Volume 15, Number 2 April 1981

CALTECH NEWS

Biologists' goal: mass production methods for interferon

Caltech biologists have embarked on a project to determine the structure of and develop mass production methods for producing a little-understood form of human interferon. A natural substance produced by the body, interferon appears to trigger the immune system and has shown promise as a potential treatment for cancer and for diseases caused by viruses. But its wide use has been prevented by its scarcity, and scientists are attempting to solve this problem by creating interferon through sophisticated genetic engineering techniques.

Two of these scientists at Caltech—Leroy E. Hood and Michael W. Hunkapiller—have been awarded a $312,000 grant by the John D. and Catherine T. MacArthur Foundation of Illinois to analyze "immune" interferon, one of three basic types of the substance. Hood is the Ethel Wilson Bowles and Robert Bowles Professor of Biology, and Hunkapiller is a senior research fellow in biology.

The other two types of interferon, leukocyte interferon and fibroblast interferon, have already been objects of successful structural determination and mass production, but immune interferon has not. According to Hood, its unique properties and extremely low concentrations in cells have thwarted efforts to understand and produce it. But since immune interferon appears to be especially active against tumors, it is potentially attractive as an anti-cancer drug.

In their research, Hood and Hunkapiller will collaborate with

Continued on page 2

Kelp: a future energy source?

PhD candidate Lisa Anderson (BS '74) grows young kelp plants under rigorously controlled conditions as she attempts to learn what metal nutrients (and what forms of these nutrients) will speed the kelp's growth rate. Her insights can help environmental engineering scientists to discover the most effective nutrients for offshore kelp farms—now being developed experimentally as an energy resource. Here Anderson adjusts the flow of air to the kelp plants. She works with Professor of Environmental Science Wheeler J. North and Professor of Environmental Engineering Science James J. Morgan.

On board the space shuttle: Caltech student research

When the space shuttle takes off on a mission in 1983 it will be carrying six experimental projects planned by Caltech students. The projects will be part of NASA's "Getaway Special" program, enabling small experiments to be carried aloft on shuttle missions for about $10,000 each. Caltech reserved two such payloads for student experiments.

At the Institute, a 20-member Student Space Organization (SSO), headed by student project manager Ralph Weeks, has selected six projects from a number of proposals, and over the next two years the students will plan, build, and test the experiments, receiving academic credit in several types of independent courses, including applied physics, biology, electrical and mechanical engineering, and materials science.

On the shuttle, the experiments will be housed in two small self-contained canisters, each slightly smaller than an oil drum, mounted along the sides of the cargo bay.

Weeks, a senior majoring in engineering, said the project offers students a valuable experience because "it allows undergraduates total responsibility for developing engineering projects of major proportions. We do the work and we take the credit or blame for the outcome."

In one experiment, the students plan to sprout oat seeds aboard the shuttle, to determine the minimum levels of gravity that plants can detect. The seeds will be grown in a special centrifuge that will expose them to a range of gravitational forces, all lower than those on earth.

In another experiment, the SSO will study how a growing fungus avoids barriers. According to current theory, the growing tip of a fungus emits a gas, and air convection circulates the gas; the fungus is then able to detect a physical barrier by sensing the gas reflected by the barrier. Since most convection is produced by the pull of gravity, little or no convection should exist in gravity-free space, and the fungus should be insensitive to the presence of barriers. The Caltech experiment should help determine if this is true.

In a third experiment, the students will melt alloy components and then recrystallize them. Experiments aboard the Apollo-Soyuz mission indicate that, in gravity-free space where gravity-induced convection does not spoil crystal formation, it should be possible to produce much stronger magnets than on earth. The Caltech students want to see if this is actually the case.

In another experiment, the student researchers will build a device to partially dissolve crystals of a salt compound, to study how this

Continued on page 3

Research goal: synthetic interferon

Continued from page 1

Vilcek of the New York University Medical Center, who will provide purified human immune interferon, and Christian Anfinsen at the National Institutes of Health, who will chemically synthesize fragments of interferon to be used in detection systems.

Hood and Hunkapiller will begin by using highly sensitive protein sequencing instrumentation to determine part of the structure of the immune interferon. They have used their sequenator, 1,000 times more sensitive than other devices of its kind, to determine the partial structure of other interferon molecules. This information was then used as the basis for mass production techniques by other researchers.

Able to analyze samples of less than a millionth of a gram, the sequenator can snip apart samples of interferon, unit by unit, and chemically analyze each unit. Like other proteins, interferon is made up of a string of units called amino acids, and the sequence of the different kinds of amino acids determines the protein's properties.

After determining the partial sequence of the immune interferon molecule, the scientists will use the recombinant DNA techniques to develop mass production methods.

On the cover

Shock-wave flow patterns around a body traveling at supersonic speeds are captured on film in this photograph from the Caltech archives. Theodore von Kármán, the first director of GALCIT and co-founder of JPL, contributed to the theory of drag of projectiles such as this one. In April, the Caltech community celebrates the 100th anniversary of von Kármán's birth.

Three Caltech historians awarded NEH fellowships

Three Caltech faculty members—all historians—have been awarded 1981-82 fellowships for Independent Study and Research from the National Endowment for the Humanities (NEH).

Daniel Kevles, Robert Rosenstone, and Eleanor Searle, professors of history, are among 50 recipients of NEH fellowships in history that were given this year. These fellowships are awarded to scholars who have made significant contributions to thought and knowledge in the humanities.

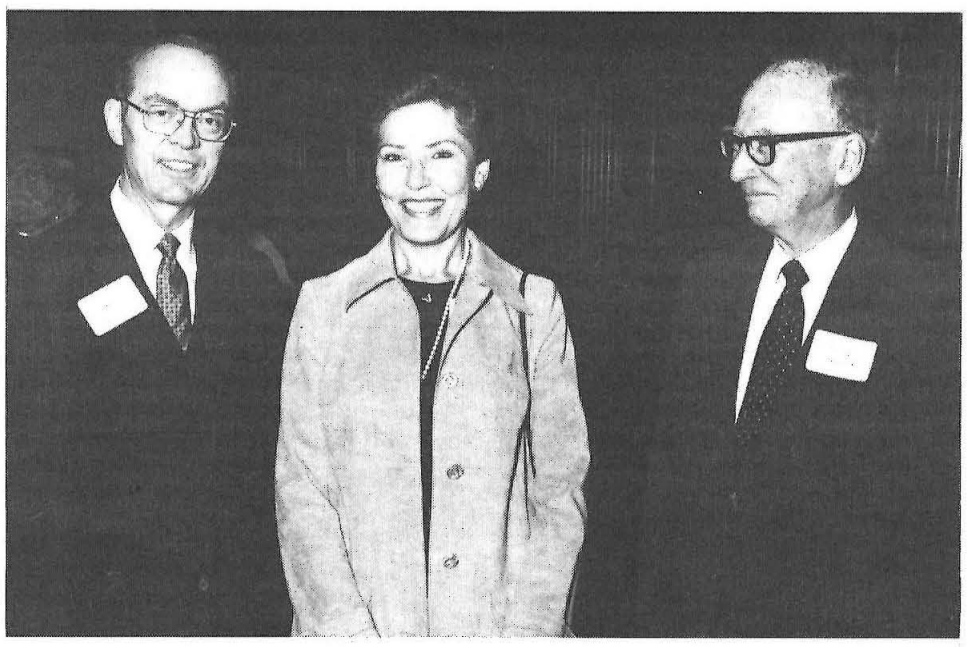
Kevles will use his NEH grant to continue his research on the social uses of genetics, from eugenics to genetic engineering, in the United States and Britain. His work will be incorporated into a book he is writing for Alfred Knopf, scheduled for completion in 1983. In his current study he is particularly interested in the interaction of science and human values and in the moral and ethical questions raised by the advances in genetics.

