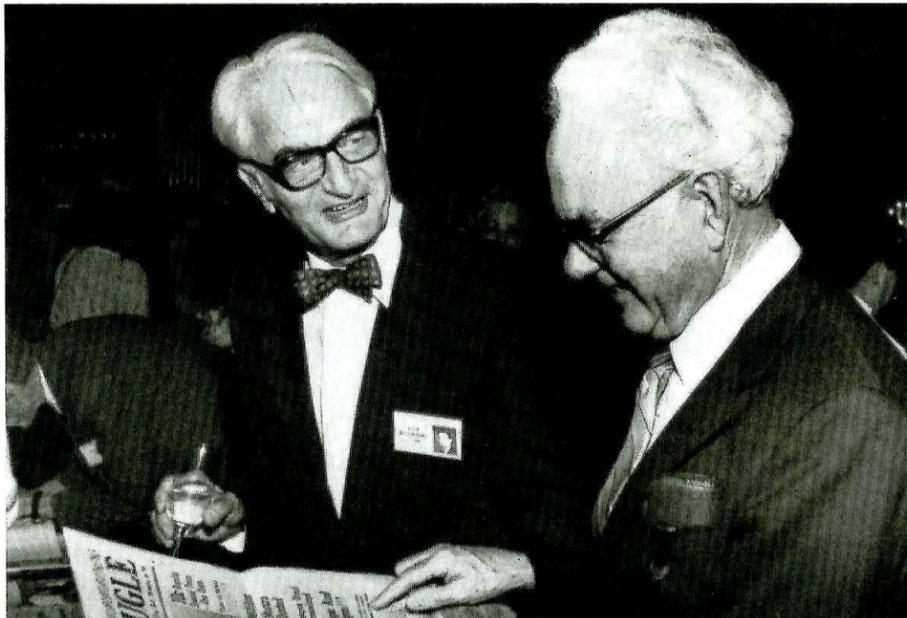
As contemporary statistics have been increasingly well documented, Potts has become more and more interested in historical research. He, Quercetani, and a third friend are now compiling best marks for events from 1937 to 1944 — a task they hope to complete in two more years.

Potts, who makes his home in Goleta, California, with his wife, Jennifer, is the father of a son and three daughters. He joined the faculty at Northridge in 1965 after teaching at UC Santa Barbara, Cal State Long Beach, and Northwestern University. Professionally he is interested in foundations and the history of mathematics, and in ways to interest students in math from a cultural point of view.

He looks forward to two more years at Cal State Northridge, and then plans to retire and to "do a lot of projects I've been putting on the back burner." Among these will be a history of sprinting and a biography of the person he considers the greatest U.S. track athlete of the nineteenth century — Lon Myers. (Potts considers Carl Lewis to be the greatest athlete of this century but adds that "I may be prejudiced because he's a sprinter and long jumper, and those were my events in college.")

One thing he is sure of: He has no fear of idle time on his hands, because the hobby that began with those high school scrapbooks continues — like a world-class mountain — to offer undiminished challenges.

**Dick Rosencranz and W. T. Cardwell, Jr. ('38) reminisce over some vintage newspapers at the Half-Century Club luncheon.**



## ALUMNI

### Classmates recall 50 years of personal history

Finding a group of classmates with whom he felt complete empathy was the special reward that being a Caltech freshman brought to Carlton L. Horine back in 1933. That empathy has lasted through the years, and it pulled 62 members of the class of 1938 back to campus for a weekend of festivities, capped by the Half-Century Club luncheon.

Charles W. Clarke was chairman of the reunion committee, assisted by Robert J. Barry, Ralph W. Jones, William F. Nash, Jr., Evan A. Johnson, Paul C. Siechert, Gardner P. Wilson, and Robert G. Metzner.

The committee planned a vigorous round of activities for classmates to enjoy, including a tour of JPL; dinner at the Valley Hunt Club, with a talk by Judith Goodstein on "Caltech in the Turbulent '30s"; a tour of campus led by CATS (Caltech Architectural Tour Service); the Half-Century Club luncheon at the Athenaeum; and a fiesta dinner at the home of Ralph Jones in San Marino.

The Reunion Campaign Committee, headed by Richard Rosencranz, presented the Institute with a check for \$42,800 to be used for scholarships — "a 41 percent increase over what the same population accomplished last year." Other committee members included Carl F. Friend, Samuel Keller, Stanley T. Wolfberg, Donald D. Davidson, George B. Holmes, Phillip Saureman, and David K. Beavon.

President Thomas E. Everhart greeted the class. He remarked that "since you graduated, you have lived through more change than any other group of alumni." He assured the alumni that the freshman class continues to stand out in relationship to its counterparts at other schools, and he noted that "we are well above Stanford and Harvard in SAT scores. And while the faculty is not the same as when you were here, it is of the same stature."

David J. D. Harper, president of the Alumni Association, was master of ceremonies for the occasion. He observed that 25 PhD degrees, 94 MS degrees, and 130 BS degrees were awarded in 1938. Recalling that year, he pointed out that Cal beat Alabama 13-0 in the Orange Bowl, Benny Goodman gave the first Carnegie Hall jazz concert, *Snow White and the Seven Dwarfs* was released, and Superman made his appearance.

Spencer Tracy won an Oscar for his role in *Boys' Town*, and Bette Davis for

her performance in *Jezebel*, and Orson Welles scared a large portion of the country into believing the Martians had invaded, with his radio rendition of *The War of the Worlds*. The first color television was demonstrated and a Caltech alumnus, the late Chester Carlson, gave his first xerography demonstration. "It was a difficult time to graduate," said Harper. "Twenty percent of the work force was unemployed."

Then it was time for the class members to reminisce a bit, as they received their Half-Century Club certificates.

Harry Boller said that one of the greatest discoveries he's made during the last 50 years has been that the better time you're having, the faster the time goes.

Thomas V. Davis recalled that he lived off campus until the year he edited the yearbook and he became so absorbed in the project that he slept on a couch in the *Confab* office in the basement of Dabney House.

Munson Dowd remembered pajamarinos, pulling the trolley off the track, playing football in the Rose Bowl against powers like Pomona, Occidental, and Redlands, snaking until all hours of the morning, and walking to class through the steam tunnels when it was raining.

Herbert Ellis recalled the time Ricketts House members were given a stern lecture to follow house rules to the letter. Since they were required to wear coats and ties to dinner in the evenings, they showed up that night in coats and ties and nothing else.

Richard B. Forward, who was with the Navy as an aviator with a torpedo squadron in the Coral Sea, remembered that the Bureau of Ordnance was looking for a naval officer with a technical background to go to Washington, and he was chosen. Shortly afterward, what had been his plane went down short of its carrier on its return from a mission.

Evan Johnson thought about Robert Millikan, who told him that he would forget the details of his education, but not the scientific approach that Caltech would teach him. What Millikan said was true, Johnson acknowledged, and he added that "this approach has been very valuable in dealing with all the problems that I've confronted in my life."

