

CALTECH NEWS

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Four distinguished alumni honored

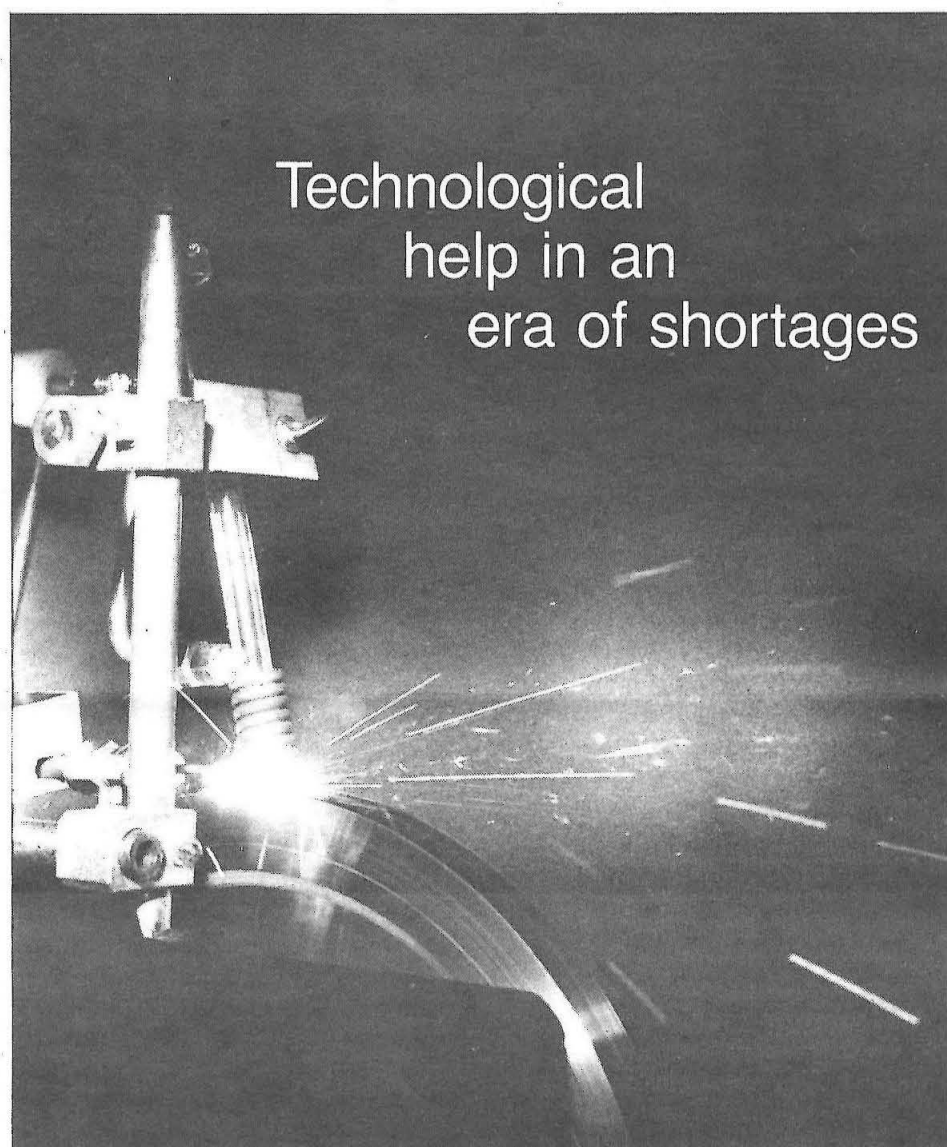
Caltech conferred its highest honor—the Distinguished Alumni Award—on four of its graduates during the Seminar Day general session. They are Moshe Arens (MS '53), an aerospace engineer who is a member of Knesset (Israel's parliament) and chairman of its Defense and Foreign Affairs Committee; John R. McMillan (BS '31), a leader for many years in the petroleum industry; Eugene N. Parker, (PhD '51), Distinguished Service Professor, Department of Physics, Department of Astronomy and Astrophysics, The University of Chicago; and George M. Whitesides (PhD '64), the Haslam and Dewey Professor of Chemistry, MIT.

On hand to receive his 1979 Distinguished Alumni Award was Robert Wilson (PhD '62), Nobel laureate in physics.

Arens, as vice president of engineering with the Israel Aircraft Industries, played a major role in the development of the Gabriel missile, the Westwind executive aircraft, and the Kfir fighter. He left the company in 1971 to found his own consulting firm (Cybernetics, Inc., in Savyon, Israel), and to enter politics. He was elected to Knesset in 1973.

McMillan's career in petroleum production, distribution, exploration, and management spans 50 years, having begun in 1927 when he worked as a draftsman while a Caltech student. He was successively with Barnsdall Oil Company, the Fullerton Oil and Gas Corporation, Monterey Oil Company, and Humble Oil &

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Technological help in an era of shortages

The country is experiencing a materials crisis as well as an energy crisis, alumni were told on Seminar Day. William L. Johnson (assistant professor of materials science) explained that costs of traditional materials are skyrocketing as supplies decrease, and that new technologies are creating a demand for new kinds of materials. This machine in Johnson's laboratory demonstrates an approach toward meeting the need. Here a melt spinning technique is used to form ribbons of metallic glass. A metal is melted with a radio frequency or heater coil, and forced by gas pressure onto a wheel that is rotating at about 60 miles per hour. The metal in its new form is spun off and cooled at a million degrees per second. Metallic alloys created by this technology may have greatly improved strength and ductility as well as magnetic and semiconducting properties. Researchers in Johnson's laboratory are experimenting with a variety of alloys to determine their potentials.

Those elusive little neutrinos: Do they have mass, after all?

Neutrinos, they are very small.

They have no charge and have no mass

And do not interact at all.

The earth is just a silly ball

To them, through which they simply pass,

Like dustmaids down a drafty hall

Or photons through a sheet of glass.

This is how John Updike described neutrinos in his poem, "Cosmic Gall." But now it looks as if Updike's description may be only partially correct.

Neutrinos are known as the "ghost" particles of the universe because they can zip through solid matter — even the earth — as if it didn't exist. Recent scientific studies

have shown that these elusive atomic particles may be a key to several major scientific mysteries, ranging from the nature of the sun to the evolution of the universe. This is because the studies have indicated that neutrinos, formerly believed to be without mass, may have mass after all.

Caltech physicists are among those conducting such neutrino studies, and their experiments — both current and planned — are contributing important information to the debate. Next fall they plan a series of experiments that they believe will provide an excellent opportunity to detect neutrino mass, if there is any to detect. Results of their current work do *not* indicate mass — in conflict with one much-publicized experiment — but more definitive data are needed.

The Caltech researchers, led by Professor of Physics Felix H. Boehm, include Research Fellow Alan Hahn, graduate student Heemin Kwon, Research Fellow Jean Luc Vuilleumier, and Research Associate Petr Vogel. Caltech Senior Design Engineer Herbert Henrikson was responsible for construction of the experimental apparatus. In their efforts the scientists are collaborating with colleagues at the University of Munich and the Institute for Nuclear Science (ISN) in Grenoble, France.

