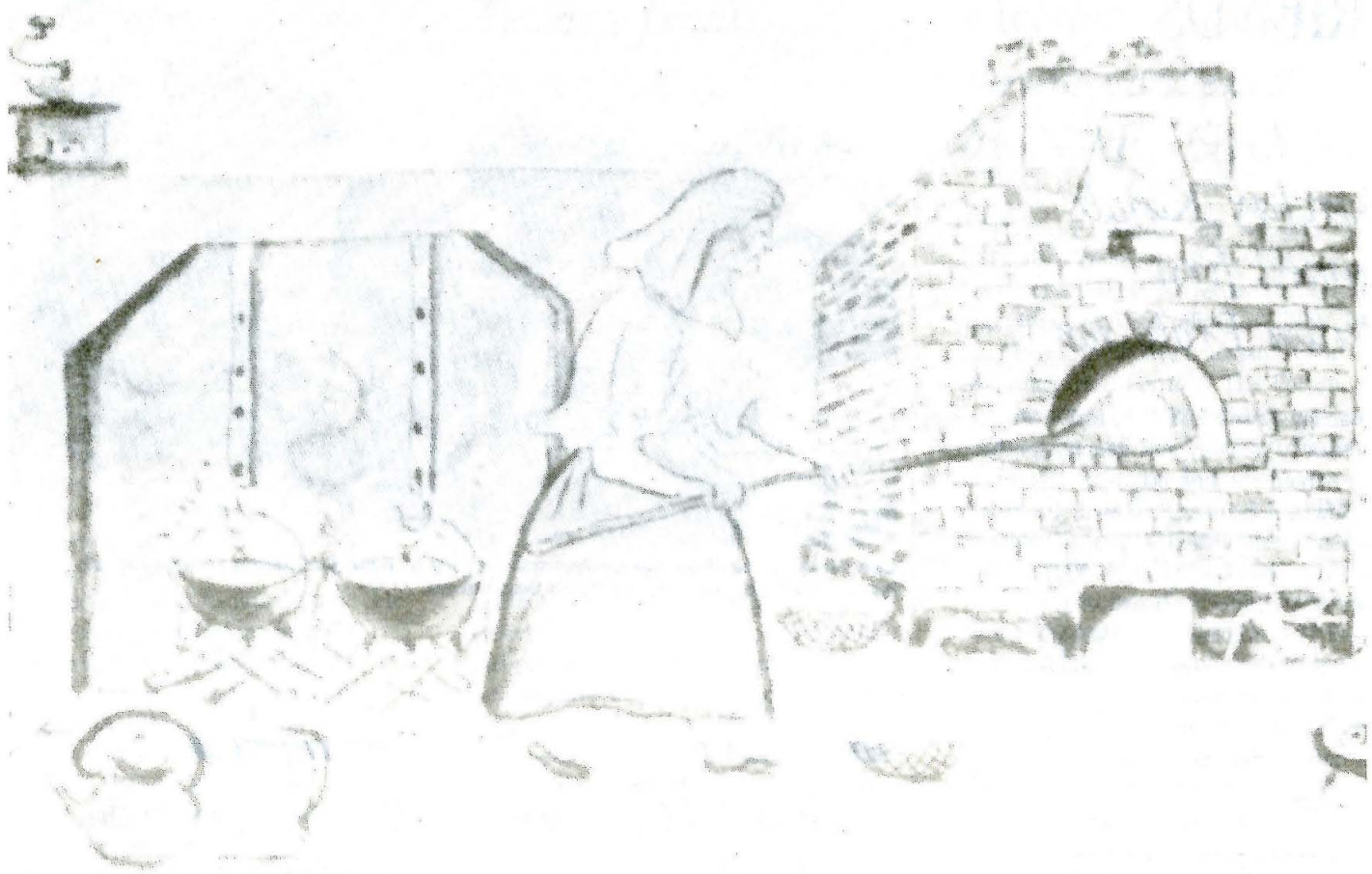
California
Institute of
Technology

Caltech News

Volume 24, No 3
June 1990



One of the sketches in Lewis Miller's "Sketches and Chronicles," 1800. Historical Society of New York County, Pennsylvania.

Making more work for mother

Ruth Schwartz Cowan was a pioneer in researching the technology of housework.

By Winifred Veronda

When Ruth Schwartz Cowan began her research into the technology of housework back in 1970, her colleagues thought she was a little crazy. What could there possibly be to say about the history of the washing machine? And even on the unlikely chance that the work turned out to be interesting, wasn't it terribly risky for a young historian who didn't even have tenure, to risk her reputation on such an off-the-wall subject?

But Cowan persisted, and her final product, entitled *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave,* won the 1983 Dexter Prize given by the Society for the History of Technology. And today, although Cowan has gone on to other fields of research ("I don't do housework any more"), other scholars have become fascinated with the field. Papers at scholarly meetings, grant proposals, books (Cowan has recently reviewed four), journal articles, museum exhibits, and oral-history projects recording the experiences of ordinary American housewives have made their appearance in abundant numbers. And using women's magazines as a research tool is no longer considered peculiar.

Cowan, who is at Caltech this year as a Sherman Fairchild Distinguished Scholar, never dreamed she would be such a pioneer when she got the idea for a "quick and dirty" project on housework. She was washing the dishes one night and thinking about some research she was doing on the impact of interurban railroads on the growth of the suburbs. "You're crazy to work on railroads," she suddenly told herself. "You really don't know how railroads function. But you do know about housework, and studying housework would be a terrific way to study the relations between technological and social change." As a new mother on maternity leave, Cowan could claim knowledge of housework with some authority. (She and her husband now have three children).

As she launched into her research she found far less data than she had anticipated. That whetted her determination to probe more deeply than she had originally intended, and soon she was involved in what would become 12 years of of intensive effort. She studied women's magazines, women's diaries, letters between women family members, sociologists' accounts of family life, home economists' writings, trade magazines, and engineering journals.

Through her research she delved into housework in preindustrial society when

Continued on page 4

FRIENDS

Barclay Kamb named first Rawn Professor

Barclay Kamb (BS '52, PhD '56), professor of geology and geophysics, has been named the first occupant of the Barbara and Stanley R. Rawn, Jr. Professorship, established with a gift from Stanley Rawn (BS '52, MS '53), a member of Caltech's board of trustees since 1974, and his wife, Barbara. Rawn is chairman and CEO of Adobe Resources Corporation of New York, an international company specializing in oil and natural gas exploration and development. The Rawns are Life Members of The Associates and members of the President's Circle. Rawn currently serves on the Visiting Committee of Caltech's Division of Biology.

Kamb joined the faculty in 1956. He was chairman of the Division of Geological and Planetary Sciences from 1972 to 1983, and provost from 1987 to 1989. He studies the dynamics and physical properties of glaciers, particularly the mechanisms that are responsible for triggering and halting a type of glacier flow called "surging" or "galloping." He has been involved in research expeditions to Blue Glacier in Washington State; the Great Aletsch Glacier and other glaciers in the Alps; Austerdal Glacier in Norway; and Variegated and Columbia glaciers in Alaska.

He currently heads a research team in Antarctica that is drilling to the base of the Antarctic ice sheet to determine whether portions of the sheet, which contains about 70 percent of the world's fresh water, are on the verge of disintegration due to a rapid outflow in large ice streams. Disintegration of the ice sheet would raise sea levels worldwide and would lead to flooding of low-lying coastal cities.

Kamb is a Fellow of the Geological Society of America, the American Geophysical Union, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences. His other honors include the 1968 Mineralogical Society of America Award, the 1977 Seligman Crystal Award presented by the International Glaciological Society, and membership in the National Academy of Sciences

Lee Silver describes the geological history of Baja California to a group of Associates on their trip to Cabo San Lucas.

Richard Hayman establishes scholarship fund

Richard L. Hayman (EX '36) has established the Richard L. Hayman Junior & Senior Scholarship Fund at Caltech. The recipients of the award for the 1989-90 academic year are Stephen Bard, a junior majoring in physics; Scott Dolim, a junior majoring in engineering; David Jeitner, a senior majoring in electrical engineering; and Thuy Nguyen, a senior majoring in biology. The students were chosen on the basis of need and academic competence.

"We're very grateful to Mr. Hayman for this gift," said President Thomas E. Everhart. "In giving funds for scholarships, he helps to meet an important need. Mr. Hayman has been a generous benefactor for years, making many gifts which are highly valued by the Institute."

Additionally, Hayman has funded the Hayman Lounge in the Caltech Athenaeum, the Richard L. and Dorothy M. Hayman Professorship of Mechanical Engineering, the Dotty and Dick Hayman Professorship of Engineering, and has contributed extensively to the Summer Undergraduate Research Fellowships (SURF) program. He is a member of the President's Circle and a Life Member of The Associates. Hayman served two terms as The Associates' president in 1985 and 1986. He is chairman and president of Haskel International, Inc., in Burbank, a manufacturer of high-tech hydro-mechanical devices.

Gift supports athletic facilities

The Lon V. Smith Foundation has given Caltech $100,000 to support Institute athletic facilities, according to President Thomas E. Everhart. Much of the gift will be used to refurbish the bleachers and construct a new press box at Caltech's Fox Stanton Track and Field facility.

In 1986, the Lon V. Smith Foundation gave Caltech the funds to construct an all-weather track and field facility, which was named after William Layton "Fox" Stanton, the Institute's athletic director from 1921 to 1942.

During his tenure at Caltech, "Fox" Stanton coached the football and track teams, both of which now use the facility named after him. During his tenure, Caltech won Southern California Conference football championships in 1930 and 1931. After his retirement in 1942, this tribute appeared in *The California Tech*: "In a school which does not pick men for athletic ability, he has formed championship teams. In a school where no credit is given for athletic work, where it must be carried entirely in addition to regular studies, he has developed outstanding football material."

"Fox" Stanton's son, W. Layton Stanton, is an alumnus of Caltech (BS '27, PhD '31), where he was named to the All-American team (Honorable Mention) as a halfback. Stanton worked 35 years for Union Oil Company (now Unilocal). He met the late Lon Smith in the oil business, and Stanton now serves as president of the Lon V. Smith Foundation, a charitable organization founded in 1951. He and his wife, Sally, have been married 60 years and are active in The Associates.