Ralph Jones remembered getting into trouble with the SPCA for using live goldfish in a liquid-air lecture in Culbertson, and Samuel Keller recalled feel-

ing insignificant as a freshman — until Jon Mathews, his freshman advisor, stopped to talk to him on campus and actually remembered his name.

Robert Metzner reminisced about an economics professor with a Welsh accent who smoked several packs of cigarettes during a class session. One day, just as he opened the second pack, all of the students pulled out five-cent cigars and lit up.

The professor told them he got the point, and promised to try to smoke less. Then he dismissed class for the day because the smoke was so heavy.

John Minasian remembered a physics class during his sophomore year when the average class score was nine percent — and his score was eight percent. And George Osborne said he hitchhiked to school from Azusa for three years, finally managing to live in Fleming when he was a senior.

Hollis Reamer said he has taken a lot of kidding because so many years passed before he got out of college. Reamer began working with Sage and Lacey's group after he graduated and stayed on as a faculty member until retirement.



### Washington, D.C.-area alumni meet

In the Washington, D. C. area, 32 alumni and guests gathered for dinner at Michael's Restaurant in Bethesda, Maryland, on May 10 to hear a talk by Alvin Trivelpiece (MS '55, PhD '58). Trivelpiece shared what he has learned and done in his roles in academia, industry, and government and he discussed some of his present concerns about U. S. science and technology. John Andelin (BS '55, PhD '65), president of the Washington, D. C. chapter, and Lisa Heinz (BS '78) organized the event.

### Association welcomes three new honorary alumni

The Alumni Association welcomed three new honorary alumni at the annual dinner in June. This honor, based on contributions to the campus community and to the students, was conferred upon Thomas E. Everhart, president of Caltech; Christopher Brennen, professor of mechanical engineering and former master of student houses; and Tsutomu Oshima, karate instructor to Caltech students since 1958.

Elected as officers for 1988-89 were: Charles H. Holland, Jr. (BS '64), president; Rhonda L. MacDonald (BS '74), vice president; E. Micheal Boughton (BS '55), treasurer; and Gary W. Stupian (BS '61), secretary. Outgoing president David J. D. Harper (MS '77) will also serve on the executive committee.

Elected as directors were Tway W. Andrews (BS '44), Joe K. Cheng (BS '85), Joseph A. Dobrowolski (BS '49); Rolf H. Sabersky (BS '42, MS '43, PhD '49), William M. Whitney (BS '51); and Hubert E. Dubb (BS '56).

Harper, 1987-88 president, was presented with a birch armchair with the Institute logo and a plaque bearing the presidential gavel. A short business meeting preceded the festivities.

### Project seeks postgraduate pranks

Readers of *Caltech News* are aware that the Alumni Association is considering the publication of a second volume of *Legends of Caltech*, and has asked for written contributions. Material received so far has been limited, so no decision has been made about whether to proceed with a second volume.

However, we have received several contributions describing pranks pulled by Caltech alumni after they graduated from the Institute. So we are pondering whether to include a section entitled "The Beat Goes On" that chronicles this special facet of Caltech's legacy.

So look past your adventures at Caltech and try to recall those special little things you've done "to and for others" after graduation. Of course, we're still very interested in any stories about pranks at Tech that have not yet been submitted. Send them to Chip Smith, Lawrence Livermore National Lab, P.O. Box 808/L-626, Livermore, California 94550. Final deadline for all submissions is September 30.

## Antarctica trip scheduled

Members of both the Caltech Alumni Association and the Harvard Alumni Association are invited to participate in a co-sponsored trip to explore Antarctica, the Strait of Magellan, and Cape Horn on February 9-24, 1989. Organized by Travel Dynamics, the trip features as a guest lecturer Barclay Kamb, vice president, provost, and professor of geology and geophysics at Caltech.

Kamb's studies have included crystal and physical properties of minerals, and the mechanics of solid deformation and basal slip in glaciers. His research at Variegated Glacier in Alaska has led to the development of a quantitative physical model of surging in valley glaciers.

Caltech alumni who graduated before 1971 should have received a brochure describing the Antarctica adventure. If you have questions, or would like to receive a brochure, please call Kathy Harris at the Alumni Office, 818/356-6593. Join us for an exciting journey into the grandeur of the world's last frontier!

## San Diego-area friends gather

San Diego-area alumni and Associates gathered on May 12 to hear President Thomas E. Everhart describe his first eight months at Caltech, and to discuss some new developments at the Institute. More than 140 alumni, Associates, and guests gathered at the La Jolla Country Club for a social hour and dinner before Dr. Everhart's talk. Instrumental in arranging the evening was Frank Davis (BS '36), a member of The Associates.

## From the alumni president

Your Caltech Alumni Association is about to begin a new year, with the aim of maintaining the expanded levels of activity that have begun in several new programs. We will also continue our ongoing activities, such as the alumni travel programs, and in these we anticipate ensuring a pattern of steady growth. We appreciate David Harper's outstanding leadership as president this past year, and will work to continue to maintain a strong Alumni Association.

This year we hope to focus on strengthening the existing alumni chapters, and creating new ones where there are clusters of interested alumni. We want to increase the visibility of the Alumni Association through chapter activities — activities that spread the word about our efforts on behalf of students, alumni, and the Institute.

As a membership organization, the Alumni Association uses your dues to fund the various programs that facilitate positive interaction among alumni, students, and the Institute. Along with our traditional programs — Seminar Day and the reunions, for example — the Alumni Association has branched out in recent years to develop an expanded range of services and support activities. We want to continue to offer these services in the future.

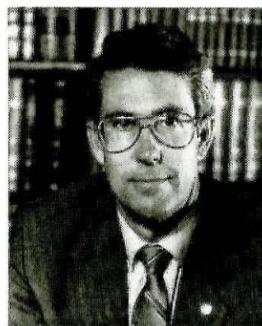
The Undergraduate Admissions Support Committee now has more than 120 alumni volunteers across the country, assisting in the recruitment of qualified students for Caltech. This program is one way for alumni away from the campus to stay involved with Caltech and with other alumni in their area.

The Student/Faculty/Alumni Relations Committee is strengthening its program of student-alumni interaction, centering around student house affiliation. Such events as camp outs, barbecues, and bridge tournaments

bring alumni and students affiliated with a particular house together in a lively social situation.

Support to enhance the lives of students on campus has been an ongoing project for the Alumni Association. Your membership dues help support such worthwhile student activities as Freshman Camp, athletics, the Glee Clubs, and many student clubs.

The Alumni Association provides seed money for new clubs trying to get started, for unusual opportunities for students — for example, the weekend



Charles H. Holland, Jr.

project last year to help repair a Mexican orphanage. Both the Mexican children and the Caltech students came away from that experience feeling they had received more than they had given.