Boehm explains that neutrinos come in three forms — electron neutrinos, muon neutrinos, and tau neutrinos. Until now, scientists believed that neutrinos did not oscillate between these forms but remained in only one state. Over the past few years, researchers around the world have designed and carried out several experiments to detect oscillations — and thus far, conclusions are mixed. (If neutrinos oscillate then they must have mass, because basic physical theories hold that a massless particle cannot undergo such transformations.)

Please turn the page

The current crop of experiments is aimed at detecting oscillations in electron neutrinos spewing out of nuclear reactors as a result of fission in the reactor core. Such a discovery could have profound effects on broad areas of physics and astronomy. For example, the oscillations could explain "the mystery of the missing solar neutrinos." Solar physicists measuring electron neutrinos streaming from the sun have been highly perplexed to discover that only one-third as many of the particles were detected as had been predicted by theory.

If neutrinos *do* oscillate, then the "missing" ones could simply be those that change from the electron form to another form on their journey to the earth.

Another important effect of neutrino mass would be on theories about whether the universe is "open" or "closed." If neutrinos have even a little bit of mass, then the total mass of the universe is much greater than scientists have estimated. This increase would be enough to settle the debate over whether the universe is "open" and will expand forever, or "closed" and massive enough to eventually reverse its expansion and collapse back upon itself.

Recently a much-discussed neutrino experiment by Frederick Reines and his colleagues at the University of California at Irvine yielded results indicating that neutrinos do oscillate. Reines used the 2,000-megawatt nuclear plant at Savannah River, South Carolina, as a neutrino source. According to the Irvine scientists, the number of electron neutrinos that they detected coming from the core was extremely low — so low that they concluded that the neutrinos must be oscillating into other forms.

But a similar Caltech experiment, using a 57-megawatt research reactor in Grenoble, did not find the same evidence for neutrino oscillations.

(Results of other neutrino oscillation experiments may soon be reported by researchers at the Moscow Institute of Theoretical and

Experimental Physics, the Brookhaven National Laboratory, and the European Organization for Nuclear Research.)

In their experiments, the Caltech scientists used a detector system about a cubic meter in size that consisted of alternate layers of two kinds of particle detectors. One layer consisted of cells of "scintillation liquid," a chemical that produces a minute flash of light when it interacts with an atomic particle called a positron. This flash of light is detected by photo-multiplier tubes. The other layer consists of a chamber full of an isotope of helium that interacts with neutrons to produce electrical pulses.

Although intense streams of neutrinos emerge from the reactor core, only occasionally does one interact with the "scintillation liquid." When this interaction takes place it results in a positron, which produces a flash of light, and a neutron, which is registered by the helium detector.

The combined detectors help the scientists to distinguish between neutrinos from the reactor core and the cosmic ray particles that constantly bombard the earth. The neutrinos from the reactor core produce a unique "signature" of signals from the detectors that cosmic rays do not.

After two years of constructing the apparatus at Caltech, and one year of assembly and testing at Grenoble, the experiment began in November 1979. In operation, the apparatus detected about 1.5 neutrino interactions per hour — a number not indicative of neutrino mass, the scientists believe. But their results don't rule out the possibility of oscillations of smaller mass parameters and amplitudes, and they plan new experiments to investigate this possibility.

For these experiments they will increase the distance between the detector and the nuclear reactor core from the current 8.7 meters to 38 meters, and eventually to 65 meters. The increased distance will give the neutrinos emerging from the core a better chance to oscillate.

To increase the detector-to-core distance, the scientists needed a more powerful neutrino source than the one in Grenoble, so they are moving their experiment to the 2,700-megawatt power reactor at Gösigen, Switzerland. They plan to install their apparatus in the reactor over the summer, and to begin gathering data this fall.



Arnold Beckman carves a cake with eight candles—one for each decade. Mrs. Beckman watches.

A special birthday gift: the Beckman Professorship is endowed

Arnold O. Beckman (chairman of the Board of Trustees, emeritus) was entering his ninth decade, and the event was cause for a warm celebration in the Athenaeum and for accolades from friends and colleagues.

Reminiscing about his days as an assistant professor of chemistry at Caltech at an annual salary of \$3,000 a year, Beckman (PhD '28) took the tributes with characteristic modesty. He recalled a saying that praise is "like a gift of good perfume. Use it sparingly and enjoy it but, for God's sake, don't swallow it."

Board of Trustees' Chairman R. Stanton Avery opened the informal after-dinner program, suggesting that a committee be formed right away to begin planning a 90th birthday party. Reminiscing about Beckman's career, Harry Gray presented him with an original Model G pH meter—the device that launched Beckman Instruments.

This pH meter was specially prepared for its designer, encased in a plexiglas case with gold hinges and enscribed with one of the industrialist's favorite sayings:

"There is no satisfactory substitute for excellence." Along with the pH meter went a basket of lemons, a reminder that it was a request for a way to measure lemon juice acidity that triggered the invention. (Gray is the William R. Kenan, Jr. Professor and professor of chemistry, and chairman of the Division of Chemistry and Chemical Engineering.)

But the most exciting announcement was made by Caltech President Marvin L. Goldberger, who told the group that, in less than five months, \$1 million had been raised to endow the Arnold O. Beckman Professorship of Chemistry. The funds were raised from friends, colleagues, and former students of Beckman by a committee headed by William F. Ballhaus (PhD '47), president of Beckman Instruments.*

Goldberger said that a chemist of international stature will be named to the professorship that is named for Beckman.

Then Professor of English J. Kent Clark sang "Beautiful Beckman," the title song from the Caltech Stock Company musical by that name (written by Clark in 1974 to honor Mabel and Arnold Beckman and Beckman Auditorium) and he introduced a new set of lyrics to characterize Beckman's life: "Strictly Instrumental in an Instrumental Way." To close what was a warm and special evening among good friends, the guests then joined Clark in his lyrical tribute to Caltech's long-time "best friend."

*Members of the committee to endow the professorship include Ballhaus, Mrs. Anna Bing Arnold, R. Stanton Avery, E. H. Clark, Jr., Robert R. Dockson, Lee A. DuBridge, J. R. Fluor, Harry B. Gray, Fred L. Hartley, Robert C. Hill, Jack K. Horton, Earle M. Jorgensen, John B. Kilroy, Frederick G. Larkin, Jr., Carson R. McKissick, Henry T. Mudd, R. J. Münzer, William H. Pickering, Robert F. Six, H. Russell Smith, Lowell Stanley, and Harry J. Volk.

Distinguished Alumni honored

continued from page 1

Refining Company, and he was founder of Reserve Oil & Gas Co. This year he supervised Reserve's merger with Getty Oil.