Historian Searle, who has been at Caltech since 1979, is a specialist in medieval history, with emphasis on the institutions of marriage and the family. She will use her award to accept a post at Clare Hall, Cambridge University, England, where she will continue her research on the property rights of women from the 10th through the 13th centuries.

Under his NEH grant, Rosenstone will continue the research that led to his article, "Learning from Those 'Imitative' Japanese," recently published in the *American Historical Review*. This work develops Rosenstone's contention that Japanese culture had a significant, and hitherto unnoticed, impact on the 19th century missionaries, businessmen, and technicians who went to Japan to "teach" Western religion and technology.

The Associates welcome their new members

The Associates welcomed 48 new members in February at a dinner in the Athenaeum where they heard Kip Thorne describe black holes and their role in modern astrophysical research. (Thorne is professor of theoretical physics at Caltech.) Above: Mr. and Mrs. Frank Dale with Mr. and Mrs. Ernest M. Clark, Jr. (The Dales are new members; the Clarks are contributing members of The Associates.)



Mr. and Mrs. George Rothell with Ralph W. Jones. (The Rothells are contributing members; Jones is a member of The Associates' Board of Directors and a contributing life member of the organization).

Caltech to celebrate von Kármán's 100th birthdate

The 100th anniversary of Theodore von Kármán's birth (May 11, 1881) will be celebrated on April 21 at a banquet in the Athenaeum. T. A. Wilson, MS '48, chairman of the board and chief executive officer of The Boeing Company, Seattle, will be the featured speaker. Co-sponsors of the banquet are the Graduate Aeronautical Laboratories of the California Institute of Technology (GALCIT) and the Theodore von Kármán Professorship Committee.

Wilson joined Boeing in 1943 as an aeronautical engineer. He became overall project engineer of the B-52 program and then led the proposal team that won the Minuteman intercontinental ballistic missile program for the company. Wilson was named president of Boeing in 1968, chief executive officer in 1969, and chairman of the board in 1972. He continues as chief executive officer.

Von Kármán joined Caltech in 1930 as the first director of GALCIT and went on to develop the laboratory into the world's leading center for research and education in aeronautics. His example and leadership were largely responsible for putting American aeronautics on a sound scientific foundation.

After World War II, working through NATO, he led in the development of international cooperation in aerospace engineering. He co-founded Caltech's Jet Propulsion Laboratory and was the founding president of the Aerojet-General Corporation.

Surveying the slippery side of Caltech history

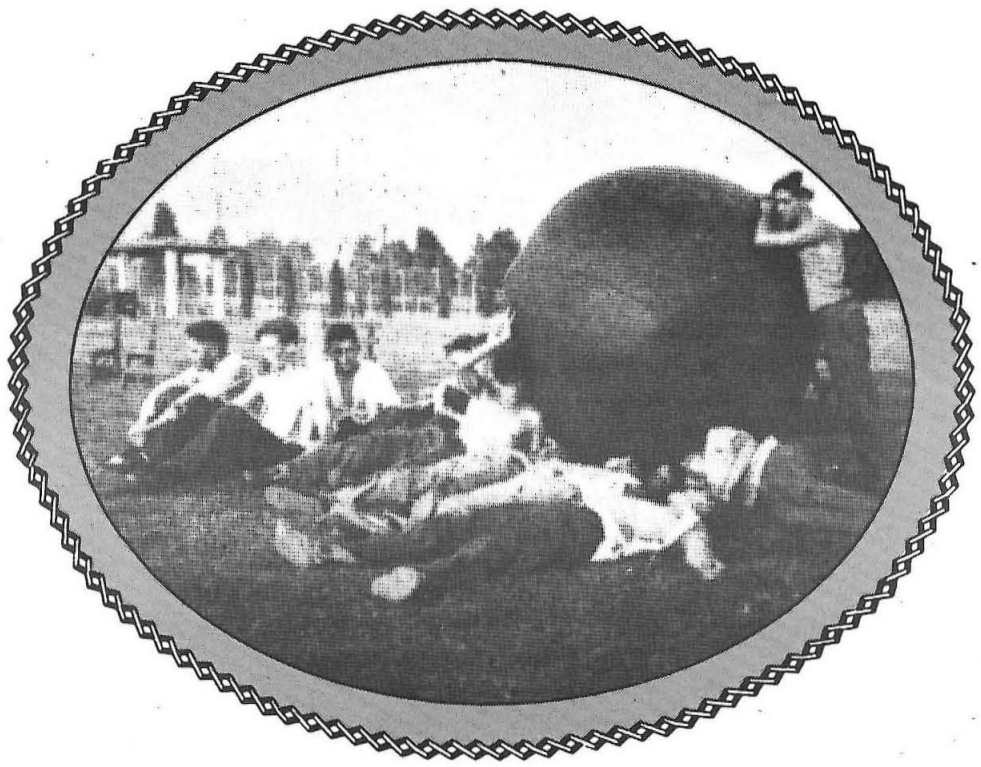
by Diane Davis

Alumni and others who follow events on the Caltech campus are familiar with the Mudeo, that slippery athletic competition that matched sophomores against freshmen in a pit of slimy goo long before mud wrestling became fashionable in southern California night spots. But not everyone knows that the Mudeo is heir to older traditions—Rodeo Day and the Pole Rush.

The pole rush was already an annual event when the yearbook, then called *The Orange and White*, described it in 1919. On October 12 that year, sophomores raised an axle-greased pole topped with a flag as a challenge to the newly arrived freshmen. (The freshmen were *so* newly arrived that they lathered themselves with green paint to distinguish one another from the upperclassmen.) Their goal: to capture the flag as the sophomores attempted to protect it with their massed bodies.