The Caltech hockey team was invited to play MIT last year and the Alumni Association helped make possible the second Annual Beaver Cup hockey game in February. Both the Caltech hockey team and Boston area alumni enjoyed this unique sporting event.

In this column in forthcoming issues of *Caltech News*, I will try to share with you the accomplishments and endeavors of the Alumni Association board and the various chapters across the country. Together we look forward to a very successful year for the Caltech Alumni Association.

## Eight faculty members retire

Eight faculty members retired at the end of the academic year. They are Heinz E. Ellersieck, associate professor of history; Edward B. Lewis, Thomas Hunt Morgan Professor of Biology; Robert W. Oliver, professor of economics and master of student houses; Charles H. Papas, professor of electrical engineering; John D. Roberts, Institute Professor of Chemistry; Rolf H. Sabersky, professor of mechanical engineering; Eli Sternberg, professor of mechanics; and David S. Wood, professor of materials science.

## ALUMNI ACTIVITIES

September 25 — Palomar Observatory trip for San Diego area alumni.

October 2-6 — New England travel program.

1989

January 2 — Rose Parade program.

February 9-24 — Antarctica travel program.

April 30-May 5 — Washington, D.C. travel program.

May 19 — 25th reunion, class of 1964.

May 20 — 52nd annual Seminar Day.

June 3 — Half-Century luncheon.

June 16-25 — Alaska travel program.

## Sinsheimer

Continued from page 1

must understand, and they cannot dismiss, the other perspectives that do not center on scientific and technological knowledge. And to comprehend these other perspectives, he added, they must be able to recognize their *own* perspective — "often unspoken but shared by most scientists and engineers."

This perspective might be expressed in this way — that knowledge is good and that more knowledge is better, and that the quest for knowledge itself is one of the highest forms of human endeavor.

"You must know," Sinsheimer continued, "that others are not sure, especially in a world in the thrall of an ethic that strongly favors the swift application of new knowledge to practical purposes.

They think of Hiroshima and Chernobyl and Love Canal — and they fear. As Robert Penn Warren wrote, 'The end of man is knowledge, but there is one thing he can't know. He can't know whether knowledge will save him or kill him.'"

Sinsheimer reminded the students that scientists firmly believe in physical causality and in a truth that can be found in nature. "And they know of the impermanence of the world, of the long history which preceded the emergence of our species, of the course of stellar evolution which produced the very elements of which we are made, of the evolution of the planet as seen in the geological record and the ongoing movements of the tectonic plates, of the evolutionary chain of life as recorded in the fossils and in our very genes. Yet much of the world recognizes no history before the written record and no order beyond that

currently accessible to our senses."

Sinsheimer pointed out that Caltech has many extraordinary strengths — among them, the relative homogeneity of a community whose members share a common outlook — "a common perception of the world which greatly facilitates agreement and action."

This homogeneity has its manifest benefit — but it may also have its cost, he said. "You may not be fully prepared for the tumultuous and diverse world outside these cloistered, cerebral quarters."

Thus, Sinsheimer told the graduates, "In addition to keeping pace with science or technology you will also — to be effective — need to learn to comprehend, and to match wits with, the advocates of world views very distant from your own."

Looking at the present — and ahead to the future — Sinsheimer termed this

"a golden age for science.

"Building upon the cumulative discoveries of the past, using ever more powerful instruments, the rates of discovery and invention continue to accelerate," he said. "You will not — you cannot — ever cease to learn. The one certainty for the future is change. I have no doubt that more will be learned in the next 20 or 30 years in most areas of science and technology than in all previous times."

Sinsheimer left the graduates with an admonition in the form of a story about an engineer who was about to be guillotined during the French revolution. Looking up at the blade hovering over him, he pointed out to his executioners that it could not fall because a screw was loose.

"It's fine to make use of your technical expertise," Sinsheimer said, "but you should always be aware of the context."

## SPORTS



### Track team posts winning season

For the third successive year, a tenacious and talented men's track team posted a winning season with a 7-6 record. With 20 freshmen athletes added to a squad of 20 upperclassmen, the team could benefit from a fine blend of experience and exuberance.

While there were many highlights during the season, the progress made by several individuals stands out dramatically. These were some of the personal-best performances achieved this season: 1:57.47 in the 800 m by senior Joe Shiang (Shiang claimed fourth place, all-conference recognition in the SCIAC); 4:06.30 for the 1500 m by senior John Gehring; 11.82 for the 100 m and 23.99 for the 200 m by junior Tom Tetzlaff; and 51.47 for the 400 m by junior Sean Hillyard.

In addition, Steve Harkness put the shot 38'6" and threw the javelin 131'11" while Ed Mao threw the discus 109'4". Sophomore Randy Ralph high jumped 6'4-1/2", while freshman Gary Eastvedt cleared 6'2" and jumped 19'4-1/4" in the long jump.

Paul Socolow ran 59.8 seconds in the 400-m intermediate hurdles and Ray Sidney cleared 12 feet in the pole vault and also triple jumped 39'7". Finally, Scott Kister raced to 16:53.0 over 5000 m and 11:06.0 in the steeplechase, while Ray Hu ran 2:01.1 for the 800-m.

In SCIAC dual-meet competition, Tech finished with 2 wins and 4 losses, easily defeating both Whittier College and the University of La Verne. The team managed to garner a tie for fifth place in the final conference standings, while Occidental won the championship.

Team captain John Gehring was voted the team's highest honor, the Goldworthy Award. This trophy is presented for spirit, leadership, and proficiency, and this season marks the second time that Gehring has been its recipient during his career.

Additional awards presented at the annual track banquet were: the M. T.

Davis award for the outstanding field-event athlete, to freshman Ray Sidney; the outstanding freshman award to Dave Park; and the most inspirational athlete award to senior Joe Shiang.

Despite the loss of several valuable athletes due to graduation, the team should still be in good shape next year. Dave Park, Randy Ralph, and Gary Eastvedt will dominate the vertical and horizontal jumps. Ray Sidney and Paul Socolow will be competitive in the hurdles races, while Scott Kister, Chris Campo, Mark Lyrtle, and Ed Naranjo will take up the slack in the distance races. Todd Kaplan, Dave Amezcua, Steve Harkness, and Ed Mao will continue to be forces in the throwing events.

Alex Athanasopoulos is expected to qualify for the nationals in the 800 m, and Ray Hu, John Raguin, and Jeff Willis will contribute heavily in the middle distances. Sprinters Tom Tetzlaff, Dan Kollmorgen, Sean Hillyard, and Jack Prater will continue to develop and are expected to contribute heavily to the team's future success.

### Women's track: a new book

The new and improved version of the Caltech women's track team has virtually rewritten the record book this year. With a squad of eight athletes, the team managed to pick up four dual-meet victories against eight losses, as well as a first-time win over a conference opponent.