McMillan was given the Distinguished Service Award by the Society of Petroleum Engineers in 1971, and in 1974 he was named a fellow of the Institute for the Advancement of Engineering. He was president of The Caltech Associates in 1969.

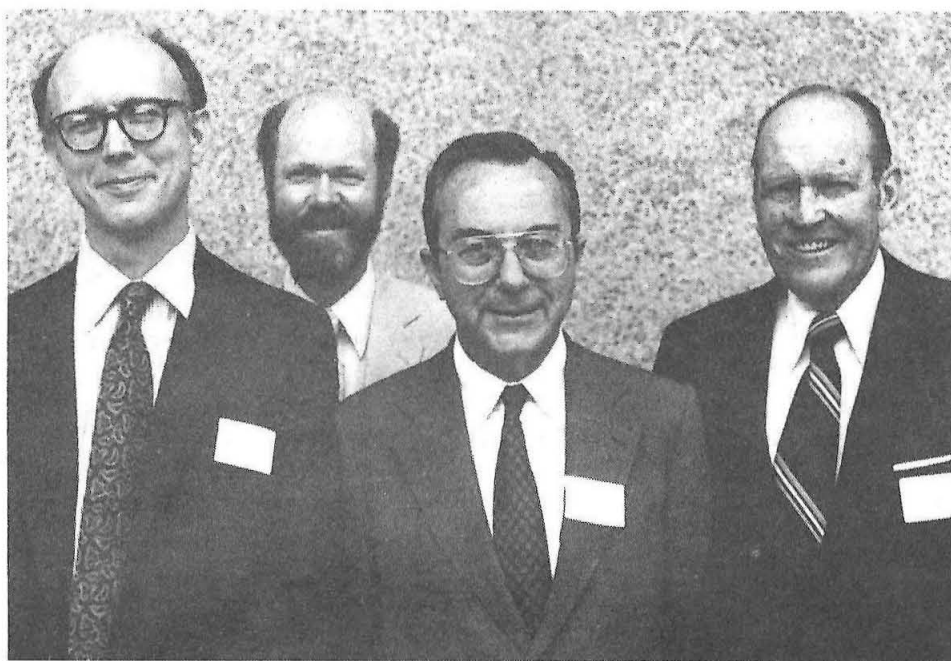
Parker, one of the country's outstanding theoretical astrophysicists, is recognized for his impact on the space program and on NASA planning. He has been involved in the theoretical study of the production of magnetic fields in moving plasmas and the theory of solar and stellar winds. More than 20 years ago he made a theoretical prediction of the existence of the solar wind and an analysis of its properties—work of great importance in space exploration.

He is a member of the National Academy of Sciences and has received the George Ellery Hale Award of the Solar Physics Division of the American Astronomical Society and the Chapman Medal of the Royal Astronomical Society.

Whitesides is known for his contributions to the theory and practice of organometallic chemistry, especially of transition metals, and for work in magnetic resonance. He also has been a leader in developing stereochemical probes for reactions occurring at transition-metal carbon bonds, and currently is conducting research in enzyme technology. He has been elected to NAS and to the American Academy of Arts and Sciences.

Hughes lauded

T.J.R. Hughes, associate professor of structural mechanics, is the co-recipient of the Melville Medal of the American Society of Mechanical Engineers. He and W.K. Lin, a Caltech graduate student, received this honor for a two-part paper, "Implicit-Explicit Finite Elements in Transient Analysis. Part I — Stability Theory, and Part II — Implementation and Numerical Examples," in the June 1978 issue of the *Journal of Applied Mechanics*.



Distinguished Alumni honored at the Seminar Day general session: George M. Whitesides, Robert Wilson (who was not present to receive his award in 1979), Moshe Arens, and John R. McMillan. Honored in absentia was Eugene N. Parker, a 1980 recipient.

Science, art, music, drama — it's Seminar Day

An embarrassment of riches—from research talks by 13 faculty members to improvisational theater to exhibits of electric cars, radio astronomy dishes, and gemstones, to a display of contemporary art and a concert by the Caltech Glee Club—all awaited alumni, their husbands, wives, and children, on Alumni Seminar Day. Some 1,350 people came to the campus to enjoy the offerings.

At noon luncheon was served, picnic style, in the Athenaeum and its courtyard while on a knoll by Winnett Student Center, members of a newly formed theater group, the Caltech Players, performed improvisational drama.

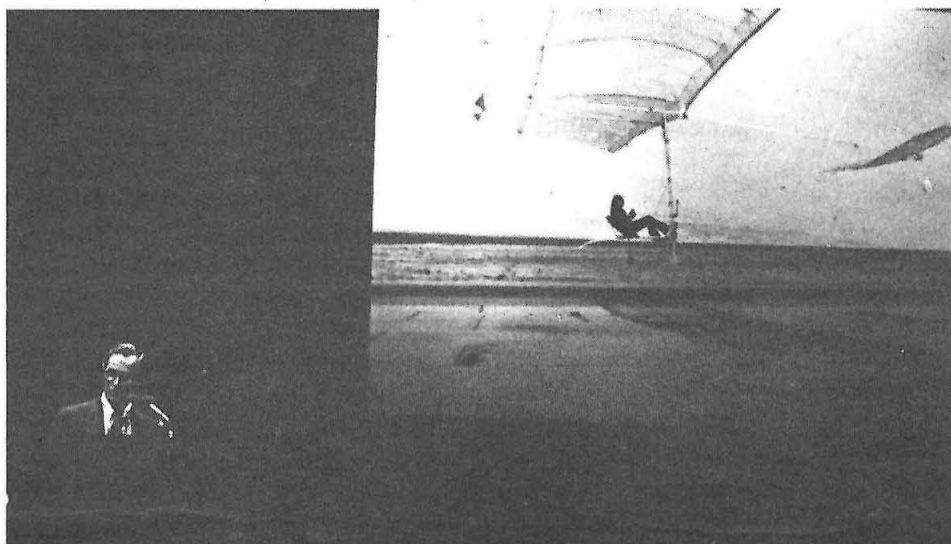
Over the noon hour, guests viewed radio astronomy dishes under construction on campus that are destined for Owens Valley Radio Observatory and Mauna Kea in Hawaii. They peered into the

interiors of electric and hybrid autos being tested at JPL, and heard about the future of alternative cars from JPL engineers. Caltech authors autographed their publications at a book sale sponsored by Friends of Caltech Libraries.

At the general session, Paul MacCready (MS '48, PhD '52) showed a movie of the flight of his creation, the Kremer-Prize-winning, man-powered Gossamer Albatross.

"Man can't outdo birds," MacCready observed, "but now he has joined them."

After the last research seminar, the audience relaxed over wine and cheese in the President's garden, and then over dinner in the Athenaeum. The annual spring concert of the Caltech Glee Club concluded a busy day, as Glee Club alumni joined student members at the end of the concert in singing the Caltech alma mater.



The audience at the Alumni Seminar Day general session broke into spontaneous applause as the Gossamer Albatross — its journey recorded in a movie shown by Paul MacCready — landed on the coast of France after its human-powered flight across the English channel.