The newcomers began their assault by trying to drive a human wedge into the sophomore line, according to *The Orange and White*, but the sophomores around the pole succeeded in defending it. The flag remained in place at the end of the preordained 20-minute fracas, but, according to one observer, "green paint, black grease, and tattered BVDs littered the field." Now the losers were confronted with one more task—to put on a dance for the rest of the Institute.

The year 1921 was a banner one for the freshmen; they captured the flag. Assisting them in their victory were members of the Junior Rules Committee, who ordered that the flag be lowered from 12 to 10 feet and prohibited the use of quinine, pyridine, or other flavoring extracts on the flag's canvas fabric. This suggests that the freshmen resorted to capturing the flag with their teeth, their arms and legs being occupied in hanging onto the pole.



Competitors in the pushball contest rest after a vigorous foray, in this picture from the 1927 Big T.

Year after year, as a Techer of the era recorded, "The freshmen looked forward to victory and the day when they would be freed from the tyranny of their superiors, and the sophomores prayed for success in battle that they might better prove their supremacy and their right to make the life of the frosh one of misery."

This enthusiasm on the part of the participants caused the pole rush to be considered by some "too brutal and shocking for public gaze." Injuries sustained in the contest *were* numerous, so in 1923 the Underclass Rodeo took its place and substituted events that emphasized organization and strategy rather than brute strength.

In an 80-foot-square battle zone with a 15-foot neutral area at opposite sides, the underclassmen tried to capture their opposition, tie them up with canvas strips, and relegate them to the neutral zone. Non-participants turned the hose on the battlers so they wouldn't get overheated, but it only took a cool 25 minutes that year for the sophomores to tie up the last freshman.

The next year the action was more heated. The tug-of-war rules were violated so many times that the games had to be halted and finished a week later. Although the frosh suffered from inexperience and disorganization the first week—to the point of tying *each other* up—they recovered by the second meet and came out on top.

A pushball competition, which involved pushing a giant ball to the field end zones, was initiated in 1925. The next day was proclaimed "Garter Day," as the losing freshmen were forced to roll up their trousers and wear their garters as a necklace.

The tussle in 1927 was an extravaganza. Neither of the two pushballs in southern California was available, so pole rushes, tie ups, and sack rushes were substituted. In the last event, a team had to carry or drag a sack of sand, and any attached opponents, to either end of the field. The freshmen, who that year had painted one arm orange and one white, were again the losers but had to treat only their opponents to a dance, rather than the entire student body.

The pushball was available in years following, and was usually fought over during halftime at football games, at least one of these tussles taking place in the Rose Bowl. In 1933, as the players competed in Tournament Park, the game was stopped when the great ball was torn during the first half. To settle the question of superiority, the battlers dug a pit and filled it with water as a stage for a tug-of-war (and a precedent for years to come). The pushball and the mudhole shared honors for several years, and during that time the freshmen enjoyed a larger share of wins.

By 1947, the Mudeo had been officially named, and most of the events that we see on soupy fields today had been established—the tug-of-war, sack race, "chicken fight," and the tire spree, as well as the tradition of throwing the junior class president into the mud.

More than 60 years of this annual competition have brought the battling underclassmen from the greasy heights to the grimy depths of combat. But enthusiasm has not been lowered and spirits have not been dampened. The year 1981 should again find the sophs and frosh pitted against each other in muddy rollicking revelry.

Space shuttle to carry Tech student experiments

Continued from page 1

process occurs in the lack of gravity. Still another project aims at producing an "amorphous alloy"—a metal that has a glass-like structure, rather than the usual crystalline form.

Such amorphous metals have been produced on earth by spattering the melt against a surface, which cools it at the rate of a million degrees centigrade a minute and prevents crystal formation. But gravity-induced turbulence and the necessary surface contact have degraded such earth-produced materials.

In a final experiment, the students will photograph the movement of aluminum flakes within a levitated drop of clear liquid, to study how temperature differences affect flow within the droplet.

Other universities in the area with students planning space shuttle projects include Cal Poly at San Luis Obispo, UC Irvine, and Cal State Long Beach.

Vol. 15, No. 2 **April 1981**

Issued nine times a year (Oct., Nov., Dec., Jan., Mar., April, May, July and Aug.) and published by the California Institute of Technology and the Alumni Association, 1201 East California Blvd., Pasadena, California 91125.
Second class postage paid at Pasadena, California.

EDITORIAL STAFF
Executive editor: Winifred Veronda.
Staff associates: Phyllis Brewster, Diane Davis, and Kay Walker.
Photographer: Chris Tschoegl

USPC 085-640

The cannon comes back to Fleming House

The 1.3-ton, 110-year-old cannon of Franco-Prussian War-vintage has returned to Caltech Olive Walk after an absence of almost four years. It once more sits menacingly in front of Fleming House, its 12-foot barrel directed toward the office of the master of student houses. The cannon was dragged there from Southwestern Academy one night in February by 80 Fleming House students who were determined to add a new page to campus history.

The cannon made its initial journey to Caltech on Halloween night in 1972 when some 75 Flems liberated it from the front lawn of Southwestern, a private preparatory school two miles south in San Marino. On the Southwestern campus since 1925, the cannon was imbedded in concrete with broken wheels, and covered with many coats of paint—the result of numerous paint-dumping expeditions by local high school students.

Seeking to rid the school of the militaristic image that the cannon created, Southwestern Director Kenneth Veronda gave quiet permission for the Flems to take the old firing piece on long-term loan. The students freed it from the concrete and repaired its wheels, and dragged it uphill with ropes during the early morning hours.

On the Olive Walk they scrubbed off approximately 30 layers of paint and restored it to firing condition; over the next four years they shot it off occasionally with blanks and gunpowder. Except for the time when assailants filled its barrel with jello, the cannon was treated relatively kindly by other houses on campus—even by rival Page House, whose members found themselves looking down its barrel when it was first positioned. Harvey Mudd students posed a more serious threat, and tried to steal it on at least two occasions. One Saturday morning they arrived with a truck to take it away, but Flems turned water hoses on them and they retreated hastily.

One spring day the Flems used the cannon to shoot off five pounds of gunpowder to summon students to an ASCIT meeting, and the concussion blew some windows out of an adjacent building. This sort of incident fed an accumulating unease within the Caltech administration, and the Flems received strong hints that the cannon was no longer especially welcome. So they returned it to Southwestern, where it was quietly placed on a side yard.

High caliber youth: Flems mass around the Southwestern cannon, back on the Olive Walk after a four-year absence. Foreground—John Quackenbush. Row 1—Michael Oliver, Phillip Albert, Mark Abeln. Row 3—Ken Grant, Stephen Jones, Michael Gorder.