Freshman sensation Liz Warner led the charge, contributing to team victories over Master's College and Chapman College with record-setting performances in the 100-m (13.87 seconds) and the 200-m (29.41 seconds). Warner also broke the existing long-jump standard on four separate occasions — the last time in the SCIAC conference finals at Occidental. Here she soared 15'10-1/2". Even though Warner was making her first attempt at the triple jump this year, she destroyed that record by almost 11 inches; her best jump was 31'4-3/4".

Tech's relay team, consisting of Warner, Golda Bernstein, Kitt Hodsdon, and Bibi Jentoft-Nilsen, established new records in both the 400-m relay (59.5 seconds) and the 1600-m relay (4:42.87). Jentoft-Nilsen provided a strong anchor leg to both events.

During the annual track and field awards banquet, team co-captains Warner and Jentoft-Nilsen received the major awards. Jentoft-Nilsen was recipient of the most valuable runner trophy. In addition to her strong contribution to the relay teams, she ran competitive times in both the 1500-m (5:29.2) and the 800 m (2:30.22). At the SCIAC finals she barely missed all-conference recognition with a seventh-place finish as she chopped more than 5

seconds off her previous best time.

The outstanding female track athlete award went to Liz Warner. Not only had she set four school records and participated in two others, but she also scored more points for the team than any other woman in Caltech track history with 178-3/4. Throughout the season she competed in 10 different events. The freshman barely missed all-conference honors in the 400-m intermediate hurdles, the long jump, and the 100-m hurdles.

The future for women's track and field looks bright, because all the team members will be returning and can be expected to improve over strong performances this year.



### Tennis recap

Caltech lost three key players from a powerful 1987 team, and two key players from the 1988 squad were injured. Thus Tech began the season with freshmen Dan Pang, Lloyd Farnham, Hemant Keny, Jimmy Ng, and senior Greg Martin in key roles.

Early in the season, Caltech defeated La Verne and barely lost to Fort Lewis College and Whittier. With the return of number-two player Raleigh Chiu and the steady play of number-one Mark Holdsworth, number-three Gene Pottinger, and number-four Ahn Tuan Le, Caltech won four of its last six team matches. The team outpointed Whittier in the league tournament to finish in fifth place for the fourth straight year.

The SCIAC men's tennis division is particularly strong this year, with three teams—Claremont, Redlands, and Pomona—belonging in the top 25 Division III NCAA teams in the country. Claremont won the conference championship and went on to compete with other top-ten teams for the national title in May.

### Women's tennis showing strong

The women's tennis team returned this year, virtually intact. Two new faces brought the roster to eight full-time players. Jane Seto, a transfer from

Occidental, challenged her way to the number two spot. Freshman Alecia Chen developed rapidly and stepped temporarily into the number-six spot when injuries sidelined two players after spring break.

Medical problems beset the team from the first week. However, despite ankle injuries, shin splints, and sore hips, elbows, and shoulders, the team managed an impressive 3-1 record during the first two weeks of the season.

Tech ended the season at 6-13 after defeating Redlands 9-0 and making an impressive showing in the SCIAC championship tournament. Three players advanced to the second round, and Carol Mullenax narrowly missed a trip to the semifinals. The doubles team of Jennifer Low and Junko Munakata returned to the semifinals on Saturday.

The team put on a consistent and impressive show this season, aided by drilling from former Oxy coach, Tracy Lillig. Especially strong play came from Carol Choy, Jane Seto, and Laura Hernandez. Jennifer Low and Carol Mullenax improved tremendously over the season. Junko Munakata battled a sore hip all season, but played consistently well. When Linda Schlueter was available, she played excellent doubles with Laura Hernandez. Jane Seto and Carol Choy played tough at number-one doubles as well.

In SCIAC competition, Pomona-Pitzer ended Occidental's domination of women's tennis. Claremont-Mudd-Scripps was runner-up while Occidental slipped to third, followed by Whittier, La Verne, Caltech, and Redlands.



### Fine baseball year

The 1988 Caltech baseball team finished its campaign in fine fashion, winning a season-ending doubleheader and raising its overall record to 8-23. The eight wins are highly significant because they represent the largest number of baseball victories recorded by any Caltech baseball team since 1963.

This year's team also posted the first SCIAC Conference victory since 1983, defeating Whittier 6-5 on April 16.

Leading this year's team was right-handed pitcher Brian Colder, a junior. Colder posted a 7-8 record on the mound and batted a team high — .292.

For these accomplishments, he was given the 1988 Alumni Award as the team's most valuable player and was recognized at the conference level with an all-league honorable mention.

A second player who received honorable mention at the conference level was Page House senior Michael Keating, a shortstop. Keating batted .267 and broke the all-time Caltech single season (21) and career (55) stolen-base record.

Other award recipients were freshman Ken Campman and senior Kenny Lin. Campman, another right-handed pitcher, received the Peterson Trophy as the outstanding freshman for his efforts as the team's number two pitcher. Lin, a second baseman, received the Coaches' Award for his outstanding dedication and hard work over the past four years.

Claremont won the SCIAC Conference title this year with a 16-2 record, followed by Whittier (13-5), Redlands (11-7), La Verne (10-8), Occidental (9-9), Pomona-Pitzer (3-15), and Caltech (1-17)

Even though this year's team was tremendously successful by Caltech standards, better things are expected next year. With a solid nucleus of 13 returning players, including six starters and a five-man pitching staff, the 1989 Caltech baseball team looks like a strong candidate to become the first to post a double-digit win total in the past 30 years. If it does, it can thank the 1988 team for the renewed confidence and enthusiasm that helped to make this possible.



## Golfers improve

Although the varsity golf team met with very little success, the team—dominated by underclassmen—showed improvement from match to match. Dong-Su Kim, a freshman, was the number one player for the entire season, and was awarded the Most Valuable Player trophy for his consistent performance.

Captain-elect Yogi Krikorian was often close behind in scoring, and shows promise of moving up in the rankings next season. Rounding out the top four were freshman Kyung Lee and sophomore James Ibbetson. The highlight of the season was a narrow loss to the Whittier varsity team in early April.

Redlands University continued its domination of the SCIAC golf competition, followed by La Verne, Claremont-Mudd-Scripps, Pomona-Pitzer, Occidental, Whittier, and Caltech.

## Commencement

*Continued from page 1*

science and technology than ever before.

"While today marks the commencement of the rest of your life," he told them, "that life will necessarily involve continuing learning, so you can be a dynamic part of this ever changing world.

"As you have discovered, Caltech is a remarkable enclave. It is small and self-contained and marches to a different drummer than much of the world around us. Part of your success will depend on how you adapt to the settings you choose after leaving here — how well you work with the people who become your colleagues, and how you apply yourselves to the tasks you undertake."

Everhart reminded the group that, in 1869, Charles William Eliot, the president of Harvard University, said that to observe keenly, to reason soundly, and to imagine vividly are as essential as clear and forceful expression, and that to develop one of these faculties, it is not necessary to repress or dwarf the others.