Associates enjoy Cabo San Lucas

Cabo San Lucas was the destination for 41 members of The Associates in March. Their faculty escorts were Leon T. Silver, the W. M. Keck Foundation Professor for Resource Geology, and Wheeler J. North, professor of environmental science. The group went snorkling with North, took a geology field trip with Silver, went whale watching, and rode in a glass bottomed boat. The trip was pronounced a huge success.

Vahala awarded Feynman-Hughes Fellowship

Kerry J. Vahala (BS '80, MS '81, PhD '85), assistant professor of applied physics at Caltech, has been chosen the first recipient of the newly created Richard P. Feynman-Hughes Fellowship. Sponsored by Hughes Aircraft Company, the Fellowship will be awarded annually to a young faculty member in Caltech's Division of Engineering and Applied Science. It has been established to honor the memory of the late Richard P. Feynman, Caltech faculty member and Nobel laureate in physics, who also consulted and lectured at Hughes.

Candidates for the fellowship are nominated by the faculty of the division, and final selection of the recipient is made by the division chairman in consultation with the Hughes key executive involved with the program.

Described by colleagues as one of the top investigators in the field of quantum electronics and lasers, Vahala has conducted pioneering research on the quantum mechanical limits of semiconductor lasers, and has also developed what is considered to be the authoritative theory on laser noise. Currently, he is studying the physics and fabrication of ultra-small solid-state devices and structures. A major goal of this research is to create materials and devices having atomic-scale sizes and features, which then can be exploited both to improve the performance of existing electronic devices and to create entirely new classes of devices.

Vahala joined the Institute's faculty as assistant professor in 1985. In 1987, he was one of only 15 outstanding

young U.S. scientists to be named an ONR Young Investigator by the Office of Naval Research, and in 1988, he received a Presidential Young Investigator Award from the National Science Foundation to support his research on the application of microdevice physics to solid-state devices. Also in 1988, he received an Outstanding Teaching Award from ASCIT.

Associates plan trip to Egypt

A trip to Egypt is being planned on November 6-23 for the President's Circle of The Associates. Faculty guides will be Ahmed H. Zewail, the Linus Pauling Professor of Chemical Physics, who will discuss the culture of the area, and Kerry E. Sieh, professor of geology, who will be responsible for explaining the geology.

The group will spend two days in Athens, then sail through the Greek Islands, stopping at Santorini, an important archeological and geological site. From there they will sail through the Suez Canal into the Red Sea, stopping at the small Sinai port of Sharm El Sheikh. They will travel overland by bus to the Monastery of St. Catherine, one of the oldest active monasteries in existence and the site where tradition says Moses received the Ten Commandments. The next day they will sail into the Gulf of Aqaba to Aqaba, Jordan, for a day excursion to the ruins of Petra. Their next stop is Luxor, Egypt. Here they wll visit the Valley of the Kings and other sites. After a three-day stay at Luxor, they will travel to Abu Simbel to visit the rock temples of Ramses II and his wife, Nefertiti. Their final destination will be Cairo, where they will see the pyramids, the Egyptian Museum, various mosques, and Coptic and Islamic Cairo.

The trip is oversubscribed, but names are being accepted for a waiting list. Persons interested should call 818/356-3919.

The Associates are planning several additional trips for 1991 and 1992. In July 1991 they will travel to Hawaii to view the solar eclipse. In October 1991, Robert Rosenstone, professor of history and author of a recent book on Japanese culture, will be the guide for a two-week tour of that country, along with Amnon Yariv, the Thomas G. Myers Professor of Electrical Engineering and professor of applied physics. Yariv's emphasis will be the differences in technology between the United States and Japan. The Associates will also visit Woods Hole with Henry Lester, professor of biology. In the planning stages for 1992 is a trip to to the Indian Ocean and Madagascar with Henry Lester.

Beall joins Caltech Board of Trustees

Donald R. Beall, chairman and chief executive officer of Rockwell International Corporation, has been elected a member of the Board of Trustees of Caltech.

Beall joined Rockwell in 1968 as executive director of finance on the corporate staff, and became executive vice president of the company's Electronics Group in 1969. Following Rockwell's initial investment in Collins Radio Company in 1971, Beall was named executive vice president of Collins Radio. He became president of Collins in 1974.

Beall was named president of Rockwell's Electronics Operations in 1976 and held this position until becoming corporate executive vice president in 1977. He became president and chief operating officer in 1979, and in February 1988 was elected chairman and chief executive officer.

Donald R. Beall

He received his BS degree in metallurgical engineering from Cal State San Jose in 1960, and his MBA from the University of Pittsburgh in 1961. He has received distinguished alumnus awards from both universities.

A member of the Aerospace Industries Association, Beall served as chairman of its board of governors in 1987. His other professional memberships include: the Business Council, the Business Roundtable, the Young President's Organization, and Beta Gamma Sigma.

He is a fellow of the American Institute of Aeronautics and Astronautics and the Society of Manufacturing Engineers, and was formerly on the national board of directors of the Armed Forces Communications and Electronics Association.

Texaco funds center for air quality analysis

A five-year grant of $500,000 has been given to Caltech's Environmental Quality Laboratory by the Texaco Philanthropic Foundation, Inc., to fund the new Center for Air Quality Analysis.

The center's primary focus will be to develop scientifically reliable environmental models, and conduct field experiments to test the accuracy of those models in order to better predict the air quality resulting from various emission control strategies. Analyses of the results will be provided to regulatory agencies governing environmental policy and to industry to assist both sectors in devising and implementing controls for improving air quality. The center will investigate the characteristics of emission sources, the chemistry of air pollutants, and the economic and technological feasibility of emissions controls.

Texaco is the first member of what will eventually be a multicompany interindustry consortium supporting the center's research. Texaco has been an annual supporter for general purposes of EQL since it was established early in the 1970s.

The center will be staffed by professorial faculty, professional staff, and graduate students under the leadership of John H. Seinfeld, the Louis E. Nohl Professor and Professor of Chemical Engineering, and chairman of the Division of Engineering and Applied Science; and Glen R. Cass, professor of environmental engineering and mechanical engineering.

Endowed fellowship supports Polish citizens

Henry Bauer, a Polish-born U. S. citizen living in Long Beach, has established a new endowed fellowship at Caltech. His gift will provide tuition support for graduate and postdoctoral students who are Polish citizens and who have graduated from a Polish university. Preference will be given to graduates of those universities located in Krakow, Poland.

Bauer said he was motivated to offer the fellowship because of his respect for Caltech, and his desire to assist in strengthening *glasnost,* which is sweeping Eastern Europe.

Mettler to chair forum convened by NAE, NAS

Ruben F. Mettler (BS '44, MS '47, PhD '49), chairman of the Caltech board of trustees and retired chairman and chief executive officer of TRW Inc., has been appointed chairman of the Manufacturing Forum. The Forum, convened by the National Academy of Engineering and the National Academy of Sciences, is a standing committee composed of senior government officials and leaders from the private sector with corporate, labor, and academic experience. Its purpose is to assess public policies and programs and private-sector actions affecting U.S. manufacturing performance.

Also appointed to the Forum was James J. Duderstadt (MS '65, PhD '68), president of the University of Michigan.

"Manufacturing is America's economic foundation," said Mettler. "World-class manufacturing capabilities, especially in key industries, are necessary to sustain a strong service sector and to generate the jobs and economic resources needed for economic growth and national security. The forum will discuss ways U.S. industries can achieve sustainable excellence and competitiveness in manufacturing."

Leroy Hood awarded honorary degree

Leroy E. Hood, the Ethel Wilson Bowles and Robert Bowles Professor of Biology at Caltech, has been awarded an honorary degree from the Johns Hopkins University. Hood, an alumnus of the Johns Hopkins University School of Medicine, is internationally recognized for his research on the functioning of the immune system. He is director of the Center for the Development of an Integrated Protein and Nucleic Acid Biotechnology, one of 11 NSF Science and Technology Centers in the country. Hood was awarded the degree of doctor of humane letters.

Honorary degrees were also awarded to President George Bush, to two other graduates of the Johns Hopkins School of Medicine, and to two Nobel laureates in med

Historian probes the ironies of household technology

Continued from page 1

men and women were partners in household duties since all work was performed in or near homes. She moved forward through the 20th century to the time when many women spend 40 hours a week in paid work, and 35 hours a week doing housework—"a working week that only the sweatshops could match."

She also explored ways in which the family car became a focus of labor for the modern housewife, making suburban life possible and adding complexity to the volume of housework through the necessity to run errands.

She traced the evolution, through the age of industrialization, of many devices that saved work for men and children, but left a woman's burden undiminished or even greater than before. She showed that the increase in housework was due in part to rising expectations —new standards that forced the housewife to do more laundry, make more clothes for her family, keep her house cleaner, and cook more diverse and complex meals.

She focused on how servants (employing a servant was once an identifying badge of the middle class) declined in availability after World War I, and how the number of delivery services also declined (the doctor, the coal man, the ice man, the grocer, the seamstress). These circumstances added to mother's work load at the same time that she was acquiring modern appliances that were intended to shorten her day.

Cowan's story begins centuries ago when both men and women were tied to the household, carrying out specific and distinct responsibilities as part of a virtually self-sufficient unit. While women cooked, sewed, laundered, cleaned, and nursed ailing family members, men gathered wood (no small task considering the amount of wood that an open hearth consumed), processed grain, made tools, brewed cider, and worked in leather. Some tasks, like butchering, were communally shared.

But all of this was about to change with the coming of industrialization. The evolution of the cooking stove was one innovation that made a tremendous impact on the American household. The stove moved rapidly into homes across the country, replacing the open hearth.

For one thing, the cooking stove meant that men spent far less time harvesting and preparing fuel, particularly as coal was substituted for wood. This, along with other innovations that were taking place (flour milling, for example), freed men to spend at least part of their time working outside the home—and made cash income a necessity. Thus began the division of labor between men and women with respect to housework, the burden falling squarely on the woman.

