

# CALTECH NEWS



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## Corcoran Is New VP For Institute Relations

William H. Corcoran, Caltech professor of chemical engineering, is the new Vice President for Institute Relations.

Corcoran, 49, a Caltech alumnus ('41, PhD '48) and a faculty member for 17 years, will supervise development, public relations, and related activities such as the Industrial Associates programs and relations with alumni.

"We have turned to a member of our faculty in appointing a new Vice President for Institute Relations," President Harold Brown said, "because we believe that Caltech is best represented by someone who knows its unique character, can participate knowledgeably in determining our future course, and can then tell our various publics about what we do and hope to do here."

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## Black SRA Project: Was It a Success?

In February of this year 12 students from four predominantly black southern colleges arrived at Caltech as part of an ASCIT Research Center project funded by the Ford Foundation. They were recruited by Caltech students to work on educational projects of their own choosing. The first 12 were joined in May by eight students from Federal City College in Washington, D.C.

In general, the people involved in the program thought it was successful, with the positive factors far outweighing the negative ones. In all cases, the student research associates showed a strong interest in their projects and were plainly dedicated to helping expand opportunities for black young people.

Most negative aspects centered around the Federal City College group. The February arrivals had the benefits of a carefully-thought-out orientation, the novelty of being first, and the stimulation of being relatively heterogeneous. Charles Creasy, '70, a black Caltech student who headed the project, admits that a much-needed orientation period was missing the second

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# Commencement -- 1969

A record 401 degrees were conferred June 13 by President Harold Brown at Caltech's 75th commencement. Among the degrees, 125 were doctorates, compared to 110 last year. There were 113 master's degrees, 157 bachelor's degrees, and six advanced engineering degrees.

In the commencement address, Herbert F. York, professor of physics at the University of California, San Diego, and former member of the President's Science Advisory Committee, emphasized that the present is a good time for America and Russia to discuss arms control.

Speaking on "A Personal View of the Arms Race," York, who served on the general advisory committee of the Arms Control and Disarmament Agency, declared:

"The present seems to be a particularly propitious time for achieving some new and stronger steps in the way of arms control and disarmament agreements... I believe we are approaching a deadline on this matter, and if we don't successfully seize this opportunity quickly, it

will pass and another like it won't come along for a long time."

The present period is opportune because the current arms situation is characterized by two factors, he declared. One is parity, "not only in the sense that each side has... more or less equal numbers of weapons, but in the important sense that each side has easily enough weapons to deter the other from attempting a first strike..."

The second factor York listed as "the relatively high degree of confidence each side now has in the accuracy of its assessment of the other side's capabilities."

He explained that it is the pending change in the second factor that threatens to end the present period of parity and stability "during which negotiations seem to be so promising."

The ABM (antiballistic missile) and MIRV (multiple independently targetable reentry vehicles) are the items that threaten to upset the second factor, he added. That is why he is opposing deployment of the ABM. The physicist believes

ABM's would "seriously accelerate the arms race just at a time when there appears to be promise of getting it under control."

York said that lack of progress in arms control comes from "fear of what the other side might be up to, fear of what they might gain by cheating, lack of confidence in the methods proposed for policing agreements, arguments over which

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*Commencement speaker Herbert York*

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## Haagen-Smit Warns of Catastrophic Pollution

Continuing air pollution could produce either a "greenhouse effect" that would heat up the earth's atmosphere or a screening effect that would deflect sunlight and result in an untimely glacial period.

"Scientists are worried about both possibilities," said Arie J. Haagen-Smit, Caltech professor of bio-organic chemistry and chairman of California's Air Resources Board.

"We don't know yet who is right, but we had better find out before it is too late—before we've melted the polar ice caps and inundated most of our coastal cities, or before we suffer a period of glaciation," declared the pioneer smog authority.

Haagen-Smit made the remarks on May 14 at the third International Symposium on Man and Beast at which he was awarded the Hodgkins Medal by the Smithsonian Institution. A co-recipient is Jule Gregory Charney of MIT.

"This generation is witnessing important man-made changes in the composition of our atmosphere," Haagen-Smit said. "In burning up our fossil fuels of coal, oil, and gas, we are increasing the carbon dioxide content of the air by about 0.03 percent per year. This is of concern to many scientists, who have predicted a rise in temperature because of the insulating effect of the carbon dioxide layer.

"Others have pointed to the increase in particle load or general dirtiness of the atmosphere, which would lead to a decrease in temperature due to an increase in reflection of the sun's heat rays."

Haagen-Smit added:

"Our ancestors lived in the happy certainty that the earth was infinite, that there was enough soil, water, and air to go around. The system was well balanced, seeming to have a comfortable stability.

"But now—looking at an astronaut's view of the earth—we begin to realize the earth is not so large and that the apparent stability applies only to our time period, which is infinitely small in the time scale of geologic and evolutionary changes.