"We hope we have helped you learn to observe keenly, to reason soundly, and to imagine vividly," Everhart said. "I know that at least some of you are capable of clear and forceful expression. These skills, even more than the formulas you have learned, will stand you in good stead as life progresses."

Letting the graduates know that they would be missed, Everhart remarked, "This is a bittersweet time for those of us who remain to carry on the work of the Institute. As you go forth from Caltech, you take a part of us with you. Unlike energy and momentum, which are conserved, ideas and knowledge are not. We can learn ideas and values and knowledge from each other, and their influence expands.

"As we do so, one individual can become part of another, not in body but in spirit. You have gained experience here from mentors and colleagues. Part of us has become part of you.

"Like home and previous schools, Caltech has become part of your roots."

## Copies of annual report available

Copies of the 1986-87 Annual Report are now available to all alumni on request through the Publications Office, Caltech 1-71, Pasadena, California, 91125.

## OBITUARIES

1916

ROBERT N. ALLEN, of Hollywood, California, on January 31.

1923

WILLARD E. BAIER, of Ontario, California, on February 16. He was manager of the research department of Sunkist Growers until his retirement in 1967. A Life Member of the Alumni Association, he was also past president of the Los Angeles and San Geronio (San Bernardino County) chapters of the American Chemical Society. He was Man of the Year for the Southern California section of the Institute of Food Technologists; an honorary board member of "Meals for Millions"; past master of Masonic Lodge No. 301 in Ontario; and author of many technical publications. He is survived by his wife, Anita; son, Rodger; daughter, Dorothea Ediger; six grandchildren; and three great-grandchildren.

1924

DAVID WOLOCHOW, of Vancouver, BC, Canada, on January 8, of a heart attack. He was director of the Specifications and Standards Branch of the Department of Defense Production and secretary of the Canadian Government Specifications Board, until his retirement in 1969. A Life Member of the Alumni Association, he was also an appointed member of the City of Victoria, BC, Advisory Planning Commission, and elected an Honorary Alumnus of the Israel Institute of Technology.

1926

MARK SERRURIER, of Pasadena, California, on February 14. A member of The Associates, he received a Distinguished Alumni Award in 1981. He worked on the design of the 200-inch telescope at Mt. Palomar and assisted with the development and modernization of the "Moviola" (used for film editing), for which he received an Oscar. He is survived by his wife, Naomi, and four children.

1927

FREDERICK G. THEARLE, of San Pedro, California. He was a Life Member of the Alumni Association.

1929

GEORGE F. WEISMANN, of La Mesa, California, on April 17. After serving as a lieutenant commander in the Navy during World War II, he went on to become a sales manager for Mobil Oil Corporation. He is survived by his sons, James and George; stepsons, Michael and Roger; and two grandchildren.

1932

JOSEPH SHEFFET, MS '33, of Indian Wells, California, on December 23, 1987. He was president of Joseph Sheffet, Inc., and Area Volunteer for the Desert for the Caltech Alumni Fund.

WILLIAM J. THOMAS, of Los Angeles, California, on October 30, 1987. He was a Life Member of the Alumni Association. He is survived by his wife, Lucile.

1933

HARALD OMSTED, MS, of Pasadena, California, on January 31. A Life Member of the Alumni Association, he is survived by his wife, Charlotte.

1934

W. LAVERN HOWLAND, MS '35, MS '36, PhD '39, on March 7, in Burbank, California. A retired aeronautical engineer, he had been head of flight-test operations at Lockheed. He was nationally recognized for his contributions to aircraft research and development. He had been actively involved with the Grandview Presbyterian Church, Junior Achievement, the PTA, and the Lockheed Starbusters. He enjoyed playing golf, and was a member of the Laguna Beach Golf Club. Dr. Howland is survived by his son, Gregory; daughter, Kathleen Field; sister, Merriam Banbury; and two grandchildren.

1938

RALPH D. BAKER, PhD, of Salt Lake City, Utah, on December 1, 1987. He began his career as an instructor in the Mechanical Engineering Department at the University of Kansas. After earning his PhD, he began teaching mechanical and aeronautical engineering at the University of Utah, a position he held for over 30 years. While at the University of Utah, he was a member of the Scholarship Committee and the Faculty Council; was head of the Mechanical Engineering Department for 7 years; and was the first chairman of a new regional organization of mechanical engineering schools to correlate curriculum for those schools. For over 40 years, he served as a volunteer for the Boy Scouts of America, receiving many awards. He is survived by his daughter, Mary Ann Kleinert; son, L. Ralph; daughter-in-law, Mary Ann; four grandchildren; and one great-grandchild.

JACK F. DOUGHERTY, MS '39, of Houston, Texas, on July 1, 1987. He was president of JFD, Inc., engaged in setting up and managing joint ventures in oil and gas exploration and development. After obtaining his MS in Geology at Caltech in 1939, he worked for the Federal Power Commission in Washington. He next took a position with the Phillips Petroleum Company in Amarillo. He then went into key positions in a succession of firms located in Dallas and New York where he evaluated petroleum and natural gas properties. As consultant and head of his own company, he was intimately associated with all aspects of the petroleum business upstream of refining and petrochemicals, with effect on development in the U.S., Canada, and Ecuador. He is survived by his wife, Ruth; and six children.

1940

ROBERT P. ADAMS, of Claremont, California, on April 26, of cancer. He was a Life Member of the Alumni Association. He is survived by his wife, Kathleen; two sons; a granddaughter; his mother; his sister; and his brother-in-law, William R. Cleveland, Jr.

STANLEY N. HEAPS, of Houston, Texas, on April 16, 1987. He is survived by his wife.

1941

WALTER E. FELLERS, MS, of Los Angeles, California, on April 13. In 1976, he was elected a Fellow of the American Institute of Aeronautics and Astronautics. He was also a Life Member of the Alumni Association. He is survived by his wife, Ruth; two sons; and five grandchildren.

FRANK H. SKALECKY, of La Mesa, California, on March 18, of lung cancer. He is survived by his wife, June; three sons, Alfred, Frank, and John; and four grandchildren.

1944

DONALD W. PENDERY, of New Canaan, Connecticut, on October 19, 1987. He was a retired vice president of the Xerox Corporation. He is survived by his wife, Joyce; sons, David and Steven; grandson, Alexander; mother, Hilda; brother, John; and sister, Mary.

## Obituaries

Continued from page 13

1946

JEROLD R. IRELAND, of Agoura, California. He was a Life Member of the Alumni Association.

1947

JOHN PETTLEY, MS, of Buellton, California.

1948

ROBERT P. BARRACLOUGH, of Costa Mesa, California, in November 1987.

1949

ROBERT T. MOORE, JR., Eng, of Woodland, California.

1950

ROBERT V. MacALLISTER, PhD, of Clinton, Iowa. He is survived by his wife.

1951

KENDRICK RADEY, MS, Eng '62, of Crestline, California, on May 6. He and his wife were killed in an auto accident.