For the housewife, the advent of the stove made cooking much more complex. Gone were the days of the simple one-pot stew, prepared over the open hearth. Now several cooking pots could be manipulated on and in the stove, and a more varied meal for the family meant more work for mother.

The preparation of bread became another time consumer for the housewife. Quick breads—whose preparation time matched their name—fell into disrepute and were deemed "fit only for Blacks, Indians, and the Irish." White bread became a symbol of status—and required much more time to prepare: hard labor in the kneading, and attention to details, particularly in maintaining yeast cultures.

Ruth Schwartz Cowan

Baking became popular, an expected responsibility for the woman competent in her kitchen. Cakes were much in evidence by 1838, Cowan notes. Wrote a Frenchman of the time, "Such is the universal attention paid to this particular form of epicurism in these states that some of the Pilgrim Fathers must have come over to the country with the cookery book under one arm and the Bible under the other."

Moreover, stoves had to be cleaned at the end of each day (while fireplaces did not), and this work was done by the women and girls, since cleaning was culturally defined as women's work.

During this period, mothers also found themselves spending much more time doing laundry, as cotton fabric became the standard clothing material. Clothing previously had been made from materials that were seldom washed—alpacas, felts, leathers, woven woolens, and linen. And while wool and linen underwear could be washed, in fact it seldom was. Moreover, the demise of home weaving and the advent of manufactured cloth—along with the development of the sewing machine—increased the amount of clothing people were expected to own. The sewing machine eliminated the need to hire seamstresses, but not the hours that the housewife herself spent sewing.

Industrialization continued to eliminate male household duties. The milling of grain eliminated grain processing. Because factories made boots and shoes, men no longer had to do leatherworking. Factories made pottery and tinware, eliminating the need to whittle. The growth of the meat-packing industry meant the gradual end to butchering.

Thus, writes Cowan, industrialization meant that "people ate a more varied diet, suffered less from cold, enjoyed more space and luxuries, and kept their clothes and bodies cleaner—but these innovations did not lift the burden of domestic work."

In the end, changes in household technology had altered the process of housework, sending men out to do cash labor while women worked at home. "During the 20th century," says Cowan, "inventors and entrepreneurs and advertising copywriters and consumers themselves simply assumed that the separation of the spheres was a normal arrangement, and they continued to build, to refine, and to accept the technological systems of housework accordingly."

Cowan cites a number of failed experiments that would have decreased or eliminated housework for mothers—apartment hotels, vaccuming services, and laundries, for example. As recently as 10 years ago, experts predicted that the fast-food industry would bring on the demise of home cooked meals because it would be cheaper to eat out than to eat at home. But history has proved that the American family prefers

The evolution of the cook-stove meant that men virtually stopped doing housework.

privacy, and, whenever economically feasible, private ownership of tools.

As the foundations for the modern household technologies were laid (roughly from 1880 to 1920) in terms of clean water and ample sewers, gas and electricity services, "no one seems to have doubted," writes Cowan, "that the individual household would be the ultimate consumption unit, and that most of the work of the household would be done by housewives who would continue to work, as they had in the past, without pay and without time clocks."

The move to the suburbs after World War II showed how deeply ingrained was the concept that the individual household would always have someone (surely mother) to stay home and do the work and run the errands that made it possible for someone else (surely father) to leave early and return late, secure in the knowledge that all was being taken care of at home. No one could foresee in the post-World-War-II era that this "someone" might decide that staying home was not her cup of tea—and that a division of labor cast in stainless steel during the previous decade would be challenged.

Mother's 75-hour week had arrived, because, as Cowan points out (even though commercials may deny it), housework still takes time. "Not even the most efficient working wife in the world can prepare, serve, and clean up from a meal in four minutes flat; and even the best-organized working mother still cannot feed breakfast to a toddler in 30 seconds." Moreover, housework is not going to disappear, Cowan believes, home computers not withstanding.

Although women cannot rid themselves of the tools of household technology (nor would they want to), Cowan says they can begin to extricate themselves from the work processes that accompany that technology by revising the unwritten rules that govern the system.

"Some of these rules—to change our sheets once a week and keep our sinks spotless and greaseless, to wipe the table after every meal, to keep our dirty linen literally and figuratively to ourselves—generate more housework than may really be necessary. These rules were passed down by members of an earlier generation (our parents) and sprang from fear of the deprivations that poverty engenders and from a desire either to rise above those deprivations or to stave them off. Now that profound poverty has ceased to be an imminent threat for most of us, the time has surely come to reevaluate the amount of time that we spend maintaining the symbols of our status."

Other rules—that men who dry dishes or change diapers are insufficiently masculine, for example—ensure that women will continue to do most of the housework. "These latter rules, connected as they are to aspects of our sexuality and our self-conception, are not easy to revise," says Cowan.

Cowan concludes that we can best help the working wife "by helping the next generation—and ourselves—to neutralize both the sexual connotation of washing machines and vacuum cleaners and the senseless tyranny of spotless shirts and immaculate floors."

If she were writing her book again, Cowan says she would devote much

more space to the role of woman as nurse, and the changes in this role with the advent of antibiotics and vaccines. "Debilitating diseases were common until recently," she says. "The impact of home health care on women throughout history was brought home to me when I read a diary, written between 1885 and 1920, by a doctor's wife. The most prevalent topic in her diary was the illnesses in her family. She had four children, and she also ministered to her servants. Somebody was sick almost every day. Antibiotics—not the dishwasher and the washing machine—may have played the major role in freeing women to enter the workforce."

Cowan is now working on a history of prenatal diagnosis and a textbook for courses in the history of American technology. Last year, in a slight departure from her usual research path, she published an oral history memoir, *Our Parents' Lives: The Americanization of Eastern European Jews,* which she co-authored with her husband, Neil M. Cowan. She is professor of history and director of women's studies at the State University of New York in Stony Brook.

Everhart named chairman of energy board

Caltech President Thomas E. Everhart has been appointed chairman of the newly created Secretary of Energy Advisory Board (SEAB) in the Department of Energy. The announcement was made by Secretary of Energy James D. Watkins.

Also appointed were Lew Allen, Jr., retiring director of JPL; and Roger Noll (BS '62), professor in the department of economics at Stanford and formerly at Caltech as the Institute Professor of Social Sciences and chairman of the Division of Humanities and Social Sciences.

Said Admiral Watkins of the 28 new appointees, "This new board will give me the high quality, independent advice I need to be able to make the best possible decisions as secretary of energy. I am grateful that so many distinguished experts have agreed to volunteer their time." The board includes three Nobel laureates.

Some of the first issues to be considered by the board, according to Admiral Watkins, will be a review of the interim report on the development of a national energy strategy and an analysis of ways to sustain the department's national laboratory complex as an intellectual resource for the nation.

Caltech students take their knowledge and enthusiasm into the public schools.

Caltech junior Michael Samollov shows third graders at Paradise Canyon Elementary School some hollow pennies made after 1983. The beaker of water is used to demonstrate how weight affects buoyancy as hollow pennies float for awhile and solid ones do not.

Reaching out to make a difference

By Winifred Veronda

How can a young person make a difference? More than 30 Caltech students have found a way, as they help pupils in area public schools grasp the excitement—and the skills—of science and math.

The students are participants in several programs at the Institute that reach out into neighborhood schools to apply the ability and enthusiasm of undergraduates and graduates as leaders in learning situations. Thus far, everyone is happy with the results.

Eric Schell, a junior majoring in planetary science, is happy with his work-study job at John Muir High School where he teaches chemistry and advanced-placement physics. Schell works two and a half hours two afternoons a week, and spends another four or five hours a week in preparation. He gives lectures to the classes, prepares laboratory experiments, answers questions and helps with problem solving, and tutors individual students.

"I enjoy it," he says. "The kids are responsive, and they appreciate the extra help. I went to a homogeneous affluent high school, and this experience has introduced me to a racially diverse environment and given me a whole new perspective—as well as some insight into what teaching is like." Schell is one of two students on work-study assignment at Muir, as an employee of the Admissions Office. He hopes to go back there next year. The Admissions Office, which envisions Caltech work-study students as role models for high school youngsters, hopes to expand the program.

Meanwhile, nine members of the SURF (Summer Undergraduate Research Fellowships) Speakers Bureau are busy raising the scientific horizons of students in four area schools through scientific presentations they have devised especially for the classroom. (The SURF Speakers Bureau is primarily composed of students who give presentations on their summer research projects to trustees, alumni, community groups, and others.)

The students have developed presentations on optics, the human nervous system, earthquakes, ecology, magnetic energy, astronomy, and chemistry for pupils at Washington Middle School in Pasadena, St. Mark's Episcopal Elementary School in Altadena, La Canada Junior High School, and La Crescenta Junior High School. Presentations have been given to sixth, seventh, or eighth grade classes. The program started in the fall of 1988.

"We want to learn at what age we can be most effective at making science fun," says Jeannie Cass, communications consultant for the SURF program. "We've already learned that we must start earlier than junior high to encourage children to pursue science. Next year we'll focus more on the third grade."

The project has already begun to experiment at that level, with presentations to third graders at St. Mark's, at Paradise Canyon Elementary School in La Canada, and to third, fourth and fifth graders at Jefferson Elementary School.

"By starting early and using some Tech students as mentors, we hope we can create role models that the students will want to emulate," says Cass.

The students endeavor to create hands-on presentations that allow the pupils to participate. For third graders, for example, one presentation on the nervous system utilized hammers created from tinker toys to test reflexes, and pen lights to show pupil dilation. The third graders were also led to push against a door as hard as possible, and learned that the arm flies up when the pushing ceases.

Barbara Freberg, coordinator for the gifted program at Jefferson Elementary School, says the SURF students made a significant contribution to the program there. "They made science exciting and fun, and really stimulated the children's interest," she remarks. The SURF students made three presentations, on physics, electricity, and the nervous system. "The presentations that involved the students in hands-on situations were the most successful," Freberg says.

In the spring, the SURF students put together a Weird Science Day for third graders at the target schools, designed to stimulate the imaginations of third graders about the wonders of science. The students learned how ghosting effects are produced in the entertainment industry, and saw liquid nitrogen turn a banana into an object hard enough to drive a nail, among other marvels.