"The living world had time, in the past, to adapt itself to a changing world, but since man came, the rate of change has been accelerated greatly. We are using up oxygen and increasing the carbon dioxide content of the air in a measurable way.

"The world underfoot, in the soil, has suffered too, from indiscriminate spraying with insecticides, herbicides, nematocides, and other toxic agents," he continued. "These have disastrous effects on soil organisms, and it takes years to re-establish a balanced soil population. And, because of thoughtless use, DDT has turned up in penguins living as far away as the South Polar regions—and, I am sure, in us too.

"A modern version of a well-known children's story sounds like this: Man eats the bird that ate the fish that ate the plant that ate the DDT that man made."

Haagen-Smit pointed out that in our urban areas eye irritation and respiratory difficulties have become common.

"To the sufferers, it is poor consolation that they are experiencing a most interesting geochemical experiment. We are watching how nature reacts to a change in the atmosphere and how it tries to reestablish the old equilibrium.

"There are, of course, many ways of ducking the responsibility. One can go

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away, as the soil creatures do; one can mutate, or one can buy a gas mask. Or—and I think this is the right way—one can fight for clean air and join the battle for intelligent land, water, and air use."

Haagen-Smit was awarded the medal for discovering the chemical nature and source of smog—particularly the photochemical smog of the Los Angeles basin. The gold medal of the Hodgkins Foundation is awarded in recognition of important contributions to knowledge of the physical environment. □

## HONORS AND AWARDS

PETER B. S. LISSAMAN, assistant professor of aeronautics, has been appointed to the transit technology review board, formed by the Southern California Rapid Transit Board directors. Lissaman is also an appointee to the Jet Propulsion Laboratory as consultant for non-space activities, particularly transportation.

WILLIAM B. ATWOOD, '70, won the 1969 Haren Lee Fisher Memorial Award in junior physics at Caltech. Atwood won the award because "the quality of his research is outstanding, and he has carried much of the responsibility for the successful progress of the projects with which he has been associated."

KENNETH T. FONG, '70, won the annual Honeywell Award, given by the Minneapolis-Honeywell Co. to the junior, preferably in engineering, who is the outstanding scholar. Fong has maintained a straight-A average in his three years at Caltech.

GEOFFREY M. LEE, '72, was awarded the Morgan Ward prize. It is given to the freshman or sophomore who submits the best mathematical problem and solution, or a significant contribution toward a solution. Lee submitted two problems on binomial coefficients.

DOUGLAS REECE, '69, won the 1969 David Joseph MacPherson Prize, which goes annually to a graduating senior in engineering who exemplifies scholastic excellence. Reece designed and developed a computer system that makes animated motion pictures. It is believed that the system can be used extensively in producing documentary and instructional films.

ROBERT E. TARJAN, '69, won the Eric Temple Bell mathematics prize for the best original mathematics paper written by a junior or a senior. It was titled "Max-min Theorem in a Combinatorial Theory."

KENNETH YOUNG, '69, has been awarded the Richard P. Feynman Fellowship for the 1969-70 academic year. The award is given to the student "who best represents the standards exemplified by the man whose name it bears." □

## Caltech Chooses Five More Alumni For Distinguished Service Awards

*These awards were presented to four of the five recipients at the Alumni Association annual meeting on June 11. The fifth winner, Satish Dhawan, could not be present at the ceremony.*

### Satish Dhawan, AE '49, PhD '51

After receiving his PhD from Caltech, Dhawan returned to India and became a senior scientific officer in the department of aeronautical engineering at the Indian Institute of Science in Bangalore. He was made assistant professor in 1952 and professor and head of the department in 1955. He has been director of the Institute since 1963, while continuing as professor of aeronautical engineering. Over the last decade, Dhawan has been closely associated with the development of aeronautics research and education in India. He serves on numerous governmental boards and committees and has traveled extensively to international scientific conferences as their representative.

Dhawan is a fellow of the Royal Aeronautical Society and is president of the Aeronautical Society of India. In 1966 he was awarded the Padma Shri by the president of India.

### Paul DeVries Manning, MS '17

Manning, the first man to receive a master's degree from Caltech, has had an active career in both industry and teaching. He was professor of chemical engineering at Caltech from 1958 to 1963, during which time he taught industrial chemistry and conducted research on protein-containing vegetation, toward the development of low-cost food sources. Prior to his service with Caltech, he spent 17 years with the International Minerals and Chemical Corporation of Chicago, retiring as senior technical vice president.

Manning was Pacific Coast editor of *Chemical and Metallurgical Engineering* for 14 years and is the author of over 80 scientific and technical papers on a wide variety of subjects. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, as well as other professional societies, and is a fellow of the American Association for the Advancement of Science and the New York Academy of Science.