Phyllis Jelinek moves to Alumni Association helm

Phyllis Jelinek has been named executive director of the Caltech Alumni Association. She succeeds James B. Black, who has resigned to become vice president for university affairs at the State University of New York at Stony Brook.

Jelinek has been with the Alumni Association since 1974 as assistant to the director, carrying major responsibility for many of the programs that she will continue to manage. Her responsibilities as executive director will include managing all alumni events, directing the alumni office, and acting as liaison between the Association and the Caltech administration.

Jelinek earned a BS degree in French from UC Irvine and an MS degree in library science from



California State University Fullerton, and studied for a year at the University of Bordeaux in France. Before coming to Caltech she taught English and French in high school and in adult education programs. A native Californian, she is a member of the Council for the Advancement and Support of Education and of the American Association of University Women.

As executive director, Jelinek said she hopes to develop programs to meet an increasingly wide variety of alumni interests, and to continue to expand chapter activities to involve alumni in other parts of the country. Moving into the new Alumni House this fall will open up many new opportunities for Association programs as well as chances to work more closely with students, she noted.

Black came to Caltech in 1968 as executive director of the Alumni Association and additionally has served as director of public relations and publications, community relations, and legislative affairs.

Caltech contributes four to NAS membership

Two Caltech faculty members, one of them an alumnus, and two other alumni have been elected to the National Academy of Sciences. They are among 59 new members of the Academy elected for "distinguished and continuing achievements in original research."

The new members are Caltech Professor of Paleocology Heinz A. Lowenstam, Caltech Professor of Geology Eugene M. Shoemaker (BS '47, MS '48), Richard G. Brewer, BS '51, an IBM Fellow with the IBM Research Laboratory, San Jose, California; and Sidney R. Coleman (PhD '62), professor of physics, Lyman Universities, Harvard.

Brewer has been active in laser physics in the area of nonlinear interactions of intense laser light with molecules. Coleman was elected for contributions to theoretical high energy physics.

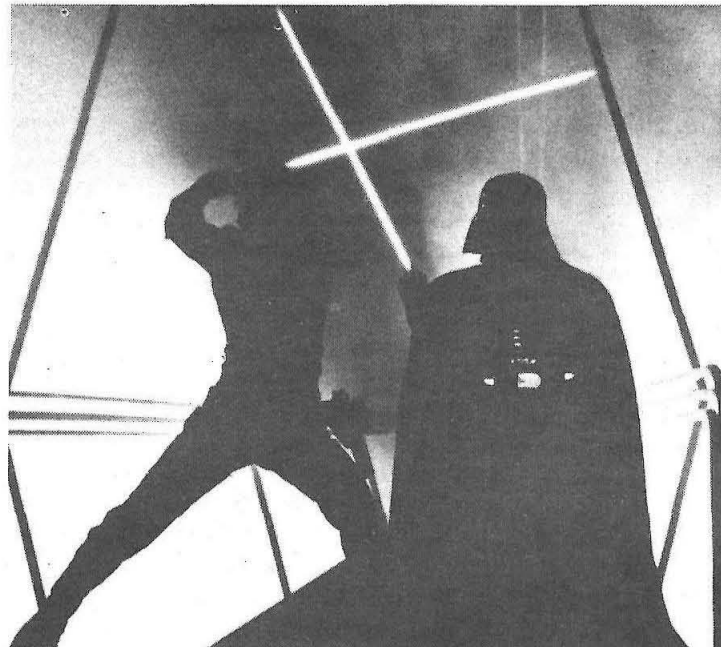
The election of Lowenstam and Shoemaker to the Academy brings to 52 the number of NAS members on the Caltech faculty. Lowenstam, who came to Caltech in 1952, has concentrated his research on proteins and minerals and other substances produced by marine organisms, and on their use as indicators of the progress of evolution. Comparisons of the structures of such proteins with those of proteins in modern animals can help us understand evolutionary changes.

Lowenstam's latest work includes a study of minerals produced by living organisms and how to distinguish them from inorganically produced minerals.

Shoemaker's career has included research both at Caltech and with the U.S. Geological Survey. Besides his work as a research geologist at the survey, he served as chief scientist at the Center of Astrogeology in Flagstaff. A veteran of the lunar exploration program, he was involved in the Ranger and Surveyor programs and from 1965 to 1970 was a principal investigator for geological field investigations for the Apollo lunar programs.

His other research has included exploration for uranium deposits and salt structures in Colorado and Utah, research on the geology and

The Empire Strikes Back in Beckman Auditorium



On the day that hundreds of Star Wars fans were filing into Kennedy Center for the world premiere of Star Wars V: The Empire Strikes Back, members of the Caltech community were treated to their own special showing in Beckman Auditorium. The preview was arranged by Dennis Stanfill, president, chairman, and chief executive officer of Twentieth Century-Fox Corporation, and a member of the Caltech Board of Trustees. Caltech donors were guests at an early evening viewing while students watched a showing at 10 p.m. Above: Donors queue up outside Beckman Auditorium to see the latest encounter between Luke Skywalker and Darth Vader (at left). Stanfill not only obtained the film for the event but also presented the Institute with a new screen on which to project it. Twentieth Century Fox provided two 35-mm projectors and a Dolby sound system.

geochemistry of the Colorado Plateau, studies of the structure and mechanics of meteor craters, a search for planet-crossing asteroids, and studies of the magnetostratigraphy of sedimentary rocks.

Morgan to vice presidential post

James J. Morgan (professor of environmental engineering science) became vice president for student affairs on Sept. 1, and David Wales (professor of mathematics and associate dean of students) has been named dean of students, according to President Marvin L. Goldberger.

Morgan succeeds Ray D. Owen (professor of biology), who has served as vice president for student affairs and as dean of students since 1975. Owen is now returning to full-time teaching and writing. Wales has been associate dean of students since 1976.

Goldberger praised Owen for his "sensitivity, ability, and concern in working with students," and said that his efforts have "enormously enhanced the quality of student life on the campus."

"With Jim Morgan as the new vice president, and David Wales continuing his work with students as dean, this tradition will certainly be carried on," he added.

Morgan has served Caltech in several roles since joining the faculty in 1965; he has been academic officer for environmental

engineering science and chairman of the faculty. Dean of students for three years, he relinquished those duties to become executive officer for environmental engineering science. Wales came to Caltech in September 1967 as a Bateman Research Fellow after obtaining his PhD degree from Harvard.

Hood to head Biology Division

Leroy E. Hood (BS '60, PhD '68, the Ethel Wilson Bowles and Robert Bowles Professor of Biology) is the new chairman of the Division of Biology. He succeeds Norman H. Horowitz (PhD '39, professor of biology), who is returning to full-time research.

Hood, who received his MD degree from the Johns Hopkins School of Medicine in 1964, has concentrated on research on the functioning of the immune system. Among his awards is a Camille and Henry Dreyfus Teacher-Scholar Grant in 1974 for outstanding teaching. He has been active as faculty adviser to students planning to attend medical school, and has organized conferences to aid public understanding of scientific issues.