Now it is back again, via the efforts of the current generation of Fleming House students. "The cannon is a symbol of power," said Steve Schneider, a mechanical engineering student who helped to engineer its return, "and we like to think we're the most athletic and sociable group in campus housing."

Sunney I. Chan, master of student houses, expressed his confidence in the reliability of Caltech students and said he feels confident that the Flems will care for the cannon in a responsible way. "Students as a whole are more serious today than a decade ago," he added.

The cannon, requiring 17 horses to move it, originally was made by the French in 1871 for the Franco-Prussian War but it arrived late and never fired a shot. In 1896 the U.S. government took it on loan and rifled the barrel for the Spanish-American War; again it was never fired. In 1904 the French hoped to sell it for the Russo-Japanese War, but Teddy Roosevelt got that war stopped before the cannon saw action. The French then sent it to Santa Barbara, where it was placed on the front lawn of the French consul general's summer home. That gentleman promptly shipped it, with much pomp and circumstance, to Veronda's father as a gift when Southwestern Academy was founded.

The cannon's original journey to Caltech was chronicled by *Los Angeles Times* columnist Jack Smith, who felt it looked as out of place on the Olive Walk as it had looked on the front lawn at Southwestern Academy. But he concluded that after all, "You have to like a cannon that has had the sense to miss action in three of history's silliest wars, spend fifty years at a peaceful boys' school, and finally make it into Caltech."

Now the cannon has made its way back to the Olive Walk and there it sits, reminding one a bit of an awkward but imposing old dog, gamely awaiting new adventures.

Alumni Chapter Officers

BOSTON CHAPTER
President J. Kelly Beatty
11 Colonial Village Drive #1, Arlington, MA 02174

CHICAGO CHAPTER
President Howard E. Jessen
225 Ridge Road, Winnetka, IL 60093

DENVER CHAPTER
Contact Dr. Carl Gottschall
Dept. of Chemistry
University of Denver
Denver, CO 80210

DETROIT CHAPTER
Contact Daniel G. Reichel
1805 Village Green Lane #C1, Ann Arbor, MI 48105

HOUSTON CHAPTER
Contact Frank C. Smith, Jr.
3330 Bering Drive, Houston, TX 77057

NEW MEXICO CHAPTER
Contact Jonathan F. Callender
University of New Mexico, Albuquerque, NM 87131

NEW YORK CHAPTER
President Frank F. Scheck
330 Madison Avenue, New York, NY 10017
Vice President Richard S. Gruner
331 West 85th Street #5, New York, NY 10024
Secretary/Treasurer Harry J. Moore
IBM Corporation, Old Orchard Road, Armonk, NY 10504

PARIS, FRANCE, CHAPTER
President Christian P. Dambrine
Quartz & Silice, 8 rue d'Anjou, Paris 75008 France
Vice President Gerard E. Bloch
73 Boulevard Commandant Charcot
Neuilly-sur-Seine 92200, France

PITTSBURGH CHAPTER
Contact Thomas P. Gordon
1136 Cornell Road, Pittsburgh, PA 15205

SAN DIEGO CHAPTER
President Walfred E. Swanson
8303 Prestwick Dr., La Jolla, CA 92307
Contacts Delano Brouillette
6671 Cibola Street, San Diego, CA 92120
Vice President David B. Wilford
10066 Sunset Avenue, La Mesa, CA 92041

SAN FRANCISCO CHAPTER
President Hubert E. Dubb
One Lyndhurst Court, Belmont, CA 94002
Vice President Ben G. Burke
919 Carl Road, Lafayette, CA 94549
Secretary/Treasurer Walter A. Specht, Jr.
3614 Tumble Way, San Jose, CA 95132

Meetings: Engineers' Club, 16th Floor, Hong Kong Bank Bldg., San Francisco. Informal luncheons every first Thursday at 11:45 a.m. Contact Chip Smith, 415/781-4211, ext. 2507 or 2221.

San Francisco Peninsula luncheons: Ming's Restaurant, Palo Alto. Luncheons third Thursday of every month at 12 noon. Call Hugh Dubb, 415/421-2674, for information or reservations.

SEATTLE CHAPTER
Contact Thomas V. Davis
3205 72nd Avenue SE, Mercer Island, WA 98040

WASHINGTON, D.C., CHAPTER
President John T. Cookson, Jr.
7508 Masters Drive, Potomac, MD 20854
Vice President Michael B. Wilson
3119 Homewood Parkway, Kensington, MD 20795
Secretary/Treasurer Madeline A. Shea
2706 St. Paul Street, Baltimore, MD 21218

OF SPECIAL INTEREST TO ALUMNI

New Association Board members nominated

The Board of Directors of the Alumni Association met as a nominating committee on January 27, 1981, in accordance with Section 5.01 of the bylaws. Six vacancies on the board, in addition to the positions of president, vice president, secretary, and treasurer, are to be filled. The current members on the board, with the years in which their terms expire, are:

Philip A. Naecker, BS '76—1981
Andrew Campbell, BS '46, 1981
Francis H. Clauser, BS '34, MS '35, PhD '37—1982
Munson W. Dowd, BS '38, MS '46—1981
Hubert E. Dubb, BS '56—1981
Vern Edwards, BS '50—1982
David E. Groce, BS '58, PhD '63—1983
Carl W. Hamilton, BS '62—1983
Carole L. Hamilton, PhD '63—1983
Frances E. Janssen, BS '75, MS '77—1982
Herbert A. Lassen, BS '43, MS '47, PhD '51—1983
Arne Kalm, BS '56, MS '57—1982
William J. Karzas, BS '49, PhD '55—1982
Carel Otte, MS '50, PhD '54—1981
Philip L. Reynolds, BS '58, MS '59 1982
J. Steven Sheffield, BS '72, PhD '78—1981
Donald L. Smith, BS '71, MS '72—1983
Donald P. Wilkinson, BS '48—1983
James W. Workman, BS '57, MS '58—1982

The following individuals have been nominated for terms beginning at the close of the annual meeting in June 1981:

President: Philip L. Reynolds, BS '58 MS '59—1 year
Vice President: William J. Karzas, BS '49, PhD '55—1 year
Secretary: Carole L. Hamilton, PhD '63—1 year
Treasurer: Arne Kalm, BS '56, MS '57—1 year
Directors:
Thomas V. Davis, BS '38, MS '47, Eng '48—1 year
Richard G. Lipes, PhD '69—3 years
Philip M. Neches, BS '73, MS '77—3 years
Neil J. Stefanides, BS '53, MS '54—3 years
Gregory P. Stone, BS '74, MS '74—3 years
Samuel N. Vodopia, BS '54—3 years

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

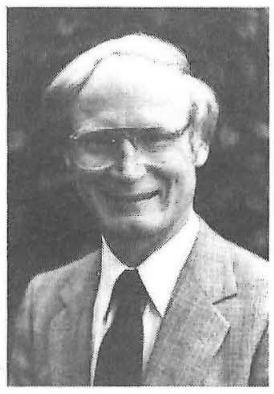
Below are biographical summaries of those nominated for directors.