### William B. McLean, '35, PhD '39

McLean's current position as technical director of the Naval Undersea Research and Development Center is the culmination of 27 years with the federal civil service. He joined the National Bureau of

Standards in 1941 as a nuclear physicist and transferred to the Naval Ordnance Test Station at China Lake, California, in 1945. He was appointed technical director at China Lake in 1954 and remained there until he assumed his present position in 1967.

He is the recipient of a number of service awards, including the maximum federal government award for the development of the Sidewinder air-to-air missile in 1956. He is also a member of numerous professional organizations such as Sigma Xi, the American Physical Society, and the American Association for the Advancement of Science. He was elected to the National Academy of Engineering in 1965.

### Howard Edwin Reinecke, '50

Reinecke, Lieutenant Governor of California, made his entry into politics fairly recently. He had served as president of Febco, Inc., manufacturers of lawn irrigation equipment, from 1954 to 1964, the year he was elected to Congress representing California's 27th Congressional District. As a Congressman he worked to bring the long-disputed Colorado River Basin water project to a conclusion and fought to maintain the state's right to preserve its own motor vehicle emission control standards—projects that reflect his concern for the problems of air and water pollution in California. Reinecke terminated his congressional career in January 1969 to become Lieutenant Governor, replacing Robert Finch.

Lt. Gov. Reinecke has several patents and holds membership in service and professional organizations, among them Kiwanis International and the American Society of Sanitary Engineers.

### A. M. Zarem, PhD '44

Zarem, recently retired senior vice president and director of Xerox Corporation and retired chairman of the board of Electro-Optical Systems of Pasadena, has had an outstanding career as a scientist and corporate manager. Founder of Electro-Optical in 1956, Zarem led his company in the development of new techniques, devices and components, and systems in most areas of electronic technology. He became a vice president of Xerox when the two companies merged.

In addition to his industry responsibilities, Zarem has also taught at UCLA, and is a trustee of Harvey Mudd College and member of the Claremont Colleges Board of Overseers. He holds member-

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Distinguished Service Award winners—Paul Manning (above), A.M. Zarem (right, above), William McLean (right, below), and Ed Reinecke (below) get medallions from Harold Brown.





California State College Chancellor Glenn Dumke addresses 250 alumni on June 11

## Dumke: Academic process intact

"To judge solely by newspaper and television coverage of violence, the whole state college system must be in shambles," said California State College Chancellor Glenn Dumke to the Alumni Association annual meeting. But, he reminded the 250 people present on June 11, trouble occurred on only three of the 19 campuses, and only one school suspended operation briefly. "The academic process continues, and we demonstrated that violence could not be a means of settling issues."

Dumke pointed out that the California state colleges will grant 31,600 bachelor's degrees this year—5 percent of all those given in the United States and 50 percent of those in California. They will also award 5,300 master's degrees, a third of all those given in California.

In trying to analyze students today, the speaker said that they *are* different from the students of a generation ago, just as the nation is different than it was in those times. Prior to World War II, he said, "the problems of the nation and the world didn't impinge on students." Today the students are very much aware of

what is happening off the campus.

Unfortunately, he added, the students don't have a good sense of history and so don't recognize progress made by the preceding generation. "The students see only today. They take the good for granted; the bad sticks out at them like a sore thumb."

Dumke summarized today's students as concerned, worried, and eager. And overall, he added, they are activists.

"But," warned Dumke, "within every university there exists a serious threat to the university and perhaps to the country itself"—the anarchists who are trying to destroy the system.

It is necessary, he said, to expose and oppose the plans of organizations like the SDS and Black Panthers. They are sophisticated, intelligent, and know their field. They are able to capitalize on important issues and use other students to their own ends.

Their programs, he claimed, are twisted to ends that sound like Marxist-Leninist philosophy, although, he added, not all the student militants are Communist-dominated. But the shouts are similar to

those raised, with less success, in the thirties. He thought there were possible ties with nations in the "red orbit," and said there was some Communist money and influence in the movement. But, he said, the majority of the student militants are anarchists, not Communists.

He noted that while students in general sympathize with the goals of the militant organizations, "there is every indication that the ultimate goals of the militants are not what they say. Their own literature and statements indicate that they want to start restructuring the universities, because they consider the universities to be the most vulnerable of our institutions."

He warned that J. Edgar Hoover has said that an SDS leader talked of five, ten, or fifteen years over which a revolutionary movement would be built. Those building the revolutionary movement, Dumke added, look for support to young idealistic students and faculty members. He reminded the audience how few people it took to produce revolutions in other countries.

But, he said, well over 99 percent of today's students are concerned, sincere citizens. "I endorse their *constructive* student activism. But I condemn without reservation the anarchists who would use the students to their own ends."

The Association's annual meeting, held again at Rodger Young Auditorium in Los Angeles, featured the presentation of a third series of Alumni Distinguished Service Awards. Recipients, who were introduced by Caltech President Harold Brown, were Paul DeVries Manning, MS '18; William McLean, '35, PhD '39; H. Edwin Reinecke, '50; and A. M. Zarem, PhD '44. A fifth winner, Satish Dhawan, PhD '51, was attending a conference in London and was unable to attend.