"The presentations have been extremely successful," says Cass. "We've had positive feedback from both the students and the schools. The project has exposed Tech students to volunteerism and the satisfactions it brings, and this is important.

"It's a real treat for me to have the opportunity to work with the SURF students. They're the best."

A pilot project at Pasadena High School began this spring as an initial venture in Caltech's high school science-education outreach program for high schools—a program founded on the belief that more needs to be done to combat science illiteracy. "At stake is not simply America's competitiveness in the global trade market, but each American's competitiveness in an increasingly technical job market," says Hall Daily, coordinator for the program.

The project—which may be expanded next year—involved a professor and a graduate student who created presentations to be given in high school classrooms. Peter J. Wyllie, professor of geology, was the faculty member for the

Continued on page 6

Reaching out to make a difference

Continued from pge 5

pilot; Jacqueline Dixon was the graduate student. The two collaborated on the creation of lessons, and the selection of materials on volcanoes—the topic covered in the program.

Dixon presented lessons to three different classes on these three topics: "What is a volcano?", "Submarine volcanoes and tectonics," and "Man & volcanoes: continental eruptions; historical effects." The following week, the students came to the campus for a tour of the seismological laboratory and a lesson from Wyllie—illustrated by slides—on how volcanoes fit into the formation and development of the earth.

Involved in the pilot project were a ninth-grade physical science class, a physical science class for tenth and eleventh graders, and a biology class. Some 100 students, three teachers, and several district and school administrators attended the project finale.

Another project to strengthen ties with the public schools was sponsored by the Admissions Office. Admissions brought 45 students from Garfield High School in Los Angeles, with grade point averages of 3.7 and above, to Caltech for a tour, lunch at the Alumni House, and presentation by President Thomas E. Everhart.

"We wanted them to know that their achievement didn't go unnoticed," says Bernice Slaughter, assistant to the director for special programs. Slaughter said three students from among the high school visitors went on to apply to Caltech.

Meanwhile, Project SEED continues to make its impact on education in several local schools. Project SEED, which stands for Science for Early Educational Development, explores ways in which the creative use of hands-on materials and classroom computers can enhance and reinforce good science teaching in kindergarten through sixth grade. It is the product of elementary science-education research led by two Caltech professors, physicist Jerome Pine and biologist James Bower.

The Board of Education of the Pasadena Unified School District recently voted unanimously to expand Project SEED to five additional schools during the current school year. Project SEED was launched at the program's pilot site, Field Elementary School in Sierra Madre. Before the expansion, Project SEED was in use at four schools—Field Elementary School, the Sequoyah School (private) in Pasadena, the Open School in Los Angeles, and Ambler School in Carson.

Golda Bernstein, who worked as a SURF student for SEED-founder James Bower, is now the Caltech spark plug for a Caltech Y tutoring program which involves ten students. These young people tutor pupils in the Pasadena school district through the Pasadena Homework Assistance Network (PHAN).

PHAN was begun five years ago with private funding. When those funds ran out after three years, PHAN received a three-year guarantee of state funding to function as a pilot program for examining the merits of volunteer tutoring. Today, 1,700 students are helped with their homework for an hour after school by 178 volunteers—retired people, students, and a cross section of others from the community. Tutoring takes place at 21 sites—19 schools and two community locations. The program is unique in the state.

Bernstein, a junior majoring in applied math, not only tutors in the program; she has lent her dynamic talents to a recruiting effort that is responsible for the presence in the public schools of most of the other tutors from Caltech.

"She's exceptional. We're very pleased with what she's doing for us," said Linda Nixon, director of PHAN.

Bernstein's interest in the young people in Pasadena schools was triggered by her work with Bower as a SURF student. Bernstein began creating science projects and taking them into the classroom at Willard Elementary School. One of her projects called for the students to build tinfoil boats that would float the maximum number of pennies. Another involved using straw and Play-Doh to build the tallest possible towers.

Bernstein, who took a class in signing at PCC, has worked with a group of deaf students at Willard. Not only has she tutored them, but she has encouraged them to write stories, a device to help them strengthen their ability to structure language.

Jackie Holmes, a junior majoring in chemical engineering, tutors at Hamilton Elementary School twice a week and once a week at Wilson Middle School, generally helping with math homework. At Hamilton she works with groups of students; at Wilson, her efforts are more one-on-one.

"I enjoy helping kids. It's fun to see them respond to help, to grow in ability, and to become more enthusiastic about their work," says Holmes. "It's satisfying when they come and ask me when I'm coming back. It's good to make a contribution."

Ralph Lin, a junior majoring in biology, has been tutoring since January. Recruited by Bernstein, he works an hour or two a week after classes at Willard Elementary School, with students in grades 1-5. "I help them with their homework," he explains, "reading, writing, a little bit of math. It's mostly on a one-to-one basis."

"The kids are really a lot of fun," he remarks. "I enjoy their company, and the tutoring is a good break from Caltech. I almost feel as if I'm doing this for my benefit, rather than theirs."

"The Caltech students are very valuable to our program," says Regina Moses, the principal of Willard Elementary School. "They're sensitive young people, very positive and upbeat. They come because they care about what they're doing. They don't have to be here. We just hope there's a mutual benefit.

"We'd love to have more of them," she adds.

"I really like working with kids," says Bernstein enthusiastically. "I can see, when I work in this program, that I'm making a difference.

"Besides," she concludes with a smile, "these are a few hours a week when nobody asks you to do anything you can't handle."

Retiring faculty honored at spring dinner

The traditional spring dinner honoring faculty who are retiring, or who have retired, during the academic year was held May 21 at the Athenaeum. Those honored were Clarence R. Allen, professor of geology and geophysics; Lee F. Browne, lecturer in education and director of secondary school relations and special student programs; Warren Emery, retired director of physical education and athletics; Samuel Epstein, the William E. Leonhard Professor of Geology; Toshi Kubota, professor of aeronautics; Richard E. Marsh, senior research associate in chemistry; and Hardy C. Martel, professor of electrical engineering.

Alumnus to fly on space shuttle

Lt. Col. Carl J. Meade (MS '75), astronaut, will be aboard the Space Shuttle Atlantis on mission STS 38 when it lifts off on July 9 from the Kennedy Space Center. The classified mission will carry a Department of Defense payload.

Lt. Col. Meade has been an astronaut for five years. This is his first mission.

George Fisher to address Caltech audience

George M. C. Fisher, chairman of the board and chief executive officer of Motorola, Inc., will be the final speaker of the Distinguished Speaker Series sponsored by Caltech's Industrial Relations Center. Fisher will speak at 8 p.m. on November 1 in Beckman Auditorium. His topic is "On Being a World Class Global Competitor." The lecture is open free of charge to the Caltech community, the business community, and the general public. To make reservations, call 818/356-4041.

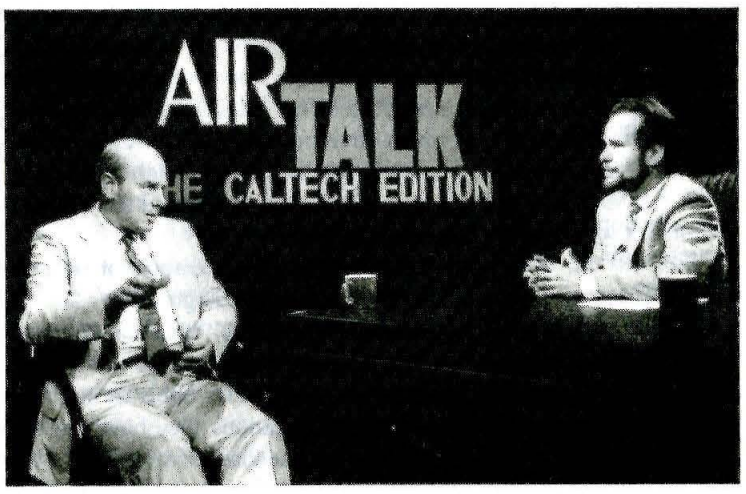
Motorola, Inc. has undergone a dramatic transformation in the last decade, improving quality and forging the organization into a world-class competitor. Fisher will outline the challenge ahead in the global marketplace.

Speakers over the spring included David T. Kearns, chairman and chief executive officer of Xerox Corporation, who spoke on "Education for a Competitive Society," and Martin Feldstein, president of the National Bureau of Economic Research, who talked on "The American Economy in the 1990s."

San Diego to stay with sodium street lights

The San Diego City Council voted 6-2 to stay with its policy of exclusively using street lights that do not interfere with the county's observatories.

In 1984, the council decided to convert all street lights to low-pressure sodium which gives off an orange glow that can easily be filtered out by the observatories. Recently the city was considering approving the installation of lights other than the low-sodium variety in high crime areas. Other types of lighting produce a sharper, whiter light that is considered "light pollution" by scientists because it interferes with their views of the night sky.



President Everhart was a guest on AirTalk: The Caltech Edition. Larry Mantle is host. The monthly program is simulcast at 6 p.m. over KPAS Channel 55 and KPCC FM, 89.3. AirTalk airs the third Wednesday of every month.

Kanamori new Seismo Lab head

Hiroo Kanamori, the John E. and Hazel S. Smits Professor of Geophysics, has been appointed director of the Seismological Laboratory. He assumed responsibilities from Robert W. Clayton, professor of geophysics, who had been acting head since Don L. Anderson, the Eleanor and John R. McMillan Professor of Geophysics, stepped down last year.

Kanamori first came to Caltech in 1965 as a research fellow. He returned in 1972 as professor of geophysics, after posts at MIT and Tokyo University. He was made the Smits Professor in 1989.

Kanamori's research centers on the causes of earthquakes. He recently collaborated on a major seismological study demonstrating that moderately strong earthquakes are not always caused by faulting, but may also result from slides or explosions of sediments on the sea floor. His research interests also include tsunamis and volcanoes as well as the structure of the Earth's crust and mantle.

A member of the American Academy for the Advancement of Sciences since 1987, Kanamori served as president of the Seismological Society of America in 1985, and chairman of the Committee on Seismology for the National Research Council of the National Academy of Sciences since 1986.