Hood's current research includes an attempt to determine the structure of interferon, a highly promising natural body substance for fighting cancer and virus diseases. He has also been involved in research on the genetic control of the immune system (that is, how sequences of DNA are translated by the living cell into protein antibodies to fight disease).

An asteroid by any other name wouldn't honor William Hicks

If William Hicks (BS '42) were to enter a contest for unusual birthday presents, he would surely win first place. At a party to celebrate his birthday this spring, Hicks learned that an asteroid was being named for him.

The object, christened "2220 Hicks," was discovered at Palomar Observatory in November 1975 by Senior Scientist Eleanor Helin. Before the asteroid could be named, it had to be observed in three successive revolutions around the earth. Helin made the third such observation this spring.

Helin has been working with Eugene Shoemaker (professor of geology) to locate a class of asteroids with orbits that cross that of the earth. Shoemaker's asteroid search has been a beneficiary of Hicks' support for the Division of Geological and Planetary Sciences.

Hicks, a member of The Caltech Associates who heads his own bulk systems engineering firm, was surprised at his party with a cake from Shoemaker and Helin bearing the asteroid's new name and number. Now he's found a convenient way to sign his notes to these two friends. If "William Hicks" seems too long and formal, "2220" is a handy substitute.

Alumni House to be center for Association programs

Come September 1, the Caltech Alumni Association will have its own alumni house: a turn-of-the-century residence at 345 South Hill Avenue that is owned by the Institute. The two-story white frame structure is located two doors north of the Industrial Relations Center and two doors south of the public relations house.

With meeting rooms, reception areas, and a kitchen, the house will offer a central location for alumni activities now in scattered locations: The Alumni Association, the Alumni Fund (which will continue as part of the Institute's development program), and the Alumni Placement Office. Downstairs rooms will be used for social events and board and committee meetings, and upstairs rooms will be used as offices.

Carel Otte, Jr. (MS '50, PhD '54, 1979-80 president of the Alumni Association) explained that the Association is raising \$90,000 to renovate it and will maintain it after it is open. Contributions are welcome.

Letters

Dear *Caltech News* Editor:

It was with great sadness that I learned in *Caltech News* of the almost-simultaneous deaths of two persons who meant a great deal to me during my education: Alfred Stern and Jon Mathews.

Until I took his course in philosophy and literature, I shared the view of Professor Stern as a little old man who insisted on wearing dark suits and a homburg on the warmest days, and who went around the campus doing peculiar things like tipping his hat and opening doors for ladies.

But what a remarkable experience his class was! Stern would greet us, each in his native tongue (he knew about 20 besides English) and would embark on incredibly wide-ranging discussions in which the philosophical zeitgeist of an era was related to its major literary productions, and vice-versa.

Only a man of near-universal learning could have accomplished the feat of conveying to our (by

contrast rather unlettered) diverse group the riches of 2,500 years of civilization, making it live and breathe for us. I think I can speak for my classmates who shared my good fortune in saying that we have been better all our lives for his teaching.

I was also fortunate enough to have taken Jon Mathews's course, Mathematical Models of Physics, at the same time that I studied philosophy with Stern. Mathews's course was one of the most difficult, yet rewarding, I ever took, and Mathews was one of the clearest and most helpful expositors I have encountered. I've subsequently taught courses in mathematical physics many times, sometimes using Mathews and Walter as a text, sometimes not, but always recommending it for the personal library of every serious student and working physicist.

I have also tried to embody in my own teaching a technique used by Mathews for which we hated him at the time (I exaggerate; we liked him but hated the method) but which in retrospect did more for my development as a scientist than any other single thing.

I refer to his habit of assigning problems long before he discussed their treatment in class. This educational heresy forced us to learn to solve *new* problems by not being afraid to tackle problems for which no one had taught us a solution. It was our first taste of the spirit of independent research, and I have no doubt that everyone in Mathews's class greatly benefited from this method.

Finally, Jon Mathews was also my adviser in my senior year, and I want to say that his advice was always helpful and to the point. I probably would never have dared to contemplate a career as a professor of physics without his encouragement.

With grateful memories of these fine men, I remain,

Sincerely yours,

Julian Noble (BS '62)
Associate Professor of Physics
The University of Virginia
Charlottesville

Did Fleming House's mythical student, Alluvial Fansome, inspire Ricketts House's mythical student, Alfonso Bedoya, or vice versa? This was Randy Cassada's question in the April

Caltech News. Now Donald R. Lindsay (Ex '46) writes to describe the Hollywood antics of Bedoya (although he isn't sure how this colorful character came to live in Ricketts House).

Dear *Caltech News* Editor:

I'm here to throw light on the origins of Alphonso Bedoya (not Bedouya). He was one of Hollywood's most lovable character actors (1904-1957). He is described in Leslie Halliwell's *Filmgoer's Companion* as a "Mexican character actor whose beaming face could provide comedy or menace."

He drew acclaim as the bandit, "Gold Hat," in *Treasure of Sierra Madre*. Humphrey Bogart took a shot at him from a train and lived to regret it when he was confronted at a water hole by Bedoya who said: "Hey, I know you!"

He gave George Murphy a rough time in *Border Incident*, but was totally miscast as an Asian in *The Black Rose*, a truly crummy movie starring Tyrone Power. He was lovable again as the Mexican ranch hand in *The Big Country*. When tenderfoot Gregory Peck was about to attempt to ride a murderous horse he asked Bedoya for "any last words of advice," which were: "Don't do e-e-eet!"

As a Ricketts freshman, he clearly predates Fleming's Al Fansome. Whether Fansome ever had the honor of meeting Bedoya is still a mystery.

Sincerely,

Donald R. Lindsay (Ex '46)
Staff Geological Engineer,
Shell Oil,
Houston

Dear *Caltech News* Editor:

I'm writing in reference to the new *Caltech News* format. I was editor of the *Throop Tech*, as I believe it was called, the undergraduate weekly in 1920. At that time the paper was a private enterprise of the editor and business manager, and both of them had been expelled for avid criticism against the "establishment," particularly against then President James A. B. Scherer, over a rank growth of weeds from California Street to San Pasqual from the front of Throop Hall to Wilson Avenue.

Wynne Mullin (BS '21), who had been selling advertising, and I were called in by the retiring owners and offered the lucrative plum if we'd take solemn oaths to continue the muckraking without mercy. This we did and before the ink was dry on our first edition I barely escaped expulsion.

When Mullin and I took over we transferred the printing to an aggressive little shop on Union Street which housed the early Pasadena "underground," a shrill little sheet specializing in (as close as they could get to) criminal libel anent Pasadena millionaires and the Pacific Electric Railway. We were in good company.