Among the people outgoing Association President Don Davidson welcomed were:

►Some 25 members of the class of 1969 and their president, Lonnie Martin.

►Mike O'Haver, '29, "the only alumnus here whose death has been reported in *Caltech News*" (see Personals).

►Three of the four Alumni Scholars—James Richards, '70; Steve Sheffield, '72; and Larry Shirley, '69.

►Representative of the oldest class present, Ludy Langer, '15.

►Three members of the 50-year class of 1919—Clarence Bjerke, Bruce Burns, and Clayton LaVene.

Davidson paid tribute to his colleagues retiring from the Association's board of directors this year. He cited John Fee, '51, treasurer since 1959 and now treasurer emeritus, thanking him for an outstanding job.

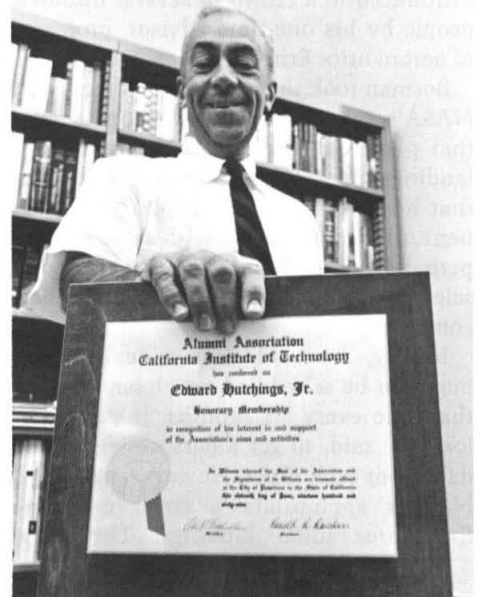
The other retiring director present at the meeting was Fred Selleck, '49, former president of the Association, who completed four years' service on the board. Selleck, Davidson said, "contributed leadership over three difficult years when we were looking very closely at ourselves."

Retiring directors not at the meeting were Fred Eimer, '47, PhD '53; Martin Webster, '37; and Donald S. Clark, '29, PhD '34, secretary of the Alumni Association since 1946. Davidson explained that Clark, scheduled to retire from the board in June, had submitted his resignation several months earlier for personal reasons.

Davidson announced the results of the election for the 1969-70 board of directors. New directors are Rube Moulton, '58; Cliff Burton, '40; Earl Hefner, '51; and Warren Schlinger, '44. Officers will

be Bob Meghreblian, PhD '53, secretary; Art Spaulding, '49, MS '58, treasurer; Bill Freed, '50, vice president; and Craig Elliott, '58, president. Directors continuing from 1968-69 are Fred Anson, '54; Bob Perpall, '52, MS '56; Doug Ritchie, '57; Bill Chapin, '41; Chuck Ray, '61; and Horace Baker, '35. Davidson also acknowledged the work done this year by Jim Black, new executive director of the Association.

Edward Hutchings Jr. was presented with an honorary membership in the Alumni Association in recognition of his 21 years as editor of *Engineering and Science* magazine. Davidson noted that Hutchings had distinguished not only the Association through the publication, but the Institute as well. □



Ed Hutchings Jr., honorary member number 11

## ASCIT Begins Another Summer Project: This Year It's Education

On June 30 the ASCIT Research Center's education group began a five-week summer institute at the Cleveland Elementary School in Pasadena. More than 300 people are taking part in the project, which centers on innovative teaching methods.

It is headed by Betsy Oliver, a student research associate from the University of Massachusetts. She is aided by Caltech alumni Gregg Wright and Mike Garet, members of the 1969 graduating class; and Barbara Holland, an SRA from Boston University. On the institute staff are 20 teachers from the Pasadena schools and 30 college students from Caltech, the Claremont Colleges, Stanford, UCLA, Occidental, and four eastern colleges. Some 250 third-through-twelfth-grade students are also participating.

Some of the methods used are similar to those tested by the four institute leaders, who taught mathematics and science this year in Los Angeles and Pasadena schools. The methods encourage students to formulate their own questions and, with help, to make observations and conclusions [*Caltech News*, April 1969]. Gaming techniques are being used in teaching elements of political science, history, anthropology, and science. There are also workshops in music, sculpture, painting, and collage; and students are working with film, video tape, and are building musical instruments.

The operation is funded by grants from the U.S. Department of Health, Education, and Welfare, and from the Rockefeller Foundation. □

## New VP Corcoran

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"It is from such a sequence of activities that support for our teaching and research can flow. As a distinguished and respected faculty member and as an outstanding individual, Corcoran is superlatively qualified to carry out these functions."

In taking over his new duties Corcoran will retain his professorial position, but will resign as executive officer for chemical engineering, a post he has held for two years.