Chess team wins division championship

In its first outing, the newly formed Caltech chess team won the collegiate division of the U.S. Amateur Team Western Regional Championship, held at the Holiday Inn in Pasadena. The University of California at San Diego finished second. Approximately 70 teams participated in the event.

The team will proceed to the Pan-American Intercollegiate Chess Team Championship, an annual event in December where approximately 200 colleges will be represented. Last year, Harvard University won this competition.

The team members are Jones Murphy, a graduate student in physics, first board and captain; Bruce MacCartney Filgate, a sophomore majoring in physics, second board; Michael Pustilnik, a graduate student in chemistry, third board; Frank Perez, a graduate student in mechanical engineering, fourth board; and Ben Skrainka; a graduate student in physics, alternate.

Centennial celebration events announced

A birthday party for the entire campus community, a symposium on "Vision of a Sustainable World," and a JPL-sponsored symposium on "Caltech and the Universe"— these are a few of the events announced to celebrate Caltech's centennial year, which will be launched on January 1 with the entry of Caltech's float in the 1991 Tournament of Roses parade.

"We strove to provide a well-rounded, year-long program that would have something for everyone," says Steering Committee Chairman Sunney Chan, professor of chemical physics and biophysical chemistry. Chan defined "everyone" as faculty, staff, students, administrators, trustees, alumni, The Associates, JPL staff, and other friends.

"We want to celebrate a century of achievement, and to take the opportunity to look into the future," said Chan. "Caltech is a world-class institution with lots to brag about. In the future, we might decide to do some things differently. This is a chance to consider some of those changes.

"Caltech has had a real impact on the world during the last 100 years. The early founders had a vision and they set the institution on course. The question for us today is how we can allow it to continue to evolve so it will have an equal impact on the next 100 years. There must be some lessons we can learn by pausing and looking back, and using this opportunity to do a self-study."

Before plans were announced, 11 centennial subcommittees spent more than a year preparing their proposals. They presented their plans to the Centennial Steering Committee for approval. The steering committee did some honing of their own, and passed a report on to the administration for final OKs.

The result is a succession of major events and minor delights that does indeed offer something for everyone. Several of the events will cluster around the official birthday on Saturday, November 2, 1991

Among the activities that have been approved for further development are:

- A series of centennial Watson lectures, one for each of the divisions, and a reenactment of the first Watson lecture. As a part of the series, there may also be a Caltech history lecture, plus two or three lectures by Caltech trustees.
- A dedication of each centennial month to a distinguished Caltech scientist, some still part of the Caltech community and some from the past. During the month a special lecture will be given, either by the person to whom the month is dedicated or about him. One month, designated Founders Month, will honor Hale, Millikan, and Noyes.
- A one-day symposium on campus, sponsored by JPL and open to the Caltech community, on the subject of Caltech and the universe.
- A one- or two-day symposium on "Vision of a Sustainable World," with invited distinguished experts speaking on a wide variety of subjects.
- The Eureka Conference, the 5th annual National Undergraduate Research Conference, hosted by the Institute in March, 1991. More than 1,000 students and 300 faculty members from other schools around the country are expected to attend. Students will share their research in science, engineering, the humanities, music, dance, and art. (EUREKA stands for Excellence in Undergraduate Research, Experience, Knowledge, and Achievement.)
- The Institute's newly organized Science Outreach Program to bring students from Pasadena high schools together with Caltech students. A pilot project this spring sent Jacqueline Dixon, graduate student in seismology, to Pasadena High School to give three lectures. Later the PHS students visited the campus for a tour of the seismology laboratory and an audiovisual presentation by Peter J. Wyllie, professor of geology.
- Several centennial publications, including pictorial note cards; a newly designed, illustrated campus map; and a visitors' brochure. A foldout brochure for the Caltech Architectural Tour Service (CATS) is also included.
- Memorabilia ranging from centennial pins and bumper stickers to such special-order gifts as wooden desk sets and watches. In between will be a choice of centennial items, available at the book store, such as mugs, key chains, mechanical pencils, pens, T-shirts, and sweatshirts, carrying either the centennial logo or a beaver motif.
- Several special musical events commemorating the centennial. These include Caltech night at the Pasadena Symphony, a concert by the Caltech Glee Clubs and the Caltech-Occidental Orchestra, and four additional concerts to be added to the regular monthly Dabney Lounge Chamber Music Concert series.
- Two varieties of wines to be identified by Athenaeum manager Abel R. Ramirez and the Athenaeum wine committee for labeling as centennial wines to be served at centennial functions.
- A silk-screen press and drying machine will be purchased for the Caltech studio art class, and a student committee, working with the centennial steering committee, will design and produce T-shirts and posters for special centennial events.
- A four-day alumni centennial celebration, May 16-19, including Alumni Seminar Day and an all-class reunion dinner on Saturday night. Dinner will be at the rebuilt Huntington Hotel, renamed the Ritz-Carlton. During the four days, there will be lunches, brunches, breakfasts, receptions, tours, concerts, and other gatherings.
- A Friday noon-time birthday party on November 1, 1991, for the entire campus, with music by the Caltech Jazz Band and a cake big enough for everyone to have a piece.

Chan was generous in his praise for the members of his committee, and for the 11 subcommittees who have worked for 15 months to produce the proposals and backup information supporting them for centennial projects. "Some months we met every week for two hours," he says. "These are very resourceful people and they came up with an abundance of wonderful ideas. The president, the provost, and the vice presidents had lots of good things to pick from."

Seinfeld new E&AS division chairman

John Seinfeld, the Louis E. Nohl Professor and professor of chemical engineering, and executive officer of chemical engineering, is the new chairman of the Division of Engineering and Applied Science

Seinfeld came to Caltech as assistant professor in 1967, and since 1974 has been executive officer for chemical engineering. In his new post, he succeeds Paul Jennings, who was division chairman from 1985 until last November, when he was named provost.

Seinfeld, whose research has focused on the physics and chemistry of air pollution and on formation and dynamics of atmospheric aerosols, is the author of seven books and 250 articles, and the recipient of numerous awards, including membership in the National Academy of Engineering, the 1970 Eckman Award of the American Automatic Control Council, the 1972 Dreyfus Foundation Teacher-Scholar Grant, and three awards from the American Institute of Chemical Engineers—the 1976 Colburn Award, the 1980 Institute Lectureship, and the 1986 Walker Award. Seinfeld also received a NASA Public Service Award in 1980, and the American Society for Engineering Education's McGraw and Westinghouse awards in 1976 and 1987, respectively. He is the recipient of a distinguished alumnus award from the University of Rochester.

ALUMNI

From the alumni president

The Alumni Association has had a very active year, and as I close my term as president, I would like to review our goals and accomplishments. The Alumni Association strove to meet three primary goals this year: increase young alumni participation in the Association, expand alumni services offered to students, and prepare for Caltech's centennial in 1991.

Several committees were instrumental in our effort to encourage young alumni

Rhonda MacDonald

to participate in the Association. The Undergraduate Admissions Support (UAS) program had excellent alumni participation at high school and college fairs nationwide. The Program Committee has taken into account the needs of young alumni and is developing several short, low-cost programs including visits to the Big Bear Solar Observatory and the San Onofre Nuclear Power Plant, and a white water rafting trip. The Membership Committee hosted a senior barbecue on May 20 to increase awareness of the Alumni Association's activities.

Our involvement with several campus organizations resulted in increased student contact. With almost 100 employers responding, the Student/Faculty/Alumni Relations (SFAR) Committee received excellent response to the Day-on-the-Job and ASPIRE (summer job and research) programs. This was the first year that we went nationwide with the ASPIRE program, and we were pleased that it was so well received. House activities such as the Ricketts House bridge tournament and barbecue and the Fleming House softball game were well attended. Graduate Student Council luncheons were quite popular and involved students, alumni, and corporate guests discussing topics such as fluid mechanics and applied physics. We also supported a Christmas open house, Sports Day, and a reception for chemical engineering's Lacy Lecture series.

The Centennial Committee finished planning the 1990 calendar and continued planning for 1991's activities. The year will be filled with exciting events to celebrate this milestone in Caltech's history, including our Rose Parade event with Caltech's float, and the all-class reunion and Alumni Seminar Day activities, May 17-19, 1991.

The UAS Committee has filled all six regional director positions, and is striving to fill all area coordinator and alumni admissions representative (AAR) positions. The nationwide receptions for admitted students were a resounding success, and we thank those alumni who graciously opened their homes to us.

Chapter activity continues to grow, as the Denver and Tri-State (Connecticut, New Jersey, and New York) chapters held their inaugural meetings. Some chapter highlights include San Francisco's sold-out tour of Stanford's Linear Accelerator Center and San Diego's well-received talk by Paul Saltman (BS '49, PhD '53), professor of biology, UC San Diego.

The challenge was put forth and you met it. *More Legends of Caltech*, along with *Legends*, has been such an overwhelming success that the Publications Committee is developing a boxed set for the centennial. In addition, the committee is already hard at work on the 1992 Alumni Directory.

The Program Committee has scheduled the Yellowstone trip at the end of the month, and brochures on January's East African safari are in the mail to all alumni in the United States. The Program Committee is developing trips to such diverse areas as California's Owens Valley, Hawaii, Iceland, and the Galapagos Islands.

The Alumni Association has succeeded in its efforts because of the hard work and dedication of several alumni and Caltech staff members. My thanks go to Judy Amis, executive director, and her staff: Arlana Bostrom, Marilyn Caiquo, Karen Carlson, Michelle Clem, Patsy Gougeon, Jane Grace, Kathy Harris, and Karen Kurilich. I wish Kathy success in her new ventures, and welcome the following staff members in their new roles: Arlana, assistant director; Karen, program coordinator; and Michelle, administrative secretary.

I would also like to express my thanks to the members of the Executive Committee: Micheal Boughton, vice president; Gary Stupian, treasurer; Le Val Lund, secretary; and Charles Holland, past president. The committee provided me with excellent support during the year and helped keep the Alumni Association board members and staff working as a team in planning and executing activities.