Thomas V. Davis

Thomas V. Davis, BS '38, MS '47, Eng '48, joined The Boeing Company as senior group engineer after completing his graduate work. He managed Boeing's Pasadena office from 1966 to 1973 and has been involved in numerous preliminary design and development programs.

Davis was a resident associate of Blacker House from 1946 to 1948, after serving as assistant chief engineer for mechanical design for Group 0-4 at Los Alamos during World War II. From 1937 to 1940, he designed a substantial portion of the Brawley diesel-electric power plant in the Imperial Valley.

A fellow of the American Society of Civil Engineers, he also is an associate fellow of the American Institute of Aeronautics and Astronautics. Active in the Alumni Fund, he has been chairman for the Boeing area for two years.



Richard Lipes

Richard Lipes, PhD '69, is a technical group supervisor at JPL. His professional interests lie in the areas of communications and information systems, digital signal processing, and microwave remote sensing.

Lipes was awarded his SB degree in physics from MIT in 1964. He is a member of the Institute of Electrical and Electronic Engineers and of the Caltech Y board of directors, having served the past year as treasurer. He is a life member of the Alumni Association.

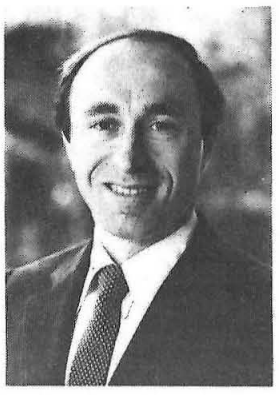
Philip M. Neches

Philip M. Neches, BS '73, MS '77, is vice president and chief scientist of the Teradata Corporation, a start-up company engaged in building data base computer systems. Before founding Teradata, Neches was project manager and consultant for Transaction Technology, Inc.

Neches has served on the Alumni Fund Council and has been active in the Gnome Club, including serving on its executive committee and as president. As the Gnome Club vice president, he initiated the career counseling seminar series in conjunction with the Caltech Y.

Neil J. Stefanides

Neil J. Stefanides, BS '53, MS '54, is vice president of exploration for Union Oil Company of California's Geothermal Division, the largest producer of geothermal energy in the world. In this capacity he is responsible for exploration and development of geothermal resources in the United States and foreign areas, and has served on United States-sponsored investment missions to underdeveloped countries. After graduating with degrees in geology, he joined the Union Oil Company, working in oil and gas exploration in a variety of assignments and locations across the United States, until his present assignment in 1973.



Gregory P. Stone

Gregory P. Stone, BS '74, MS '74, is an attorney with Munger, Tolles & Rickershauser where he specializes in complex civil litigation, including antitrust, securities, and patent litigation. After graduating from Caltech, he attended Yale Law School and then served a year as a law clerk to United States District Judge William Matthew Byrne, Jr.

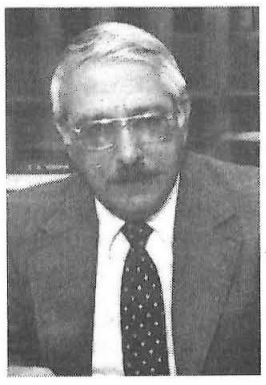
Stone has been a member of the Seminar Day Committee for three years and is finishing his second year of work for the Alumni Fund. He also is a member of the Gnome Club board of directors and the chairman of its committee on career

Please turn the page

OF SPECIAL INTEREST TO ALUMNI

Continued from previous page

counseling seminars. He also is an adjunct professor of law at Southwestern University Law School and a hearing examiner for the Los Angeles Board of Police Commissioners.



Samuel N. Vodopia

Samuel N. Vodopia, BS '54, is a project manager with the Radar Systems Group of the Hughes Aircraft Company. After graduating from Caltech, he joined the Bell Telephone Laboratories where his work focused on problems of military communication. For the past 20 years he has been involved with radar and laser systems programs at Hughes. Vodopia is a life member of the Alumni Association.

Annual meeting notice

NOTICE IS HEREBY GIVEN that pursuant to the bylaws of the Alumni Association, California Institute of Technology, the annual meeting of the members thereof will be held Thursday, June 18, at 6 p.m. in the Athenaeum, 551 South Hill Avenue, Pasadena, for the purpose of receiving results of the election of officers and directors and for the purpose of transacting any and all business that may come before such meeting of the members.

JAMES W. WORKMAN, BS '57, MS '58,
PRESIDENT

WILLIAM J. KARZAS, BS '49, PhD '55,
SECRETARY

50th birthday party planned for Kellogg Lab

Next November 5–6, alumni and friends will commemorate the 50th birthday of Caltech's Kellogg Radiation Laboratory, via a two-day meeting in Ramo Auditorium featuring invited papers on nuclear physics and its applications to other sciences. A second attraction will be a party in the Athenaeum to celebrate the first 70 years of William A. Fowler, the Institute Professor of Physics. Families of alumni are also invited. See future issues of *Caltech News* for more details.

Seminar Day speakers selected

Thirteen research seminars in the sciences, humanities, and social sciences will complement keynote speaker Sir Fred Hoyle on the Alumni Seminar Day program, May 16 on the Caltech campus. Hoyle, noted as an astronomer, physicist, and author, will be joined by speakers including:

James Bonner, professor of biology; Jeremy Brockes, associate professor of biology; James Bailey, professor of chemical engineering; Aron Kuppermann, professor of chemical physics; George Housner, the Carl F Braun Professor of Engineering; Robert Middlebrook, professor of electrical engineering; Sue Kieffer, MS '67, PhD '71, geologist with USGS in Flagstaff; Kent Clark, professor of literature; Charles Plott, professor of economics; Peter Haff, research associate in physics; Anthony Readhead, research associate in radio astronomy; Greg McRae of the Environmental Quality Laboratory; and Raymond Heacock of the Jet Propulsion Laboratory.

Class of 1951 to celebrate 30 years as alumni

John R. Fee, BS '51, head of the reunion committee for the class of 1951, writes to remind all members of the class of 1951 to "mark Saturday, June 6, afternoon and evening, on their calendars." Festivities for the 30-year reunion for members and their guests will include an early-afternoon visit to JPL, cocktails in the Alumni House, and a campus tour, followed by dinner and a program in the Athenaeum.