Corcoran is active in a variety of fields. He is especially interested in biomedical chemical engineering and has developed courses at Caltech on the teaching of principles of chemical engineering by working on topical problems such as the designing of artificial kidneys. He is a nationally known authority on chemical engineering kinetics, transport processes, rocketry, and engineering in medical areas. His bibliography includes 40 scientific papers and three books.

Since 1963 Corcoran has been chairman of Caltech's important committee on sponsored research and is a member and chairman of many other Institute committees. He has taught undergraduate and graduate courses and last year was named educator of the year by the San Fernando Valley Chapter of the American Society of Tool and Manufacturing Engineers. □



William Corcoran

During World War II he did research and development at Caltech on rocket propellants, interior ballistics of rockets, and ordnance work for the Manhattan Project. From 1948 to 1952 he was director of technical development at Cutter Laboratories in Berkeley. He joined the Caltech faculty in 1952, and while on the faculty he served—1957-1959—as vice president and scientific director for Don Baxter, Inc., a biomedical engineering and hospital supply firm in Glendale, Calif., and a subsidiary of the American Hospital Supply Corp. □

## Borman: From Caltech To the Moon--And Back

An alumnus returning to campus is usually lucky to find a professor who remembers his name or even one student who has any interest in him. Frank Borman, MS '57, is obviously not in that category. When the Apollo 8 astronaut visited his old school on May 28, he was treated like a first-magnitude celebrity—chauffeured car, personal escorts, and plenty of autograph hunters.

The occasion of his appearance was a two-day trip to Pasadena to see people at JPL and Caltech in connection with his new job—field director of space station studies for NASA. At Caltech he was introduced to a crowd of several hundred people by his one-time advisor, professor of aeronautics Ernest Sechler.

Borman took the opportunity to explain NASA's manned space program, saying that plans call for nine additional lunar landings after the first one in July. After that he would like to see a large, permanent orbiting lunar lab with a life span of perhaps ten years, available for use by all scientific disciplines and open to all countries.

Ideally, he said, the nine landings ought to be scheduled no closer together than one every six months. It takes that long, he said, to get a perspective on the data from each flight. However, he added, NASA's appropriations cover only the first three lunar landings. The space



Astronaut Frank Borman fields questions about space travel and the Apollo program.

agency must sell the rest of the lunar program on its merits.

After his brief remarks, Borman opened up the session to questions from the audience. The first few came hesitantly, but with Borman answering quickly and crisply, the tempo picked up; after about 30 minutes Borman's escorts had to halt the session to allow him time to get to the airport for his departure. Some of his comments during the session were that:

"We need a more flexible space suit. The one we have now doesn't have a decent torso joint, and it's like walking around in an inflated tire casing.

"Our mode of transportation will be unsophisticated—by human foot, which is, after all, not a bad way to go. There have been all kinds of wild suggestions about other methods of transportation, including some kind of flying belt, which I find ridiculous. I'd like to have the person who is pushing it try it himself

first—over the Grand Canyon.

"The first landing will be primarily a test of the transportation systems. Scientific experiments will consist of a more accurate determination of the orbit of the moon, a seismometer, and, of course, collection of samples. The second landing will be equipped to do more, such as test for the moon's seismological occurrences and test for the solar wind. Those experiments will have isotope power supplies that will keep them operating for months or even years.

"There's no way we could have gone to the moon without the Caltech-JPL programs of Ranger, Lunar Orbiter, and Surveyor.

"On Apollo 8 there were 5 million parts and only five minor failures. That's pretty reliable. However, on Apollo 11 those last 50,000 feet above the lunar surface will be a whole new ball game. The reliability engineers would probably put the overall safety factor at 99.999 percent. Personally, I'd put it at about 75 percent.

"When they return, the astronauts will spend 21 days in isolation. We really don't know for sure what the procedure for protecting against possible extraterrestrial organisms should be, but this quarantine is based on the beliefs of a lot of very solid scientists. But having seen the moon from a distance of 60 miles, I'd say that if there is any living bug on the moon, it's a very hardy one.

"We're sending samples of lunar material to more than 30 countries, and the Russians are welcome to some of our material—but I think the Russians are

planning to collect their own.

"The moon is international, like Antarctica, and should remain that way. I hope there will be no military uses of the moon and that it will be shared by and bring cooperation among all earthmen.

"There are no provisions for space rescue. The philosophy has been to build redundancy into the equipment to minimize the danger. I get very upset with people who raise a fuss about there not being provisions for space rescue. All the astronauts have made their decisions to take the necessary risks. If something happens, that's it, and we're prepared to accept it.

"Please don't get the idea that I'm foolhardy about risk; none of us is. In the case of dangerous solar flares during the flight, there are certain mileposts along the way during the trip at which we can, if necessary, abort the mission and return to earth.