We could not have accomplished our goals without the superb help of the committee chairs. My sincere thanks go to: Ted Combs, centennial chair; Vic Veysey, chapter affairs chair; Joe Dobrowolski, membership chair; Tway Andrews, program chair; Pete Mason and Bill Whitney, publication co-chairs; Gary Stupian, reunion chair; Le Val Lund, SFAR chair; and Ed Lambert and Bill Whitney, UAS co-chairs. The committee chairmen actively recruited association members to serve on the committees and developed enthusiastic teams to conduct their activities.

I would like to extend a special "thank you" to Dr. Everhart, who has continued to be very supportive of alumni activities and goals, especially for our centennial celebration. His participation in chapter events at San Francisco, New York, and Denver was appreciated by everyone.

I also give my sincere thanks to two individuals who have consistently been advocates of Alumni Association efforts: Ted Hurwitz, vice president for Institute relations; and Bob O'Rourke, assistant vice president for public relations. Ted and Bob provided excellent support in helping us meet our staffing needs to carry out our ambitious programs. I also thank Sunney Chan and the administration for their unwavering support of our centennial celebration efforts.

This past year has been very rewarding and I am pleased with the accomplishments we achieved. I wish Mike Boughton much success and enjoyment as the new president of the Alumni Association during the exciting time of Caltech's centennial.

We appreciate feedback from alumni regarding any Association issue. Please contact us by mail or phone: Caltech Alumni Association, mail code 1-97, Pasadena, California 91125, (818) 356-6592.

Alumni Fund announces Mayr challenge grant

The George H. Mayr Foundation has awarded Caltech a challenge grant of $75,000 to be utilized over a three-year period. The purpose of the grant is to encourage Caltech alumni to help build the Institute's scholarship endowment funds. During 1990, the foundation will match, dollar for dollar up to $2,000 each, the first $25,000 in alumni gifts made to named scholarship endowment funds or to the general Institute endowment designated for scholarships.

The George H. Mayr Foundation has made this grant in addition to its regular annual gift for undergraduate scholarships. The foundation has made annual grants to Caltech for scholarships for over 30 years.

The foundation was established by George Henry Mayr in 1949 to provide scholarship aid to students attending private California colleges, universities, and high schools. Dr. Mayr, who was a physician and real estate investor in both Chicago and Los Angeles, had a lifelong interest in helping young people to complete their educations.

East African safari offered to alumni

The Caltech Alumni Association is offering its members an East African safari to Kenya and Tanzania, January 22 through February 6, 1991. Exclusively for alumni, the safari will be led by Edwin S. Munger, professor of geography, emeritus, who will be making his 80th trip to the continent. Munger's experience and in-depth knowledge of the region will provide participants with a unique opportunity to experience magnificent landscapes and wildlife while learning about the current issues that face East Africa.

From cosmopolitan Nairobi, Kenya, to pastoral Tanzania, the group will travel through areas of abundant wildlife, including the Ngorongoro Crater, the Masai Mara Game Reserve, and Amboseli National Park. The northernmost point of the safari takes participants across the equator into Kikuyu country. Museum tours, game runs, and a hot-air balloon safari will provide the group with distinctive views of this vast region. Two extraordinary features of the tour, personally arranged by Munger, will be a reception at the U.S. Embassy, hosted by the U.S. ambassador to Kenya, Smith Hempstone, and a personal tour of Olduvai Gorge with Mary Leakey, schedules permitting.

Alumni can also take advantage of two optional extensions to the safari. Munger has offered to guide interested travelers on a pre-safari trip to the Kenyan Coast. This excursion will take participants to the old Portuguese port city of Mombasa, and to the island of Lamu, which prohibits auto traffic, allowing alumni the opportunity to stroll undisturbed amongst the 14th-century Arabic architecture. Munger's post-safari trip will feature a guided hike up the gentle slopes of Mt. Kilamanjaro.

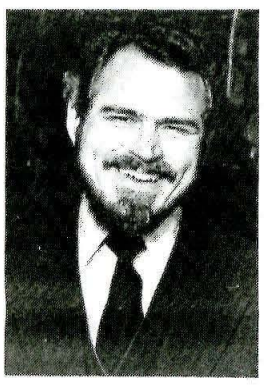
The cost of the excursion will be $4949 including airfare from the west coast. The extension trips are offered at an additional cost, and require a minimum number of participants.

Alumni Association members will be given priority for the safari. Detailed brochures have been sent to all alumni residing in the United States. If you would like more information on this exciting adventure, please contact Karen Kurilich, program coordinator, Alumni Association, at 818-356-8364.

Chapter news

Walter Specht enjoys contact with people in Boston alumni chapter

Walter A. Specht (BS '57, MS '61, PhD '65), president of the Boston alumni chapter, says that what he enjoys most about his role is the contact with the other alumni and the knowledge that they all are trying to help Caltech. Specht feels that the purpose of an alumni chapter is to give members the



Walter Specht

opportunity to get together, enjoy one another's company, and share memories. Another objective is to provide a channel of support for the Institute. One way in which the Boston chapter is providing such support is through involvement in the Alumni Admissions Representative Program. Participants in the program represent Caltech at high school and college fairs where they talk to students interested in enrolling.

The Boston chapter sets a goal of three meetings a year for either a seminar, dinner, or social event. Most programs focus on giving people interested in technology the opportunity to acquire new knowledge within a Caltech framework. The last program was an excursion to an exhibit at the Boston Museum of Science. Specht says some future programs under consideration include geology day trips, a seminar on the Hubble Space Telescope, and a visit to the New England Aquarium. Some members have offered to contribute technical seminars based on their work. "We have more ideas for programs than we have time slots," says Specht.

The president of the Boston alumni chapter joined the MITRE Corporation in 1981 as a member of the technical staff in the Naval Systems and Technical Intelligence Department. His major efforts at MITRE have involved signal security, telemetry data noise removal techniques, telemetry data manipulation system implementations, and technical support to major system development programs.

From 1974 to 1981, Specht was an engineering specialist in the Electro-Optics, Electronic Warfare, and Shipboard Systems Organizations of the Western Division of the Sylvania Systems Group. At Sylvania, he was design task manager for the conceptual design and specification of the land mobile configuration of the Navy's signal security assessment system, CLASSIC FOX; staff engineer for optical design in the office of the chief engineer; and head of the research and development section of the Electro-Optics Organization. In addition, he developed and proposed advanced-systems concepts in electro-optical, radio frequency, and microwave systems; planned and coordinated IR&D programs, and marketed electro-optical warfare and reconnaissance systems.

His earlier work was in laser radar and imaging systems at TRW Systems, and in quantum electronics research at Hughes Research Laboratories.

Tri-State alumni chapter holds inaugural meeting

The Tri-State chapter of the Alumni Association, serving Connecticut, New Jersey, and New York, held its inaugural meeting at the Princeton Club in New York City on April 3.

Twenty-eight alumni and their guests, including Life Trustee James Robison, heard President Thomas E. Everhart answer questions about Caltech's future plans. Everhart reaffirmed Caltech's commitment to its traditional scientific and technological focus, emphasizing fundamental issues. He mentioned that we are entering a period of unique opportunities in the biological sciences, and that the Institute intends to remain in the forefront in this expanding area.

The Tri-State chapter is developing a calendar of events for 1990-1991. Anyone wishing more information should contact Andrew Weigel (BS '73) at 212-480-3360.

Athletic dept. starts newsletter

Caltech's athletic department is going through an era of rapid transition. Major facility upgrades, program expansions, and special events will be taking place over the next few years. So that the department can keep alumni informed and involved, plans are under way to begin sending out regular newsletters to all former athletes. But first a directory of former Tech athletes must be developed.

Thus, the department is asking all alumni who participated in athletics as undergraduates at Caltech to fill out and send in the form below. Please give specific information, because some events will solicit participation by members of certain teams or years. If the response to this request is favorable, alumni can expect to receive their first athletic department alumni newsletter before the start of the next academic year!

Annual Fund Council plans for year ahead

The Annual Fund Council held its yearly meeting on campus on April 21, to plan for the upcoming campaign, scheduled to begin in the fall. G. Stanley Holditch (BS '48), Annual Fund chairman, headed the meeting. Seventeen representatives from around the country met to discuss fund-raising strategies. These key volunteers are responsible for recruiting approximately 750 additional alumni workers. Their efforts this year resulted in a volunteer group of 5 percent of the entire alumni body, a remarkable percentage.

The Fund Council is responsible for five distinct campaigns. The Special Gifts I and II campaigns focus on soliciting gifts of $1,000 or more for membership in the Golden Beaver Society. Reunion volunteers organize class gifts to be presented to Caltech when the class reunion is held. The newest campaign is the Young Alumni group which contacts graduates who received a bachelor's degree within the last nine years. Finally, the remainder of the alumni are divided into 13 national areas and are contacted by a volunteer from the regional campaign.

Alumni interested in working as a volunteer for this highly successful group should contact the Office of Annual Giving at 818/356-6323, or write to the office at Caltech, mail code 105-40, Pasadena, California 91125.

Alumni Activities

June 1, *Half Century Club reception and luncheon*, the Athenaeum. The class of 1940 will be inducted into the Half Century Club. Members and guests are invited to attend.

June 1, *Reception for class reunions (for classes of 1945, 1950, 1965, and 1980)*, the President's home.

June 1, *Class reunion dinners (for classes of 1945, 1950, 1980)*, the Athenaeum.

June 2, *Class reunion dinner (for class of 1965)*, Alumni House.

June 2, *53rd Alumni Seminar Day*, the Caltech campus.

June 21, *Alumni Association annual meeting and honorary alumni dinner*, the Athenaeum.

June 24–July 1, *Yellowstone travel/study program* with Robert P. Sharp, the Robert P. Sharp Professor of Geology, Emeritus, and Leon T. Silver, the W.M. Keck Foundation Professor for Resource Geology.

September 15, *Alumni Fund Leadership Conference*, the Caltech campus.

January 1, 1990, *Rose Parade event*. Breakfast and lunch, the Athenaeum. Reserved seating for the 102nd Tournament of Roses Parade, Hill and Colorado.