Class reunion time is almost here

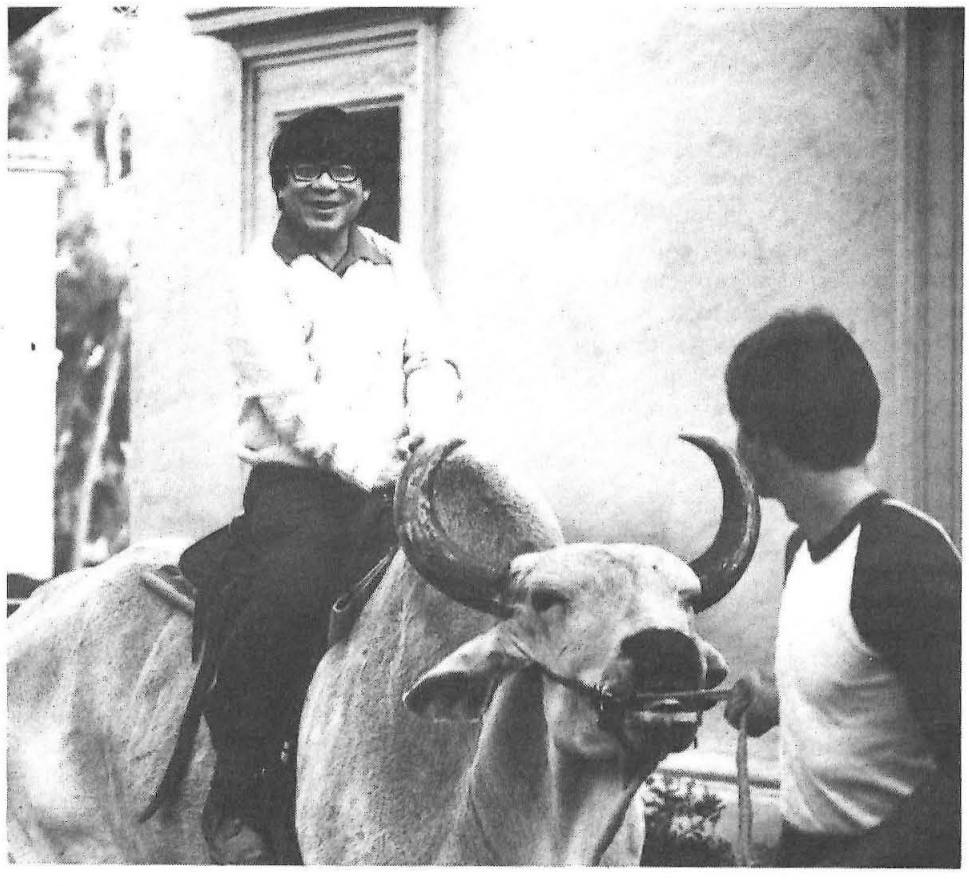
Yes, it really *has* been that long since you graduated, and your class reunion *may* be this year. Alumni who graduated 50 years ago—and at 5-year intervals since then—are invited to the campus this spring for reunions with their classmates. Specially honored will be members of the class of 1931, who will be inducted into the Half-Century Club on June 5 at a luncheon at 12:30 p.m. in the President's garden. Their wives or guests, and alumni from earlier classes, are also invited.

After lunch, Half-Century Club members will meet for a campus tour at 4 p.m., followed by cocktails and dinner in the Alumni House.

Most of the other class reunions will follow the traditional format, with campus tours at 4 p.m. followed by no-host cocktail receptions at 5:30 p.m. and dinner at 7 p.m. in the Athenaeum. Exceptions are the class of 1951, which will tour JPL as well as Caltech, and the class of 1976, which is planning a more informal program.

Reunion dates are: **May 15**—class of 1956; **June 5**—classes of 1931, 1936, and 1941; **June 6**—classes of 1946 and 1951; **June 13**—classes of 1961, 1966, 1971, and 1976.

A Chinese New Year party



For the first time in its 90-year history, Caltech celebrated the Chinese New Year in honor of the new master of student houses, Sunney Chan. Among the features were fish kites, Chinese dancers, two six-foot paper — cloth — and bamboo Chinese lions, roosters (both live and costumed) to commemorate the beginning of the Year of the Rooster, and a live Brahma bull, trained to kneel and allow riders to mount. Here the new master takes his turn for a ride.

Obituaries

1922
RICHARD M. BOZORTH, PhD, on January 24. Bozorth, who received an MA from Oxford University in 1968, was retired from Bell Laboratories and from consulting work with the U.S. Navy. He had been living in Short Hills, New Jersey.

1923
JOHN HAROLD PULS on December 12 in Palm Springs, California. He served in an executive position for Texaco in Los Angeles for 35 years, retiring in 1965. He is survived by his wife, Edith, a son, David, a daughter, Diane, and a great-granddaughter. Mrs. Puls writes that "He always was proud of and had a high regard for Caltech, and an abiding affection for Dr. Millikan." Contributions may be made to the American Cancer Society.

1924
HAROLD R. BECK in January. Among his various activities at Caltech he had served as student body vice president, chairman of the board of control, and later as president of the Alumni Association (1927–28). Retired in 1973, Beck had worked as an engineer at Lockheed for 27 years, specializing in the compensatory magnetics relative to aircraft compasses and magnetometers. He also worked with the Navy on anti-submarine warfare, consulted with the French Atomic Energy Commission regarding a refined electronic magnetometer, and developed a detector for non-ferrous materials under salt water. Beck also organized the first collective bargaining unit in the U.S. for professional engineers and scientists at Lockheed in 1944–45. He is survived by two daughters and three grandchildren.

VINCENT MANCHEE, Ex, on December 31 of Parkinson's disease. He had retired from the Atola Insurance Company in 1965 and was living in Pasadena.

1926
STERLING B. HENDRICKS, PhD, on January 4, from Guillain-Barre syndrome, a neurological disorder. He was a chemist with the Department of Agriculture from 1928 until 1970; for the last 13 of those years he was chief scientist of the department's Mineral Nutrition Pioneering Research Laboratory. In 1958 he became one of five government officials chosen as the first recipients of the President's Award for Distinguished Civilian Service, the highest honor given to career civil servants. Among several other honors, he received the Department of Agriculture's Distinguished Service Award in 1952, and in 1976 President Ford presented him with the National Medal of Science. Hendricks was also a mountaineer, climbing four previously unscaled heights in the British Columbian Rockies, and in 1942 was a member of the third party to conquer Mount McKinley in Alaska. His professional memberships included serving as president of both the American Mineralogical Society and the Society of Plant Physiology. Hendricks is survived by his wife, Edith, a daughter, Martha O'Neill, and two grandchildren.

1929
WILLIAM G. YOUNG, PhD, on July 5, 1980. He was professor and vice chancellor emeritus at UCLA, and had been residing in Laguna Hills, California. Young received Caltech's Alumni Distinguished Service Award in 1968, and the year before, the American Chemical Society's Priestly Medal, the highest honor in American chemistry. His wife, Helen, survives him.