"I still believe that our American society, with all its faults, is the most noble creation of man—and the space program is an essential part of it. I can suggest five reasons why I think the program should be continued: the need to continue a program that challenges the country in time of peace; the educational impact of space technology not only in lower grades but among graduates in engineering and other fields; the scientific findings in space that will be of great value; the sheer quest and exploration involved; and the tendency of all countries to cooperate and perhaps realize that earth is a fragile thing." □

## More: Commencement 1969

*Continued from page 1*

comes first—agreement to stop something followed by working out policing methods, or vice versa—and arguments over the number of on-site inspections and by whom they ought to be carried out."

During the commencement ceremonies, the annual Frederick H. Hinrichs Jr. Award for outstanding contributions to the welfare of the student body was given jointly to Joseph Rhodes and Christopher Dede. Rhodes, a history major from Pittsburgh, was twice student body president and an originator of the ASCIT research project. He will be a Harvard Junior Fellow for the next three years.

Dede, a chemistry and English major from Milwaukee, has participated in Caltech's YMCA, the drama group, and other activities. He won a Danforth Fellowship for advanced study and a merit award from *Chemical and Engineering News*.

The George W. Green Memorial Prize for creative scholarship was awarded jointly to Edwin Loh, a physics major from Blacksburg, Va., and John A. Armstrong, a chemistry major from Northport, Long Island, N.Y.

Harold Brown echoed some of York's comments when he told the graduates that "I can assure you that almost all of us who have labored in that particular vineyard share Herb York's apprehensions and conviction of urgency, and most of his conclusions. Indeed, of those who have served as civilian officials in the Defense Department at the level of Presidential appointment . . . the overwhelming majority have recognized the severely limited utility of military power and the frightening dangers in its exercise, as well as the sad necessity of its possession. The higher their position, and hence their responsibility, the more they have come to the conclusion that we must seek

national security through other than strictly military means—and urgently."

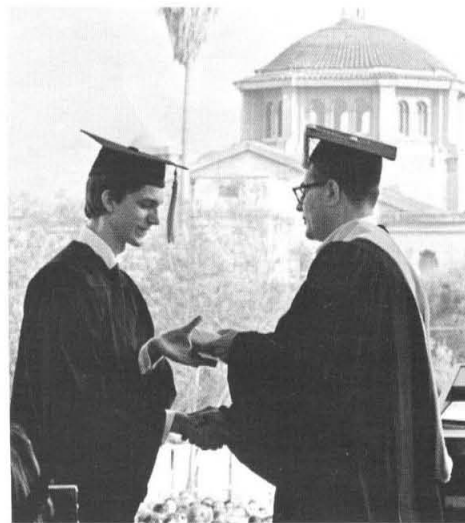
Brown also discussed problems of more immediacy to the student and local communities, such as the failure of modern industrial society "to provide material rewards to some, and psychic satisfaction to many, of our citizens," and the Vietnam war, "whose effect on our national security is complex, not simple, to explain and which is viewed by many of our people as tragic and mistaken at best, wicked at worst." Campus unrest, he said, is the expected result of youth's particular sensitivity to these deficiencies of society.

"But we can hope for one saving grace," Brown said. "That is a sense of mutual respect and of trust, which I have seen at Caltech between people and between groups who differ profoundly, and even heatedly, over issues at the Institute or over the often-related great issues of our time. Such a sense of respect for others' opinions, even if we think they are mistaken, for others' motives, even if we think they are foolish, produces a sense of community which can carry an institution or a people through crises. It appears to be less common in political life, in industrial life, and in urban life than it was. It is clearly less common than it was in academic life. At Caltech I find it exists still, but inevitably it is more precarious than it was.

"How can it be otherwise when the larger communities . . . of which we are a part are losing it? I pray we may retain such a sense of community and of mutual respect and trust . . . Success in this endeavor perhaps can help bring back such mutual respect to the larger communities of which Caltech is a part. That quality is desperately needed if the high average level of material prosperity and intellec-

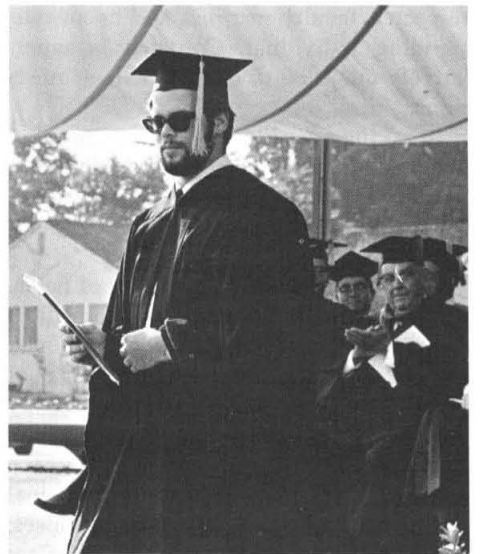


Hinrichs Award winners Joe Rhodes (above) and Chris Dede (below); Green Award winners Edwin Loh (right, above) and John Armstrong (right, below).



tual achievement, in which we take pride, is to be extended to those who now fail to share in it."