January 22–February 6, 1991, *East African safari (Kenya/Tanzania) travel/study program* with Edwin S. Munger, professor of geography, emeritus.

.....

Name _____ Class year _____

Address _____

_____

Phone _____

Sports and years played at Caltech _____

_____

Athletic awards, honors, etc. _____

_____

Please mail to: Dan Bridges, Director of Athletics
Caltech 1-2, Pasadena, CA 91125

CALTECH IN THE NEWS

●*Fortune* magazine's 60th anniversary issue looks at what life will be like in the 90s. Caltech professors and alumni Lee Hood and Carver Mead were interviewed for the article, along with businessmen, politicians, and other researchers. In describing his research to develop computerized instruments known as gene machines, Hood stated, "In 15 years we'll have identified at least 100 genes that predispose people to diseases, and we'll have figured out how to circumvent their bad effects. Medicine will thus shift from a reactive to a preventive mode." Carver Mead said of his work to develop machines that imitate the way the mind processes information, "There's no question in my mind that we will have machines that understand speech, and that understand the world by looking at it. We're going to be able to do that, but it won't be tomorrow."

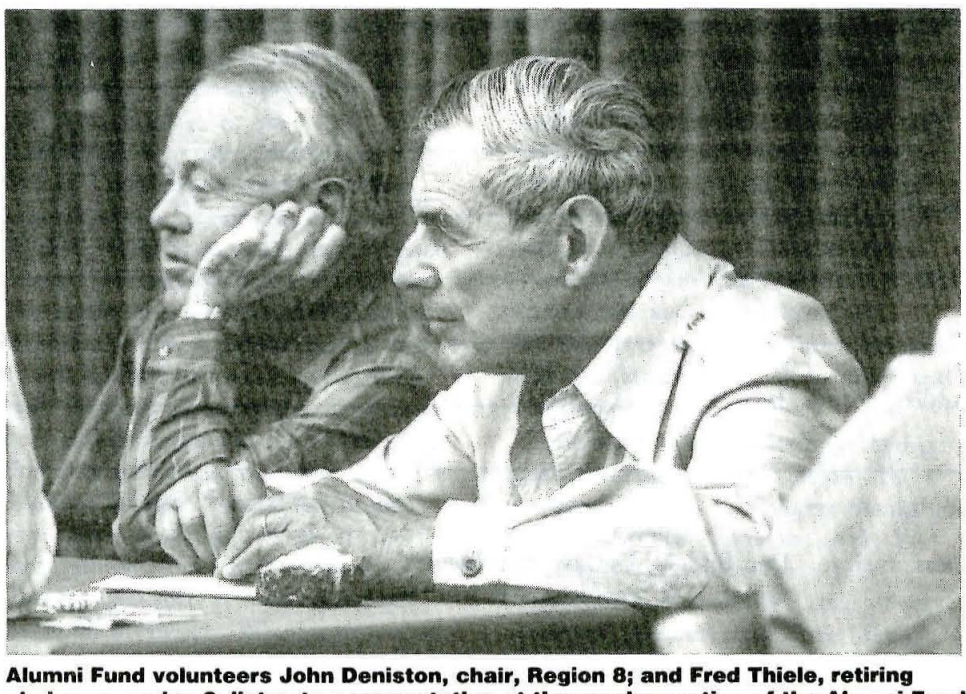
●David Van Essen, professor of biology at Caltech, and Charles Anderson, of JPL, suspect that there is an area in the brain which corrects retinal slip—stabilizing an image that moves as it is being viewed. So far, this area has not been mapped, reports the winter 1989 issue of *Mosaic*. But the pair is attempting to make a model of the "shifter circuit" that would feed moving images into a neural network, and then stabilize the image. "We've hypothesized the existence of a 'shifter circuit,'" says Van Essen, "which would probably use retinal information, and would probably be in the primary visual cortex. We don't necessarily believe this model is correct in the simplest form, but the model does make predictions for what to look for in the brain."

●What was Pasadena like on November 28, 1900? That is the question that columnist Jack Smith addressed in the *Los Angeles Times* on March 12. In a local newspaper from that date, Smith found home lots for sale at $1,000, and bread for five cents a loaf. He also found that Throop Polytechnic Institute offered complete courses in sewing and cooking, along with biological, physical, chemical, and electrical laboratories. Tuition was $75 a year.

●The promising research on wet photovoltaics by Caltech associate professor of chemistry and alumnus Nate Lewis recently received media attention. Lewis and his group were highlighted on February 13 in a new column on science in the *Pasadena Star-News*. The research is aimed at finding a way to "convert sunlight into electricity cheaply enough to compete on a widespread basis in the world's energy economy."

●An example of Caltech student humor appeared in the February 26 *New Yorker* in an article by Joan Didion which was commenting on the recent, controversial changes in the *Los Angeles Times,* described by the paper itself as "the new, faster format." Didion wrote that even Caltech's student paper, the *California Tech,* was "having a little fun at the *Times*' expense, calling itself the 'new, faster-format *Tech*,' and declaring itself dedicated to 'increasing the amount of information on the front page by replacing all stories with pictures.'"

●In an article entitled "Positive Chemistry," the *Cape of Good Hope News* tells of the efforts of Harry Gray, director of the Beckman Institute, to help his chemistry colleagues in southern Africa. Because of Gray, 19 chemists who are black or teach at predominately black institutions, have become members of the American Chemical Society. They received free subscriptions to ACS journals, which otherwise would have been prohibitively expensive due to current monetary exchange rates.



Alumni Fund volunteers John Deniston, chair, Region 8; and Fred Thiele, retiring chairman, region 8, listen to a presentation at the yearly meeting of the Alumni Fund Council.

Everhart speaker at two commencements

President Thomas E. Everhart delivered the addresses at two commencement exercises this spring. He spoke on April 14 for the commencement of the Graduate School of Business and Management of Pepperdine University, where he received an honorary degree. He was also the speaker on May 11 for commencement at the Colorado School of Mines in Golden, Colorado.

OBITUARIES

1924
JOHN W. PIPER, Larchmont, New York, on October 30, 1989, after a lengthy illness. He is survived by his wife, Edith; two daughters, Jayne M. Huggins and Judy E. Zinn; and five grandchildren.

1927
EDWARD M. BROWDER, JR., has died of asthma and was buried in Arlington National Cemetery. A life member of the Alumni Association, Browder began his U.S. government career in 1930 as a structural designer in the Panama Canal Zone. After serving as an engineer in the Army during WWII at the canal, he continued his career with the Panama Canal Company until his retirement from the position of assistant director of the engineering and construction bureau in 1964. Browder then moved to San Francisco, where he was a structural designer for the downtown stations of BART. He was a fellow of the ASCE, and a former president of the Panama-Canal Zone chapter. He was a life member of the Masons and a member of the American Section, Care Board of Engineers for Rivers and Harbors. Browder is survived by his wife, Marie; and two sons, Edward and William.

1930
AUSTIN W. STRONG, MS '31, of San Marino, California, on February 7, of cancer. He had worked for the Southern California Gas Company, and was a volunteer at Caltech's Industrial Relations Center. He is survived by his wife, Barbara.

1933
DOUGLAS G. MARLOW, of Newport Beach, California, known as Pete to his classmates, of a heart attack on December 23, 1989. He invented the multiturn potentiometer and was instrumental in the development of the first commercial spectrophotometer while employed by Beckman Instruments. His expertise in optical instrumentation led to later employment with the Naval Weapons Lab, ElectroOptical Systems, and several other firms. He is survived by his wife and two children.

1939
REAR ADMIRAL LEONIDAS D. COATES, MS, of San Diego, California, on November 15, 1989.

1942
JACK C. SMITH, PhD, of Chevy Chase, Maryland, on January 19, of cancer. He is survived by his wife, Charlotte.

1944
KNOX T. MILLSAPS, PhD, of Gainesville, Florida, on December 19, 1989, after a long illness. He was 68. Millsaps was a professor in the aerospace engineering, mechanics, and engineering science department at the University of Florida, and served as chairman of the UF engineering sciences department. Millsaps had also worked in several positions for the Air Force, as well as in various faculty positions at MIT, Colorado State University, and Ohio State University. He is survived by his former wife, Lorraine Harte; three daughters, Melinda, Charmaine, and Catherine; and a son, Knox, Jr.

WILLARD R. SCOTT, of Palos Verdes Estates, California, on January 24, of cancer. He was born July 1, 1922, in Los Angeles. After graduation, he served in the Navy during WWII. He had retired last June after a 33-year career at TRW, where he worked in the space program. He is survived by his wife, Alice; children, Donald Bradway, Judith Kiraly, Douglas, and Roger; five grandchildren; and mother-in-law, Marguerite Robey.

1951
DAVID S. RATHJE, of Hermosa Beach, California, on November 22, 1989. He collapsed while hiking. He is survived by his wife, Janice.

1959
MARTIN E. NORDBERG, Jr., MS, PhD '61, of Ithaca, New York, in 1989.

1965
WILLIAM D. HIXSON, MS '66, of Durango, Colorado, on September 17, 1989, of a cerebral hemorrhage.

1981
CELIA R. PETERSON, of Bloomington, Indiana, on December 21, 1989, in an automobile accident. She is survived by her father, Lloyd.

PERSONALS

1941
GEORGE HARR, of Long Beach, California, writes, "After trekking in the Mount Everest region in 1986, I returned to Nepal in October, 1989. This time the trek was into the Annapurna Sanctuary. Although not as long or as high as the Everest trek, it was probably as strenuous due to the interminable stone staircases on a route cutting across the grain of the mountain ranges. As on my previous trip, I met another Techer. After Nepal, I visited India, Thailand, and Korea."

1942
FRANK FLECK, of Yucca Valley, California, is credited with organizing the grass-roots protest that encouraged Congress to repeal the Catastrophic Medicare Act of 1988. Fleck wrote and published a book entitled *Seniors Arise*, and distributed it to key legislators and influential people throughout the United States. Fleck is a stockbroker with Thomas Green San Diego Securities, Inc.

KEEP US INFORMED!