1954

JAMES L. MCGREGOR, PhD, of Los Altos Hills, California, on January 3. Professor emeritus of mathematics at Stanford University, he contributed most notably in the areas of applied stochastic processes, metric analysis, and moment theory. He also pursued research over a wide spectrum of basic mathematical models in evolutionary theory. Collaborating with Stanford mathematician Paul Berg, Dr. McGregor wrote the introductory text *Elementary Partial Differential Equations*. Following his retirement in 1986, he became interested in computers and devoted much time to investigations of combinatorial problems. He was also an avid fisherman and led groups of his colleagues on salmon fishing excursions. In addition to his work at Stanford, Dr. McGregor was a noted area horticulturist who produced vigorous hybrid stock. At one time he was an officer of the Bay Area Camellia Society. He is survived by his wife, Alice; son, James; daughter, Elaine Rhodes; and two brothers, John and William.

1958

JOHN D. EBERHARDT, of San Diego, California. A Life Member of the Alumni Association, he is survived by his wife.

1960

GERALD R. JANTSCHER, of Bethesda, Maryland, on October 17, 1987, of cancer. In 1966, he moved to the Washington, D.C., area and joined the Office of Tax Analysis at the Treasury Department. From 1967 to 1977, he was a research associate at the Brookings Institution. Since 1977, he had been a tax policy analyst with the General Accounting Office. Dr. Jantscher wrote several books, including *Bread Upon the Waters*, published by the Brookings Institution. He is survived by his wife, Milka; and his stepmother, Maurine.

1965

JOHN J. TURECHEK, of Glendale, California, on March 4. A Life Member of the Alumni Association, he is survived by his mother.

1966

DAVID A. BRUECKNER, MS, of Highland Park, Illinois, on March 21. After receiving his medical degree from Washington University in St. Louis, he went on to become a psychiatrist,

and worked in private practice for 14 years in Highland Park, Illinois. A Life Member of the Alumni Association, he is survived by his wife, Marilyn; his mother, Maysie; and a sister.

1967

WILLIAM G. HAMMER, of Spokane, Washington, on March 21.

1979

RICHARD C. PARKER, PhD, of Los Angeles, of cancer about a year and a half ago. According to Jeffrey Mayne (PhD, '84), "He had been fighting it since very shortly after he left Caltech, first as a postdoctoral fellow at UCSF, and later as a faculty member at Columbia." Columbia has set up the Richard C. Parker Memorial Fund since his death.

Trustee

JAMES E. OLSON, Trustee, of Short Hills, New Jersey, of cancer. Chairman and chief executive officer of AT&T, Mr. Olson played a key leadership role in the redesign of AT&T following divestiture, especially in the aggressive moves to extend the company's business internationally and in the restructuring of its manufacturing organization. Mr. Olson was a graduate of the University of North Dakota and the University of Pennsylvania's Institute of Humanistic Studies. He was a member of the board of directors of the Chase Manhattan Corporation, Caterpillar, Inc., the Warner-Lambert Co., the Mobil Corporation, as well as of the Council for Aid to Education Inc.; the National Legal Center for the Public Interest, and the Business Committee for the Arts. He was chairman of the U.S.-Japan Council and of the United Way Tri-State, and was a trustee of the American Enterprise Institute, and the Conference Board. He was also a member of the Business Roundtable, the Business Council, and the Business Higher Education Forum of the American Council on Education. He was deeply concerned about the quality of American education, especially its availability to minorities. He is survived by his wife, Jean; son, James; daughter, Mrs. Bruce Paterson; a brother; and two sisters.

## PERSONALS

1927

RUSSELL E. THOMPSON, of Alhambra, California, celebrated his 60th wedding anniversary on March 31.

1937

MARTIN H. WEBSTER, of Los Angeles, has been elected to serve a second two-year term as chairman of the board of advisors of the UCLA Medical Center. He is also active in the Caltech Alumni Literary Group, an organization Webster co-founded 35 years ago.

1939

LLOYD R. ZUMWALT, PhD, is professor emeritus of nuclear engineering at North Carolina State University, Raleigh.

1941

REUBEN P. SNODGRASS, MS '42, retired in 1987 after 20 years with Grumman Aerospace, flight-test department. His last position there was as operations manager — automated telemetry system, a real-time computerized flight-test facility. Last winter, Snodgrass traveled to Leningrad, USSR, to compete in the world championships of DN iceboats. He and his wife, Virginia, live in Lake Ronkonkoma, Long Island, New York.

1942

MYRON POLLYCOVE is director of the department of nuclear medicine, San Francisco General Hospital. He also holds a faculty post at UC San Francisco, as professor of laboratory medicine and radiology in the School of Medicine. He is now serving as president of the American College of Nuclear Physicians and director of the American Board of Nuclear Medicine.

CARL H. SAVIT, MS '43, was named by the Houston Intellectual Property Law Association as the recipient of its 1988 Outstanding Inventor Award. Savit, who holds over 40 U.S. patents, was recognized for his inventions relating to improved methods for obtaining and processing seismic data, inventions that have had a significant impact on the offshore oil and gas exploration industry. Savit recently retired as a senior vice president of technology at Western Atlas International, Inc. (formerly Western Geophysical Company), where he had worked for almost 40 years. In 1970-71, Savit served on the White House staff, assisting the President's science advisor in the areas of earth, sea, and air sciences.

1943

LEON BLITZER, PhD, has retired as professor emeritus of physics, at the University of Arizona, Tucson.

PETER DEHLINGER, MS, PhD '50, became professor emeritus at the University of Connecticut, as of January 1987. During his 18-1/2 years there, he served as professor of geophysics and, for eight of those years, as director of the university's Marine Sciences Institute.

1944

JOSEPH B. (BEN) EARL, a resident of Arcadia, California, was honored this spring by the American Cancer Society, Northeast Los Angeles County Unit. Earl, president of O.K. Earl Corporation (a Pasadena-based architectural, engineering, building, and realty firm), was praised for his leadership and support in the fight against cancer. A former president of the Society's local unit, Earl is a longtime volunteer of the organization and now serves as chairman of the major gifts committee. His firm helped the Society procure new office space in 1987.

1946

MIKE FOSSIER, MS, ENG '47, technical vice president of Raytheon Company of Lexington, Massachusetts, was selected this year as a Fellow by the American Institute of Aeronautics and Astronautics. Fossier was recognized for his contributions to the development of radar-guided homing-missile technology. Since joining Raytheon in 1950, he has been a pioneer in the fields of missile design and guidance technologies. His work was incorporated in the Hawk and Sparrow missile programs — the leading radar-guided missiles for the U.S. and its allies since 1960.