Brown told the graduates that he hoped their years as part of the Caltech community had helped them to grow and that they had "obtained a sense of the joy science offers, that learning offers, that life offers. This generation will, I am sure, continue to have, to overcome, and to make its share of troubles—the world is like that. The problems of the world



are hard, and never really soluble. But I beg of you, act so as to ensure that you get your share of the fun too—the fun that lies in learning, all your lives, in discovery, in work, in building, in reforming, even in revolting; the fun that lies, sometimes, in interacting with other people and learning that you are not alone in your problems, your hopes, your emotions.

"Remember us kindly, if you can. Goodbye, and God bless you all." □

## More: Research Center's Black Student Program

*Continued from page 1*

time around and that the very homogeneity of the FCC students did not work to anybody's advantage.

The alienation of these students from the Caltech community could also be related to such facts as that Federal City College is only a year old and, as Creasy and some of the other black SRA's pointed out, has as its director of black education an "angry" black man, Jimmy Garrett, who went to FCC from San Francisco State. Four of the eight are in his program there and, Creasy suggests, are influenced by his philosophy. Also, the group is younger than the earlier arrivals. They average 18 years of age to the others' early twenties.

Their one self-made confrontation with the Caltech community was a meeting held in Winnett Plaza several weeks after they arrived, which was conducted by Maurice Frye, the most vocal member of the group. Frye's remarks, and those of some of the others, irritated numbers of Caltech people, especially the startling descriptions of Caltech as a bastion of secret war work for the Pentagon. This irritation was compounded by the question of how they could know much about Caltech when they had kept so much to themselves, and off campus to boot.

Creasy feels that today a young black person may go through certain predictable stages of attitudes, and that the FCC students who came to Caltech were in the midst of a difficult transition period in their development. He describes the stages:

1. Childhood unawareness that he is different—i.e., "You don't stop to wonder why you and your mother always sit at the back of the bus."
2. The awareness of being considered not only different but often suspect by the majority of white people.
3. The stage where he wants to prove that he is really no different from the rest of the citizenry. This includes nonviolent protests against any infringement of his civil rights. If he is thwarted at this point, he may go a step further into:
4. Cultural nationalism. He becomes immersed in the pride of being black. He fights for black studies and gives up social values and points of appearance he thinks of as white. He distrusts whites and tends to move out of contact with them as much as possible.
5. The last stage is revolutionary nationalism. By now, the young black person has a strong dedication to certain basic principles where the rights and treatment of blacks are concerned. However, he accepts white individuals who feel the way he does.

Creasy's hunch is that the FCC youngsters are in transition between cultural nationalism and revolutionary nationalism. Right now they want little to do with Caltech or whites in general. Being set down in the Institute atmosphere with no other similar environment to compare it with was, possibly, too exotic an experience. The general agreement among the other black SRA's is that these students came because the available money would further their projects and they could also do some recruiting of students for Federal City College. Creasy thinks their Caltech experience has had a small moderating effect on them. However, he



About a dozen black students from other colleges, from local public schools, and from Caltech speak in Winnett plaza on May 22.

resists talking in generalities and points out that there are some members of the group who are out of phase 4 enough to have more perspective on their own personal development. These individuals have taken a more positive interest in some aspects of Caltech.

Lyman Bonner, Caltech's director of student affairs, is of the opinion that, in the future, all SRA's should be more carefully and individually screened by their student coworkers in order that both the SRA himself and Caltech can benefit to the fullest by the experience.

Some Caltech faculty and students say that the original 12 SRA's exhibited more initiative in taking advantage of their situation than many of Caltech's regularly enrolled students do. Several took courses or special tutoring from Caltech professors—in history, black literature, mathematics, biology, and physics. Pur-

## Bowerman, Gilbert, Strong Retire

Three long-time members of the Caltech faculty—Paul Bowerman, Horace N. Gilbert, and Foster Strong—retired in June.

Bowerman, 70, professor of modern languages, emeritus, joined the Caltech faculty in 1942 after service in several countries as a U.S. foreign service officer. He joined the Institute's faculty as an instructor, became assistant professor in 1945 and associate professor in 1947. He also was a teaching assistant in English at USC from 1938 to 1945. Bowerman received his bachelor's degree at Dartmouth in 1920 and his master's degree at the University of Michigan in 1936.

Gilbert, 67, professor of business economics, emeritus, came to Caltech in 1929 as assistant professor after teaching for four years at Harvard University. He became associate professor in 1930 and professor in 1947. Gilbert got his bachelor's degree at the University of Washington in 1923 and his master's degree at Harvard in 1926. He was active in mobilization and defense work during World War II, for which he received a special commendation from the commanding general of the Air Materiel Command.