Keep us informed so we can keep your fellow alums informed. Send us news about you and your family, about a new job, promotion, awards—anything you'd like to see printed in the Personals section of *Caltech News*. Return this coupon and any additional materials to: *Caltech News*, Caltech Mail Stop 1-71, Pasadena, CA 91125.

Name _____

Degree(s) and Year(s) Granted _____

Address _____

_____

Is this a new address? ___ Day phone _____ Occupation _____

News _____

_____

_____

_____

1944
ALFRED G. KNUDSON, PhD '56, of Philadelphia, Pennsylvania, was elected to the National Academy of Sciences in 1988. A senior member of the cancer research staff at the Fox Chase Cancer Center, Knudson has also received the Mott Prize from the General Motors Cancer Research Foundation in 1988, and the Medal of Honor from the American Cancer Society in 1989.

1947
JOHN L. MASON, MS '48, PhD '50, has been elected president of the Society of Automotive Engineers, Inc., for 1990. The 55,000- member organization is dedicated to the advancement of mobility technology to better serve humanity. Mason is retired from the position of vice president of Allied-Signal Aerospace Company, a company he joined in 1950. Mason has served on SAE's technical board and its board of directors. He was elected an SAE fellow in 1988.

1948
JAMES C. FLETCHER, PhD, has received the National Engineering Award from the American Association of Engineering Societies for work that "has been of significant benefit to the engineering profession and the nation."

George Gleghorn

GEORGE J. GLEGHORN, MS, PhD '55, vice president of product integrity at TRW Space & Technology Group, has been elected a member of the National Academy of Engineering for his contributions to the development of advanced scientific and communications satellites and the technology of spacecraft systems engineering. Gleghorn and his wife reside in Rancho Palos Verdes, California.

1951
STEPHEN PARDEE, MS '52, of Summit, New Jersey, writes, "I retired at the beginning of this year from my job as director of the computer-aided engineering and design lab at AT&T Bell Laboratories. I am enjoying retirement, and plan to do a little consulting and resurrect my golf game."

1952
EDWIN B. KURTZ, PhD, of Flagstaff, Arizona, has been appointed professor emeritus of life science at the University of Texas of the Permian Basin, in Odessa, Texas, after 39 years of teaching.

1954
WILLIAM A. NEVILL, PhD, professor of chemistry at Louisiana State University in Shreveport, has been appointed to chair the joint advisory board established by the American Chemical Society and the Smithsonian Institution, which will help with the plans for a new addition to the Smithsonian, "Science in American Life."

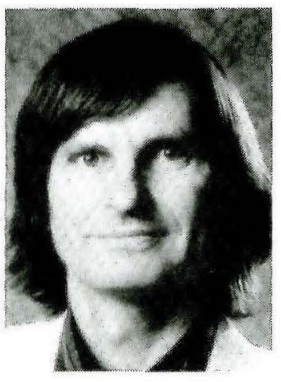
1956
WILLIAM W. BUCHMAN, PhD, of Los Angeles, California, recently retired from the position of senior scientist/engineer at Hughes Aircraft. He writes that he hopes to do more fly fishing and to learn Macintosh programming.

1957
ELIZABETH BERTANI, PhD, staff biologist at Caltech, writes, "My son Christofer will be graduating from Caltech this June with a BS in mechanical engineering. I wonder if we are the first 'mother–son' combination to come out of Caltech?"

1958
JOHN F. ASMUS, MS '59, PhD '65, of La Jolla, California, writes, "On April 26 I became a Rolex Laureate and received the Rolex Award for Enterprise for 'Laser Recovery of the Qin Dynasty Treasure-Trove Polychrome.' On the same day I received third prize in the IBM Supercomputing Competition for 'Digital Computer Image Enhancement of the Mona Lisa.' Asmus is a research physicist at UC San Diego.

1961
RICK FOSTER has accepted the position of dramaturge for the Sierra Repertory Theatre in Sonora, California. He held the same position at the Lorraine Hansbury Theater in San Francisco, and has taught at San Francisco State University.

1963
ALLEN M. PFEFFER, PhD '66, of Thalwil, Switzerland, is developing a new product line for Asea Braun Boveri.



John Nady

1965
JOHN NADY, of Berkeley, California, is president of Nady Systems, Inc., which he started in 1976. The company manufactures wireless microphones and consumer electronics. Nady is also founder and president of Omni Entertainment, Inc., which operates two of the largest, live showcase nightclubs—the Stone and the Omni— in San Francisco and Oakland. In addition, as a long-time rock musician, Nady "stays young" by performing at his clubs and recording in his own 16-track recording studio.

JOHN C. SIMPSON, JR., of Marshall, Virginia, has been appointed president of Mobil South, Inc., and is responsible for Mobil's marketing and refining in Africa, South America, Asia, Australia, and New Zealand.

1968
ARNOLD L. SHUGARMAN, PhD, of Santa Ana, California, has been promoted to manager of lubricants technology at Unocal's Science and Technology Center in Brea, California. He manages twenty-four chemists, engineers, and technicians responsible for research and development of new and improved lubricant products and manufacturing processes for Unocal's Refining and Marketing Division.

1969
WILLIAM A. COTY, of Danville, California, has been promoted to the position of director of applied research of Microgenics Corporation, which manufactures genetically engineered medical diagnostic products. Coty and his wife, Sue, will celebrate their 25th anniversary this summer.

1970
STEVEN S. CHENG, PhD, of Hsin-chu, Taiwan, writes, "After a 19-year career with Bell Labs and Bellcore, with the last seven years as a PhD recruiter for Bellcore, I accepted a job as managing director of Taiwan's Information Technology Lab, a nonprofit research and development organization that works on the development of Taiwan's computer, telecommunications, and consumer electronics industry. My family will move to Taiwan in July."

1971
VICTOR W. LEE, M.D., of Fullerton, California, writes, "I was the medical director for the Kilimanjaro Confidence Climb in February. Twelve athletes from the California chapter of the Special Olympics spent one month in Kenya and Tanzania, culminating with a climb on Mount Kilimanjaro. Five of the twelve athletes successfully reached the summit—Uhuru Peak, at 19,300 feet."

1972
ROBERT C. DULLIEN, of Boulder, Colorado, writes, "Our third daughter, Julia, was born in October 1989. Jacqueline, 8, and Candice, 6, are attending Bear Creek Elementary. My management consulting and publishing practices are doing well (we advise companies on organizational and technology issues)."

PAUL B. RÉ, of Albuquerque, New Mexico, has had his art exhibit, "Touchable Art: An Exhibit for the Blind and Sighted," displayed at the Sumter Gallery of Art in Sumter, South Carolina.

1974
POL D. SPANOS, MS, PhD '77, a registered professional engineer in Texas and a professor at Rice University, Houston, Texas, has been named a Fellow of the American Society of Mechanical Engineers.

1976
HARVEY M. PHILLIPS, of Houston, Texas, writes, "My wife, Linda, and I rejoice at the birth of our daughter, Michelle, on January 1."

1977
ROSEMARY G. KENNETT, MS, MS '79, PhD '80, has recently moved from Pasadena to New York State. She remembers, "I spent two years working on radar scatterometry at JPL with Fuk Li. This is a fascinating system for measuring oceanic winds from space. Then I spent close to two years at home with my three children: Oliver, 8, Pamela, 5, and Heather, 4. During this time I trained as a docent at the Eaton Canyon Nature Center. My husband, Geoffrey Fox, and I are now moving to Syracuse, where we both will be in the physics department."

1980
JOHN R. DEAGUIAR writes, "My wife, two-year-old daughter, the new baby, and I have moved to Sebastopol, California (50 miles north of San Francisco), to live in a rural setting. I still work for Optigraphics Corp., a leader in engineering document imaging and management systems, as a senior research engineer. I have been working on image recognition, very large bitmap display and editing, system architecture, and other related technical issues, in addition to my management and marketing duties."

1981
ARTURO O. CIFUENTES, MS, PhD '85, of Ossining, New York, writes, "After living for nine years in Pasadena, I moved to New York, where I took a position in electronic packaging and applied mechanics with IBM. For those interested in finite elements, my book, *Using MSC/Nastran: Statics and Dynamics*, was recently published. We settled in Westchester County, where we are enjoying our new home. We are close to the city, so we can take advantage of the good things it offers, but not close enough to worry about congestion, etc. My wife, Ventura, took a job with Merrill Lynch in Manhattan.

1983
PHILIP S. BERAN, MS, PhD '89, of Centerville, Ohio, was named an assistant professor of aerospace engineering at the Air Force Institute of Technology, Wright–Patterson AFB, Ohio.

1984
DANIEL G. NOCERA, PhD, associate professor of chemistry at Michigan State University, has been awarded a Sloan Research Fellowship. Nocera's research focuses on uses of light as a means of catalyzing chemical reactions. He also received a Dreyfus Foundation award in 1983, and a Presidential Young Investigator Award in 1985.

1986
LAURA R. GILLIOM, PhD, of Albuquerque, New Mexico, was promoted in February to supervisor of the chemical instrumentation research division of Sandia National Laboratories. She is doing research in noninvasive diagnostics and new instrumentation.

ALAN P. SYLWESTER, PhD, of Albuquerque, New Mexico, was promoted in January to supervisor of the fuel sciences division of Sandia National Laboratories. He is doing research in catalysis and biomimetic chemistry.

Caltech*News*

Volume 24, No. 3
June 1990

Issued six times a year (Feb., April, June, Aug., Oct., and Dec.) 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. Postmaster: Please send address changes to *Caltech News*, 1-71, California Institute of Technology, Pasadena, CA 91125. (818) 356-4692

Rhonda L. MacDonald
President of the Alumni Association
Theodore P. Hurwitz
Vice President for Institute Relations
Robert L. O'Rourke
Assistant Vice President for Public Relations
Jane S. Dietrich
Director of Periodicals

Executive Editor — Winifred J. Veronda
Production Artist — Barbara Wirick
Copy Editors — Michael Farquhar, Julie Hakewill, Betsy Hatch
Personals/Obituaries — Betsy Hatch
Photographer — Robert Paz
Contributors — Phyllis Brewster, Heidi Aspaturian

USPS 085-640

Volume 24, No. 3
June 1990

California Institute of Technology

Caltech*News*

In this issue