EBERHARDT RECHTIN, PhD '50, retired as president of the Aerospace Corporation in December of 1987. He is now on the faculty of the University of Southern California, where he has established the nation's first academic programs for systems architecture and related fields. "The Space Station, the Strategic Defense Initiative ('Star Wars'), and the Worldwide Military Command and Control System are a few examples of systems of such vast complexity that their conception is not so much a matter of traditional engineering as it is architecture," Rechtin said in a recent interview published in the *Los Angeles Times*.

WILLIAM C. STOOKEY, of Fullerton, California, received an Outstanding Engineering Merit award this spring, one of three awards given by

the Institute for the Advancement of Engineering. Stookey, an engineer and city planner, is co-founder and chairman of Willdan Associates in Anaheim, California. He was recognized for his ability to "consummate difficult engineering programs in the politically sensitive municipal arena."

1947

KURT MISLOW, PhD, has received a number of awards during the last three years, among them: the Prelog Medal of the E.T.H. (Zurich) in 1986, the William H. Nichols Medal of the American Chemical Society's New York Section in 1987, and the Scientific Achievement Award Medal of the CCNY Alumni Association in 1988.

1948

GEORGE J. GLEGHORN, JR., MS, PhD '55, vice president and director, product integrity, of TRW's Space and Technology Group, received a Distinguished Engineering Alumnus Award from the University of Colorado's College of Engineering and Applied Science, Boulder. Gleghorn was recognized for his role in some of the nation's most notable space accomplishments during the past three decades.

DONALD E. LOVELACE, of Carson City, Nevada, has retired into a life of music. He plays trumpet with his local community band, which went on a two-week concert tour in eastern Australia this summer. Among their gigs was a concert at Expo '88.

1950

CAREL OTTE, JR., MS, PhD '54, has been selected as a member of the National Academy of Engineering. A resident of La Canada-Flintridge, California, he is president of the geothermal division of UNOCAL. Otte has served as chairman of the U.S. Department of Energy Advisory Committee on Geothermal Energy and was a Distinguished Lecturer for the Society of Petroleum Engineers in 1980. Recipient of Caltech's Distinguished Alumni Award in 1984, Otte is a member of the Associates and a former president of the Caltech Alumni Association.

1952

WILLIAM L. WISE, an electrical engineer in Mountain View, California, has developed a way to make robot arms "smarter." Wise has submitted patent applications in Europe, the U.S., and Asia for a technique that would regulate feedback in closed-loop circuits. "With this technique," Wise told the San Jose Business Journal, "a robot arm could pick up a boulder and then a feather, and do both with the same precise performance."

1953

DAVID JOHNSTON is living in Zhouxian, in the People's Republic of China, working as a research geophysicist on contract with China's Petroleum Bureau.

RONALD L. RICHMOND, MS, PhD '57, has retired as chief engineer, advanced engineering, at Ford Aerospace in Newport Beach, California, where he had worked for 28 years. He is now a part-time adjunct faculty member at the University of California, Irvine, teaching aeronautical design.

1954

WILLIAM E. DIBBLE, PhD '60, professor of physics at BYU, has won an Alcuin Fellowship. Awarded by the university to recognize outstanding contributions to general education and honors, the fellowship provides research, curriculum, and professional development support for three years.

ROLAND S. MILLER, MS '55, has returned from the Far East (where he had lived for 17-1/2 years) to take a job in Sacramento as project director of the multi-billion dollar California prison construction program.

1956

ALAN M. POISNER is returning home to Kansas City this summer after a sabbatical year in North Carolina at the National Institute for Environmental Research in Research Triangle Park and at Duke University. His next trip is an 18-day tour to Japan and the Orient.

1957

RAY H. WHITE, of San Diego, California, teaches physics and computer science at the University of San Diego. In his free time, he bicycles — his last major tour took him up the coast to San Francisco. His son Ken works at JPL; daughter KAREN ('85) is a graduate student at Columbia, studying mathematics; and his youngest son, Peter, is a student at UC Berkeley, majoring in physics.

1958

TRACY L. ATHERTON, JR., MS '60, is the president of Alcatel Business Systems in Milpitas, California. ABS is a group of business communications and data systems companies in the U.S. formed from a joint venture between ITT and CGE in France.

RICHARD W. FIDDLER, of Seattle, Washington, has been elected to a third three-year term as director of the Sierra Club, the national environmental organization.

GEORGE D. LEAL, MS, chief executive officer of Dames & Moore, Los Angeles, has been named a Fellow by the American Society of Civil Engineers. During his 29 years with Dames & Moore, engineering and environmental consultants, Leal has directed a number of geotechnical and environmental projects.

WILLIAM G. WAGNER, PhD '62, has served, since 1987, as the dean of Interdisciplinary Programs and Developmental Activities at the University of Southern California, where he has been professor of physics and electrical engineering since 1969. He currently is an advisor for NSF, in the area of emerging engineering technologies. Wagner writes that he and his wife are proud parents of four children, ages 19, 17, 16, and 14.

1959

AKIRA KOBAYASHI, MS, professor in the Institute of Interdisciplinary Research at the University of Tokyo, has been appointed professor in the department of materials science, faculty of engineering. Since 1986, he has served as a national delegate of Japan for the international committee on aeronautical fatigue. He is also chairman of the Japanese organizing committee for the fourth Japan-U.S. Conference on Composite Materials, held in Washington, D.C. in June 1988; and general vice chairman of the seventh International Conference on Composite Materials, to be held in Beijing, People's Republic of China, in 1989. He is director for both the Japan Society for Aeronautical and Space Sciences and the Japan Society for Composite Materials.

1960

JAMES L. FARMER, recently promoted to professor of zoology at BYU, was awarded an Alcuin Fellowship by the university in recognition of his outstanding contributions to general education and honors. The award will provide funding, over the next three years, for research, curriculum, and professional development.

1963

RICHARD C. BLISH II, MS '64, PhD '67, of Saratoga, California, is with Intel, as manager of

ASIC assembly quality and reliability engineering. His children are following in his science-sized footsteps: Spencer is studying computer science engineering at Arizona State while daughter Cathy, a senior in high school, is considering a college major in genetics or premed, perhaps at Caltech or UC Davis.

1964

MARK LEVINSON, PhD, professor of mechanical engineering and director of the technology and society project at the University of Maine (on leave 1987-89) has been awarded an NSF History and Philosophy of Science Senior Fellowship for 1989. The fellowship is intended to enable him to continue his historical research in airfoil theory, design, and selection in the United States and Germany during the period 1880-1922. He will be a research associate in the department of history at the University of Washington while holding the fellowship.

1965

ROGER L. HOOKE, PhD, is on sabbatical this year and plans an extensive travel program: to Norway, Sweden, Hawaii, Australia, and New Zealand, and (most important, he writes) to Maine.

GIULIO V. VENEZIAN, PhD, is an associate professor of physics at the College of Charleston, South Carolina, where he teaches the engineering courses. He is also the state coordinator for JETS, and the engineering advisor for the engineering transfer option at the college.