1937
ROBERT M. MAHONEY on April 23, 1980, of lung cancer. He had worked for Union Carbide Corporation from 1937 until 1975, in various parts of the country, including New York City, where he died. Mahoney, who was student body president when he was at Caltech, was a recipient of the Conger Peace Prize. He was buried in Custer, Montana, and is survived by his wife, Avangia, a son, Robert, a daughter, Patricia Haley, and three grandchildren.

1938
S. BROOKS WALTON, MS, on January 2 at his home in Saratoga, California, after a lengthy illness. He had helped establish the mechanical engineering department at San Jose State University and was its first chairman. In honor of his twenty years of service to the school, the university dedicated a power laboratory in his name in 1979. Walton is survived by his wife, Blanche, a daughter, and three grandchildren. Contributions may be sent to the S. B. Walton Scholarship Fund, Mechanical Engineering Department, San Jose State University, or to the Starr King School of Religion at Berkeley.

1957
GEORGE F. BABITS on June 23, 1980, of cancer. He was a lieutenant colonel in the Air Force for 16 years, and won the Distinguished Flying Cross. More recently he was owner of the Christmas Hill Tree Farm in Silverton, Oregon. His wife survives him.

1970
KARL A. BELL, MS, PhD '74, on December 9. His family reports that he died by his own hand in his laboratory at UC Irvine, after struggling with a serious illness. He was assistant adjunct professor of medicine and community and environmental medicine, doing research on aerosols, and had been at the university for three years. Previously he was a research associate at the Rancho Los Amigos Hospital in Downey, California. He is survived by his wife, Myra Handsaker.

Personals

1932
VINCENT KELLEY, MS, PhD '37, professor emeritus in the University of New Mexico's geology department, and LEON T. SILVER, PhD '55, professor of geology at Caltech, have been honored by the University of New Mexico, which has established graduate fellowships in their names, through funding by the Caswell Silver Foundation.

1933
GREGORY K. HARTMANN writes from Garrett Park, Maryland, "Members of my class and others are cordially invited to buy and/or read my book, *Weapons That Wait*, published by the U.S. Naval Institute, Annapolis."

1936
ALELXANDER KOSSIAKOFF, former director of The Johns Hopkins University Applied Physics Laboratory and a leader in the design and development of modern defensive systems for the Navy, has been awarded the Department of Defense Medal for Distinguished Public Service. This is the highest award that may be granted by the Department to an individual who is not an employee of the government. "Exceptional contributions to combat readiness of naval forces" were noted on his citation. In July 1980 Kossiakoff relinquished his position as director of the laboratory to become chief scientist. He resides in Brookeville, Maryland.

1941
KENYON B. HOWARD reports that he received his J.D. degree from Humphreys College School of Law in Fresno, California, last year and became a member of the California State Bar in December. He has been an instructor at the College of the Sequoias in Visalia, California, where he still lives.

1946
SANTIAGO RODRIGUEZ-ROZO, MS, has been assigned to the Centromin Lead Sinter Plant Project in Peru as contract engineer for three years. He writes, "My present assignment will locate me in the central part of the Andes mountains in Peru—domain of the former Cerro de Pasco Corporation, now under the ownership and control of the Peruvian government since 1970. I will be working at an elevation range of 12–15 thousand feet above sea level."

1955
HOMER (BUD) HOWELL, JR., MS, writes from San Bernardino, California, "I formed my own consulting service company in July 1979. At the end of 1980 I am enjoying a very successful business and looking forward to better yet in 1981. I meet many good alumni along the way."

1958
JOHN F. ASMUS, MS '59, PhD '65, associate research physicist at UC San Diego, reports, "Using art restoration techniques (employing pulsed lasers) developed in Venice over the past nine years, my family and I finally found an application in this country. We spent the fall in Moab, Utah, restoring a 2500-year-old Indian pictograph that had been vandalized (purportedly, due to its 'heretical' elements)."

1959
J. PHILIP BROMBERG, MS, tells us that a textbook he wrote, *Physical Chemistry*, published by Allyn and Bacon of Boston, appeared in 1980. He adds, "After twelve years as a chemistry professor at Carnegie-Mellon University, I was admitted to the Pennsylvania Bar and am currently practicing law in Pittsburgh."

DONALD M. WIBERG, MS '60, PhD '65, writes, "Barbara Penney and I were married on October 12, 1980. I am still a professor in the UCLA school of engineering, but we are temporarily living in Huntington Beach."

1962
JULIAN F. PRINCE sends this update: "I am now project manager in the data processing department at Maccabees Mutual Life Insurance Co. in Southfield, Michigan, where I am in charge of all the individual life and health insurance systems. After 13 years in Connecticut, my wife Evelyn and I live with our children, Cynthia, 11, and Mark, 8, in West Bloomfield (a suburb of Detroit). My wife and I are the Michigan coordinators for the North Atlantic Cultural Exchange League student exchange programs with France. We initiated these programs in this state last summer after having organized and run them for four years in Connecticut and western Massachusetts. I would enjoy hearing from some of my Caltech friends."

1965
ROGER C. DAVISSON, MS '66, writes, "As a general partner in Brentwood Associates, a major venture capital investment firm (located in Los Angeles), I would be pleased to hear from any would-be entrepreneurs among Caltech alumni."

1966
TOM R. MILLER reports from Webster Groves, Missouri, "I became assistant professor of radiology at the Washington University School of Medicine, after completing residency training in nuclear medicine. Besides clinical duties, my research is in applications of computers in nuclear medicine, especially in studies of cardiac function. We now have two children—Michelle Marie, age 4, and Daniel, age 3 months."

1968
LESLIE G. FISHBONE, who is at Brookhaven National Laboratories in Upton, New York, shares this news: "On August 10, 1980, my wife, Leslie Weitzner, gave birth to our first child, Aaron Raphael. What great joy he has brought to our lives!"

1973
DEBORAH CHUNG, MS '73, assistant professor of metallurgy and materials science and of electrical engineering at Carnegie-Mellon University, has been awarded the 1980 Robert Lansing Hardy Gold Medal in Metallurgy by the Metallurgical Society of the American Institute of Mining, Metallurgical and Petroleum Engineers. The award is bestowed on the basis of outstanding promise of a successful career in metallurgy. Chung, one of the first four women graduates at Caltech, is involved in research on graphite intercalaction compounds, coal, composite materials, integrated circuit technology, and semiconductors.

1974
ROBERT M. KIECKHEFER reports on a busy past year: "Defended my PhD thesis [at UC San Diego] in June, had foot surgery later in June, got married in July, was out at sea August to October, had a delayed honeymoon in Nepal in November, and moved to Pittsburgh in December to assume a position with Gulf Research and Development Company."