Many tidbits got into our paper that we didn't know about until it was printed, and the responsibility for them was that of a long-legged unshaven Irishman called Murray the Printer who ran the linotype at the print shop and had secret editorial ambitions. Murray had come into a vast quantity of slick paper and made us a proposition to use it that we couldn't refuse. Our one sheet had the exact appearance of the *Caltech News* until now. Naturally when I saw your new format I wondered whether Murray the Printer's vast supply of slick paper had finally run out.

Sincerely,

Art Garfield (BS '22)

Garfield lives in Encinitas, California. He is retired.

Ed. note: Murray the Printer kept raising his prices to match those of all the other printers, so Caltech News was finally forced to go elsewhere. Too bad!

"Many thanks to those who have contributed to the ongoing collection of Caltech legends, pranks, and perpetrations," writes Willard Dodge (BS '44, MS '47). "Further contributions are very much welcome and should be sent to: Willard A. Dodge, Jr., P.O. Box 1105, Novato, California 94947."

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"After looking at the Grand Canyon from the rim, people of a certain spirit must descend into it," a writer observed, and another noted that "within those red walls exist innumerable little worlds and hundreds of hidden paradises."

The chance to make this descent and explore those hidden worlds with three Caltech geologists was a lure irresistible to the alumni who joined the Alumni Association's April trek to the canyon floor. Within a few weeks after it was publicized, the five-day trip was fully subscribed.

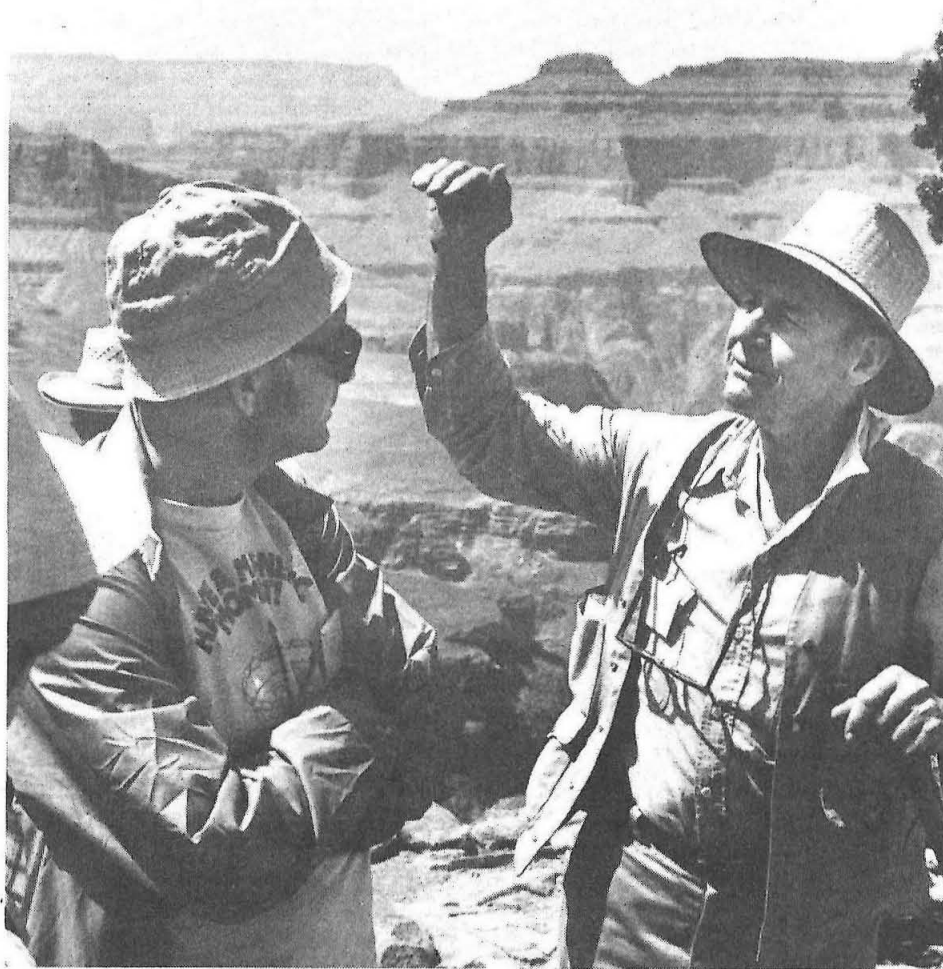
Planning, under way since the idea was conceived two years earlier, culminated as the group, along with Professor of Geology, Emeritus, Robert Sharp and Professor of Geology Eugene Shoemaker, boarded a bus on campus at 7 a.m. and, coffee and doughnuts in hand, headed east over the Mojave Desert.*

Sharp took responsibility for describing the geology along the bus's route in California, keeping up a fluent and entertaining dialogue over a three-hour span. Equally fluent in his descriptions, Shoemaker took the microphone as the bus crossed the Colorado River, entered Arizona, and climbed onto the Colorado Plateau.

In Williams, where the alumni stopped for a steak dinner that evening, they were joined by Carolyn Shoemaker and a third geologist, Sue Kieffer. (Kieffer, MS '67, PhD '71, is with the U.S. Geological Survey in Flagstaff.) Then they pressed on to the canyon rim to bed down in the Thunderbird Lodge before rising early the next morning to enter the canyon, packs on backs, via the Kaibab Trail. During the descent, the trekkers clustered in three bunches around the geologists, the better to absorb commentary about the structures they were passing.

The canyon, they soon learned, is much less monolithic than it looks from the top, and it is full of

**Leon Silver had helped plan the trip but could not accompany it; he had joined in orienting the alumni to the canyon's geology at dinner the evening before.*



Caltech geologist Robert P. Sharp shares his knowledge with alumni.

The canyon works its magic

by Winifred Veronda

precipices, amphitheaters, buttes, slopes, spires, temples, spectacular vistas, and nameless shapes in red, gold, pink, rust, green, orange, and mauve—and with little streams, and a rich variety of vegetation. Along the Kaibab Trail the hiker descends 4,800 feet in 7.1 miles, traversing almost 2,000 million years of geological history.

The group stopped for lunch at Cedar Bluff and then pressed on, several members meanwhile discovering previously undetected flaws in the fit of their hiking boots. That evening, with five passenger mules trailing behind (two of them eventually were pressed into service), the caravan of hikers began to trickle into Phantom Ranch about 4:15 p.m., 15 minutes after the Park Service's curfew on beer and wine service. Lemonade and iced tea provided a welcome substitute in temperatures above 90 degrees.

After laying claim to bunks in the 10-person dormitories (Eugene Loh, MS '53, PhD '54, narrowly missed

being assigned to the women's dorm because there was no other spot for him, but a place opened up in a men's dorm when the Shoemakers decided to move their mattresses outside to sleep beside Bright Angel Creek), the hikers met in the dining hall for dinner.

After dinner they gathered under an almost-full moon in an outdoor amphitheater, surrounded by pines and by 2,000 million-year-old Precambrian granitic rocks of the basement complex of the North American continent. Sue Kieffer talked about her research in vulcanism at Mount St. Helens, and Bob Sharp reminisced about a revered absent-minded geology professor at Harvard. (Challenged to remember during an entire field trip that his graduate assistant's name was Dave, the prof met the challenge by calling everybody "Dave" until all were back on campus.)