1966

RONALD L. CONSTABLE has left his post at Lockheed (where he worked for 20 years) to accept the position of manager of systems integration at Northrop's Ventura division. He's building a house in Camarillo, California.

1969

RICHARD R. BURKE, MS, is manager of electronic communications for the Summer Institute of Linguistics, a nonprofit corporation dedicated to seeing the world's unwritten languages (about 3,000) transcribed, the speakers of the languages (approximately 300 million) taught to read their mother tongues, and then the translation of the Bible into each of these languages.

1970

ERIC B. JENSEN was married to Deborah Feder in January 1987, at the Caltech Alumni House. In November, he left The Aerospace Corporation to join the Hughes Aircraft Company as a senior scientist in the advanced programs organization, space and strategic systems division, electro-optical and data systems group.

LAHMER LYND, PhD, of Glastonbury, Connecticut, was among the 14 United Technologies Research Center scientists and engineers cited by the Research Center for their achievements in 1987. Lynds and two other colleagues were the first to demonstrate how to make superconducting thin films using the laser ablation deposition technique with near-infrared laser radiation.

MICHAEL R. SPERRY has moved back to Colorado, and is working as a senior engineer at NBI in Boulder.

1971

DAVID P. HILL, PhD, is taking a leave from his post as research scientist at the U.S. Geological Survey in Menlo Park, California, to spend six months at E.T.H. in Zurich, Switzerland, where he will teach a graduate seminar in seismology.

1972

MARK S. WRIGHTON, PhD, the Frederick G. Keys Professor of Chemistry and head of the chemistry department at MIT, is the 1988 reci-

ipient of the American Chemical Society Award in Inorganic Chemistry. Wrighton was recognized for his contributions to developing new catalysts, new electronic devices, and new approaches to converting solar energy to useful forms of energy such as electricity and chemical energy. He holds nine patents and is the author or coauthor of over 200 publications. In 1983, he was awarded a MacArthur Prize fellowship.

1973

JAMES E. CRAIG, MS, PhD '77, works for Spectron in El Toro, California. As part of a team involved with the Lidar in Space Technology Experiment for NASA Langley, he will participate in the design, fabrication, and integration of a space-qualified laser for a Space Shuttle flight in the 1990s.

GERALD A. NAVRATIL has been named chairman of the department of applied physics and nuclear engineering at Columbia University. Navratil and his wife, Joan Etzweiler, live in Manhasset, New York, with their three daughters, Frances, Alexis, and Paula.

JONATHAN V. POST is living with his wife in Pasadena, California.

1974

JAMES M. STANA, MS, is a staff engineer and task leader for the Martin Marietta LANTIRN program, in Orlando, Florida.

1975

ANN ELIZABETH CLEMMENS and husband, Gary Ferland, have moved to Ohio State in Columbus. Previously, they were at the University of Kentucky, where Clemmens earned her PhD in statistics (in 1986) and Ferland was an astronomer. Their first child, Peter Andrew, was born April 2, 1987.

KATHRYN D. CROSSLAND has begun an oncology fellowship at the University of Washington, in Seattle, after finishing an internal medicine residency there. Her son, Noah, was born on April 30, 1987.

WILLIAM J. SHARMAN and wife, Aly, had their first child, Morgan, in March 1987. They live in Tucson, where Sharman works for Hughes.

1976

JAN L. HILLSON, MS, is a fellow in rheumatology and biochemistry at the University of Washington, in Seattle. She is married to David R. Haynor, and they have two sons: Sam (2 years) and Ben (4 months).

HUGO E. HUEY has returned to Varian Associates, Palo Alto, California, to lead the gyrotron development group for electron cyclotron heating of fusion plasmas.

CLIFFORD LEONG married Lani Haeyung Chu on April 2. Since graduation, Leong has completed an MS in mechanical engineering at the University of Michigan and an MBA at the University of Hawaii. Leong lives in San Diego, where he is an engineering supervisor for General Dynamics' Convair Division. Wife Lani is a senior programming analyst for The CompuCare Co.

1977

THOMAS D. SNYDER received the highest score on the Illinois CPA exam, and is now working in the tax department of Arthur Anderson & Co. in Chicago.

1979

PHILIP G. CORMIER has been transferred to Offutt Air Force Base, in Omaha, Nebraska, where he works on computer simulations and modeling.

WILLIAM D. JONES II, PhD, professor of chemistry at the University of Rochester, has been awarded a Guggenheim Fellowship for the 1988-89 year. Jones will conduct research on the photochemical behavior of organometallic complexes. His project involves the study of reactive compounds that may convert oil products into other useful substances.

PETER G. SCHULTZ, PhD '84, associate professor of chemistry at UC Berkeley, has won the National Science Foundation's prestigious Alan T. Waterman Award. Schultz will receive a medal and NSF grants of up to \$500,000 to fund research and advanced studies over the next three years. His research interests center on the interface of chemistry and biology. NSF, in making the award, singled out his work in the investigation of catalytic antibodies as especially important.

1980

KENNETH H. BRITTEN received his PhD in neurobiology from SUNY, Stony Brook, in 1987.

S. SHEVAUN (GILLEY) DUIKER and husband, HENDRIK M. (MATT) ('84), are parents of daughter Brenna, born January 20, 1988. Shevaun is in her second year of a family-practice residency in Denver. Matt is working on his PhD in theoretical physics at the University of Colorado.

1981

JOSEPH E. SHEPHERD, PhD, became an assistant professor at Rensselaer Polytechnic Institute in 1986.

1982

ANDREW W. MAVERICK, PhD, has taken a new position as assistant professor of chemistry at Louisiana State University, in Baton Rouge.

1983

RI-CHEE CHOU completed a PhD degree in electrical engineering (in electromagnetics) last August and has been an assistant professor of electrical engineering at Ohio State University since September, 1987.

J. NICHOLAS GROSS has recently graduated from Loyola Law School in Los Angeles. After a summer vacation in Maine, he will begin working as an associate specializing in intellectual property with the law firm of Spensley, Horn, Jubas & Lubitz in Century City, California.

ROBERT KANNE, MS, a physics teacher in Yorba Linda, California, married Diane Dillon November 28 at the chapel in Yosemite Valley.

BJORN E. MATTHIAS is finishing his work at LAMPF for a PhD in physics from Yale. He and wife, Susanne, are expecting their first child.

1985

BRIAN H. DAVISON, PhD, who is with the Oak Ridge National Lab in Knoxville, has been appointed adjunct professor of chemical engineering at the University of Tennessee.

BRUCE C. FAUST, PhD, joined the faculty of Duke University in November of 1987, as a research assistant professor of environmental chemistry.

ANIRVAN GHOSH is a graduate student in the Stanford neurosciences program, working on the development of the visual system. He and LEEANNA MORELAND ('86) were married in Palo Alto on October 17, 1987. LeeAnna works at Lockheed Missiles and Space Co., and is studying for her master's in mechanical engineering at Stanford.

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