1976
ELIZABETH McLEOD YELVERTON, research associate in molecular biology at Genentech, Inc., in South San Francisco, announces her marriage to J. Basil Yelverton of Pensacola, Florida, on February 29, 1980.

1978
DUANE R. GRAY, development engineer with Hewlett-Packard in Boise, Idaho, married Anita Payton in July 1980.

ASCIT honors outstanding teachers

Five Caltech faculty members have been selected by ASCIT to receive its 1980–81 awards for teaching excellence. The recipients are William B. Bridges, professor of electrical engineering and applied physics; Peter B. Dervan, associate professor of chemistry; Joel N. Franklin, professor of applied mathematics; Rodman W. Paul, the Edward S. Harkness Professor of History; and Valentina Zaydman, lecturer in Russian.

The selections were made by ASCIT's Educational Policies Committee on the basis of student ratings. The results will be published in the Teaching Quality Feedback Report (TQFR). This booklet contains statistics, and comments from questionnaires in which the students evaluated the instructors' clarity, enthusiasm, command of the subject, rapport with the class, and interest in the students as individuals. The awards were first given in 1976.

Bridges, a Caltech faculty member since 1977, was given his award for his "good command of the material" and his "enthusiasm and clear, effective teaching" in the course, "Communication System Fundamentals." In the fall 1978 quarter, an optics course taught by Bridges was rated highest in a survey of teaching quality in engineering courses conducted by the Caltech Tau Beta Pi Chapter. Tau Beta Pi is the national engineering honor society.

Dervan, a second-time winner of the ASCIT award, was praised as "an excellent lecturer, sympathetic to students' problems, and enthusiastic," in his course, "Chemistry of Covalent Compounds." Dervan, a member of the Caltech faculty since 1973, is conducting research on the design and synthesis of small molecules that bind DNA.

Franklin's course in "Mathematical Programming and Game Theory" earned him his second ASCIT award and praise for his lecturing style and for his "ideal mixture of rigor and clarity." A Caltech faculty member since 1957, Franklin formerly taught at New York University and the University of Washington.

Paul was lauded for his teaching ability in his history course, "American Life and Thought," as he won his second ASCIT award. The students praised Paul as "an excellent teacher, knowledgeble and dynamic," and for encouraging class discussions that stimulated interest. Paul has been a member of the Caltech faculty since 1947. He has received many honors for his research and publications on the history of California and the American West.

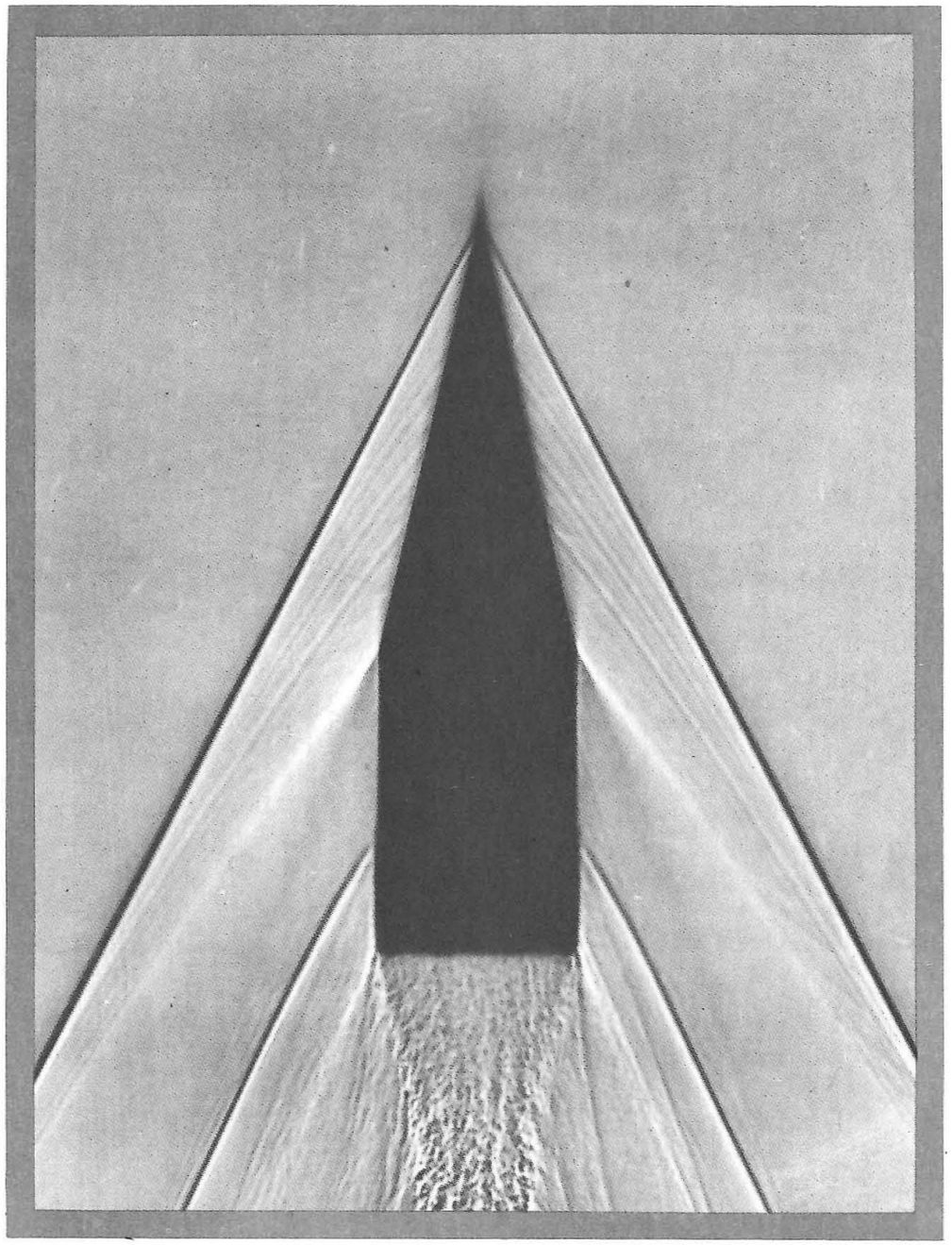
A fourth-time winner, Zaydman first received the teaching award in 1976, the first year it was given. Zaydman has been teaching Russian at Caltech since 1974. She was commended by students in her elementary Russian class for making "a hard class interesting and enjoyable for everyone."

CALTECH NEWS

California Institute of Technology
1201 E. California Boulevard
Pasadena, California 91125

Published for Alumni and Friends of the California Institute of Technology
Volume 15, Number 2, April 1981

CALTECH NEWS



Shock-wave flow patterns such as this one around a body traveling at supersonic speeds were among many research interests of Theodore von Kármán. In April, Caltech commemorates his 100th birthdate. *See page 2.*