The next day, alumni chose among hikes led by each of the three resident geologists. The majority joined Shoemaker's walk beside the banks of Bright Angel Creek toward the canyon's north rim (billed as "leisurely"). A few tough-footed souls joined Bob Sharp on a hike up the Clear Creek

Trail, Gene Loh fashioning a sun hat out of a paper bag. At noon the group lunched under an overhang, leaning against a discontinuity where adjacent rock strata were separated by 1.5 billion years of geological history.

Another cluster of alumni followed Sue Kieffer up to the Tonto Plateau and then down a series of ledges into Cremation Canyon. Here Kieffer, an accomplished flutist, tried out the canyon acoustics as she played selections from Brahms and Telemann. Meanwhile, back at camp, alumni were becoming increasingly pragmatic. Confronted with a blister and no way to break it, one individual pressed the corner of her name tag into service.

After a steak dinner that evening, alumni gathered for another seminar under the stars as Carel Otte (MS '50, PhD '54), president of Union Oil's Geothermal Division and of the Alumni Association, described his firm's programs to develop geothermal energy resources. Then it was off to bed to rest up for the biggest challenge of the trip: a ten-mile hike out of the canyon via Bright Angel Trail.

Some of the hikers were quietly uneasy the next morning. Ages generally ranged from 40 into the 60s—a span within which humility has begun to temper physical verve. Five passenger mules and a muleskinner would follow them out but no one wanted to be the first to have to mount one of the animals. And above them the trail in places would turn into a series of innumerable switchbacks on the face of a sheer cliff where hikers walk 60 feet in one direction, then turn and walk 60 feet in the opposite direction—all to gain an altitude of ten feet.

Alumni fanned out along the trail, some heading straight for the top with unswerving tenacity, others digressing to enjoy the scenery. Wildflowers were at their best. Bill Lundy (BS '47, MS '48) counted 40 varieties along the trail. A light cloud cover shielded the hikers during most of the climb, an event that sparked remarks about Caltech's guardian angel.

By 1:10 the first hikers—Dorothy Semenow (PhD '55), Fred Felberg (BS '42, MS '45) and Bob Zurbach—crested the canyon rim. By 4 p.m. the last hikers emerged. The mules, somewhere down the trail, had remained out of sight and passengerless during the entire climb.

"Congratulations! We weren't sure you could do it," Shoemaker told the group over cocktails. "You shocked the socks off us. We're proud as punch of all of you!"

Bob Sharp continued, "To go down into the canyon and come up out of it is an experience 99 and 44/100 percent of the population will never have. No one can take it away from you and the more you share it the more it will mean."

Then the group presented Sharp, Shoemaker, and Kieffer with certificates commending them for "information, encouragement, and help far beyond reasonable expectations." "You really shouldn't thank us," Sharp responded. "We just took you into the canyon and let it work its magic. The spell of the canyon makes people one big family."

The geologists then presented gifts, gathered in the canyon, to trip coordinators Phyllis Jelinek (then assistant to the director of the Alumni Association) and Janet Black (wife of the director). Jelinek received a 1,700-million-year-old pegmatite dike with two major crystals intruding Precambrian Vishnu schist, and Black was given a choice piece of Tapeats sandstone from the Tonto Platform.

As the trip wound down and the group gathered for dinner in El Tovar Hotel, no one wanted to separate. "I feel as if I made 40 new friends," one commented, and another added, "The group was marvelous."

"If the Alumni Association were to announce another trip now, I would guess two-thirds of these people would sign up for it, no matter where it was going," someone remarked.

Next morning the group, foot-sore and leg-sore but happy, boarded a bus to return to California. They stopped for lunch at a little park in Yarnell, Arizona, and for dinner near San Bernardino. Planning a reunion to share slides, they pulled into the Caltech parking lot still feeling the euphoria induced by friendship and by the canyon.

The trip was over but its effects would continue. For, in the words of one 60-year-old participant, "As I climbed out of the canyon, I felt that if I could do this then I could do a lot of other things that I hadn't thought were possible."

"And now I'm going to do them."

WALTER B. GRIMES, who appeared in our April obituaries, is alive and well in Chico, California. Our apologies!

Tech sports review

Basketball

The 1979-80 basketball season hit a high this year, with a total of four victories for the season. The first league win in nine years was over Pomona-Pitzer by a score of 57-51.

The season was a success in other ways as well. Senior Joe Zasadzinski broke the school record in rebounds, with 115 for 12 continuous games. Junior Gary Tornquist set a new school record for free throws, 84.7 percent, and was the leading scorer for the year with 294 points. Senior captain Pete Edwards set a record for assists with 31 for 12 conference games, and he received the Vesper Award as the Most Valuable Player. Edwards was also selected to represent Caltech in the NAIA District III All-Star Game. Bob Golden was honored with the Carl Shy award, presented to the best freshman basketball player, and Greg Blaisdell, second in rebounds, was chief dunk shot artist.

Men's swimming

This year Clinton Dodd replaced Ed Spencer as coach of the swimming and diving team. Ed left Caltech to coach the AAU team at Industry Hills. Caltech's men's team swam to a 2 and 6 record, beating both Whittier and Redlands, and narrowly missing another victory against Pomona-Pitzer.

Two new school records were established this year. The old record of 7:52.7 for the 800-yard free relay was smashed to 7:42.14 by Dave Huff, Björn Matthias, Brent Stuart, and Chris McKinnon, all freshmen. McKinnon was also able to lower the 400 individual medley mark from 4:34.60 to 4:25.17, which qualified him for the NCAA championships, held on March 21. He came in 25th overall in the nation.

Many other team members contributed to making this a fine season: freshmen Chuck Lindsey and junior Terry Thomason in diving, and freshmen Steve Chin and Greg Schenter and sophomore Joe McIntyre in breaststroke. Distance swims were led by freshmen Greg Sayles and backstroke by junior Todd Olson. The short events were swum by sophomore Kurt Bachmann and freshman Mike George. "We had several excellent swimmers who had to miss the season because of academic loads this winter," reports Coach Dodd, "so I'm looking forward to next year when we have the depth that is needed to upset a few good teams."

Women's swimming

The women's swim team lacked the numbers to post a win, but its members were not short on enthusiasm and speed as they competed in this year's season. Led by senior Lynn Hildemann's diving and freshman Loren Alving's all-around aquatic talents, the team posted five new school records. The most startling was the destruction of the 800 free relay record by more than 14 seconds — to 9:14.58 — by Hildemann, junior Bonnie Blamick, Alving, and Sue Fuhs. Senior Fuhs also set a new 50-yard breaststroke record of 39.2, while Alving broke the 100-yard butterfly (1:10.2) and 100 individual medley (1:11.1) as well as tying the 50-yard butterfly (30.5). Rounding out the field were sophomore Cathy Kirschvink, who swam the 200s, and freshman Gloria Badilla, who swam the distance.

The total team effort was highlighted by a narrow two-point loss to highly rated Occidental. Oxy took the early lead, but the Caltech women battled back with the help of a few first and second finishes from Alving and Kirschvink, while Hildemann placed first in the two diving contests. The five Caltech swimmers who swam that day narrowly missed upsetting the much larger and faster Oxy squad. A job well done.

Team captain Hildemann, a three-time conference champion, qualified for the 3-meter diving AIAW championship in Pennsylvania on March 15, in which she came in 32nd in the nation.

Wrestling

After last year's wrestling team almost faded out of existence, this year's rebound in team fortunes is remarkable. Three freshmen — Mike Ammon at 134 pounds, Bob Shoemaker at 142 pounds, and John Humphrey at 150 pounds—joined upperclassmen Randy Okubo at 118 pounds and team captain Kurt Runge at 177 pounds to form a small but strong squad. Coach Bob Davies brought a new enthusiasm to the program with his unique style of coaching, combining body throws and bad jokes with superb conditioning to lead the team to a second place finish in the SCIAC championship.

The season got off to a good start when last year's entire team, junior Kurt Runge, returned and brought several Page House members with

him. (Next season's prospects dwindled somewhat when junior Runge announced that he was senior Runge and would graduate at the end of the year. The team members bemoan the fact that whenever they get a really good wrestler, he graduates in just three years. They hope this year's group of frosh will not be so precocious.)

In the dual meet season the Tech grapplers wound up with a 2-5-1 record, not too bad for a five-man squad meeting full ten-man teams. The final SCIAC championships showed the true mettle of the team as all five members reached the finals, taking three firsts and two seconds. No other team placed all its men in the finals, although Claremont-Mudd, with four individual champions, prevailed in team scoring over Caltech — 85 to 52 — by dint of fielding a full team.

Mike Ammon added the 134-pound league championship to his third-place finishes in the Caltech Invitational and Coddington Memorial tournaments and finished the year with the school's best record of 11 wins and 3 losses. Bob Shoemaker also pinned his way through the tournament to add league championship to his third place finish in the Coddington tournament. The third individual champion was Kurt Runge, who added the championship to his third at the Coddington and fourth at the Caltech tournament, earning the Tom Latham Trophy as the outstanding wrestler at Caltech. Randy Okubo, wrestling at 126 pounds, and John Humphrey each took second in the league tournament.

The future looks fairly bright for the Tech team next year because most of the wrestlers are expected to return. They will have to adjust to a new coach, though; football and wrestling coach Bob Davies is moving on to Fullerton, where he will concentrate on football.

Attention all alumni: 1978-79 President's Report

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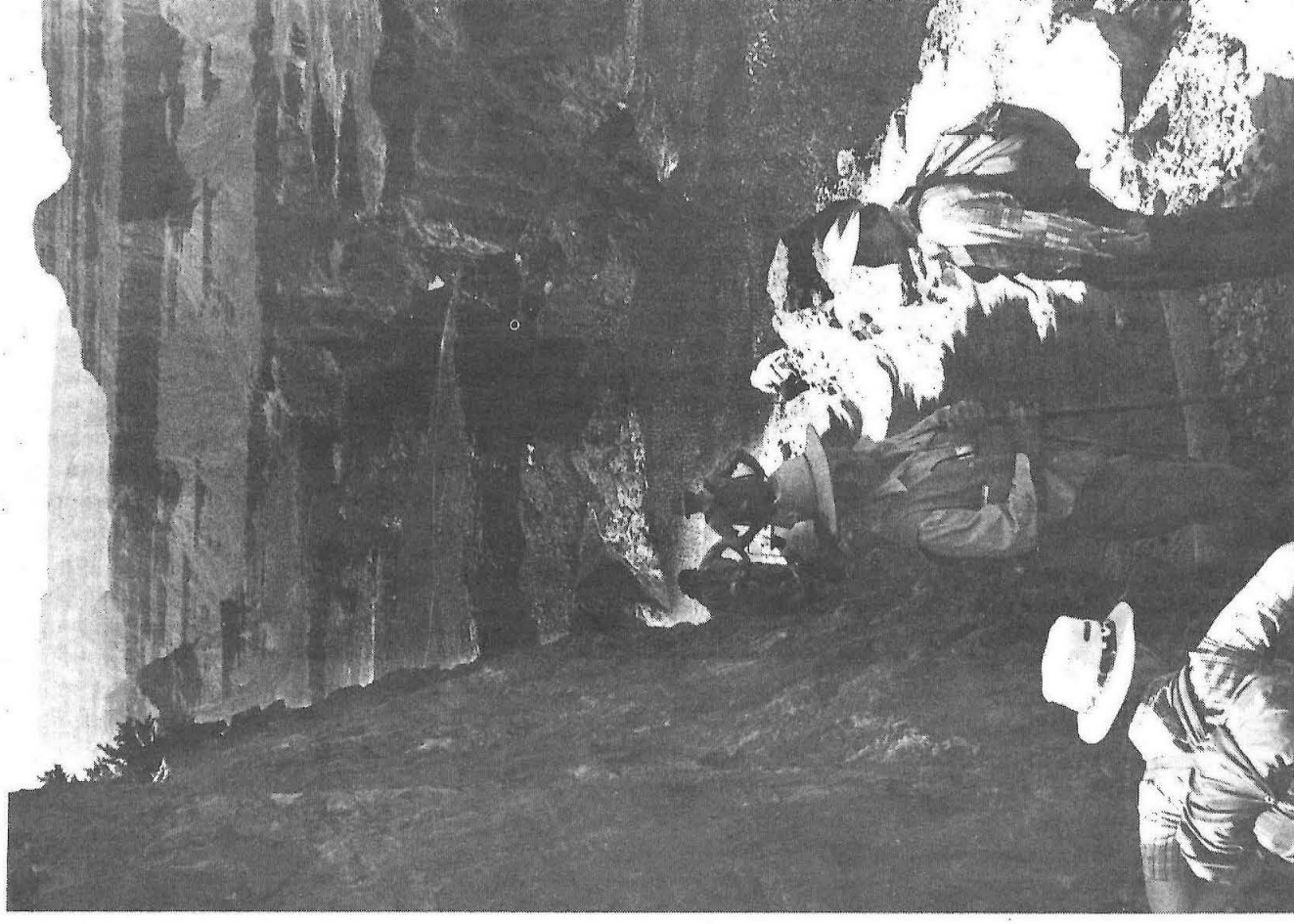


One of history's low-profile losers is the man who flunked Einstein in elementary school arithmetic. Caltech students decided the teacher was due some belated recognition for this blooper, and so this spring they celebrated P. Ephraim Schultz Day on the Olive Walk with food, music, balloons — and even elephant rides.

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Alumni hike down the Kaibab Trail on a trek to the bottom of the Grand Canyon.