Strong, 68, dean of freshmen, emeritus, came to the Institute in 1933 for his master's degree in physics. He started teaching physics at Caltech in 1937, became assistant professor in 1943 and associate professor in 1965. He also served as dean of freshmen for 23 years. Strong got his bachelor's degree in civil engineering in 1922 at the University of Wisconsin, then entered industry to work

with the projects that originally brought them to the Institute took them on visits to other California colleges and led to considerable work in public schools in Pasadena. Two spent part of their time back at their own university—Xavier in New Orleans—gathering information on its relationship to the black community around it. This resulted in laying groundwork for a community center in which Xavier students will participate. A further result was that one of the Xavier SRA's enrolled at Yale for a summer program in the general field of community service.

Communications is the basic study of the Federal City College group. They are working on a book and a film designed to show black communities how the mass media can, they feel, distort "the black experience" in the United States. They are also studying attitudes of students on several college campuses, attitudes of black student unions, and the political aspects of communications between blacks and whites.

If Creasy had it to do all over again, he says he would plan to have every SRA working on the same research topic. As it was, the scope of some was just too broad for one person, or even a small team, to make any impact. He would also try to arrange it so that a second group would not come into the picture so late.

He regrets that there were not black SRA's in more student houses. Only Ricketts and Blacker absorbed any. He says the interaction in these two houses was "pretty good," and that it "was probably more helpful to Teckers than to the black students."

He is gratified that so many of the SRA's asked and received faculty assistance, and that some chose to appear before the faculty committee on minority admissions to try to give some insight into black attitudes.

Some found Caltech's academic excellence "challenging" and an intellectually invigorating environment to be in. Those having any extended contact with faculty members were appreciative of the warmth and interest they encountered. Their underlying disappointments in Caltech sound familiar: So many students are not aware of the social changes eddying around them, and some who are aware don't care to involve themselves. Also, they felt the Institute has the opportunity to make a positive impact on the Pasadena community, but doesn't. In short, these visitors took a fresh look at the Institute and then voiced many of the same comments that some of its own students and faculty have been making. □

## Scoggins: New PR Head

Ty F. Scoggins, well-known figure in Los Angeles and Pasadena community affairs, became public relations director of Caltech on July 1. He succeeded James R. Miller, who moved east to resume a career in free-lance writing after 15 years at Caltech.

Scoggins, 51, had served since 1959 as manager of public relations for Getty Oil Company, where his responsibilities included the shareholders relations program, governmental relations, internal corporate communications, external communications, and community relations. From 1949 to 1959 he was public relations manager for Shell Oil Company in the southeast and southwestern United States.

Scoggins is a native of Colusa, California. He graduated with a BA in science from the University of California, Berkeley, in 1940 and later did graduate work at both Stanford and UCLA. □

## Distinguished Alumnus

*Continued from page 2*

ships in many professional and public service organizations, including the American Chemical Society, American Institute of Aeronautics and Astronautics, American Physical Society, and Los Angeles Chamber of Commerce. He is a member of the President's Council of Caltech. □

### Placement Assistance To Caltech Alumni

The Caltech Placement Service may be of assistance to you in one of the following ways:

- (1) Help you when you become unemployed or need to change employment.
- (2) Inform you of possible opportunities from time to time.

This service is provided to alumni by the Institute. A fee or charge is not involved.

If you wish to avail yourself of this service, fill in and mail the following form:

To: Caltech Placement Service  
California Institute of Technology  
Pasadena, California 91109

- Please send me: (Check one)
- An application for placement assistance
  - A form indicating a desire to keep watch of opportunities although I am not contemplating a change.

Name.....  
Degree(s)..... Year(s).....  
Address.....  
.....

## PERSONALS

**1929**

HUBERT M. O'HAVER, reported in the June *Caltech News* to have died, says that he is very much alive and enjoying his recent retirement from the Southern California Gas Co. *Caltech News* regrets the error and the concern it caused the O'Havers and their many friends.

**1932**

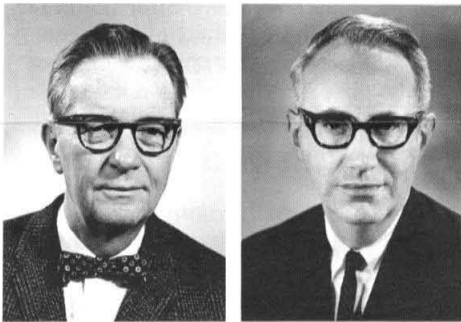
JOHN A. LEERMAKERS, PhD, vice president of Eastman Kodak Company, Rochester, N.Y., was awarded an honorary Doctor of Science degree by Hampden-Sydney College, Hampden-Sydney, Virginia. Associated with Eastman since 1934, he has directed its research laboratories since 1964.

**1933**

ARNOLD M. KUETHE, PhD, the Felix Pawlowski professor of aerodynamics at the University of Michigan, was this year's Henry Russel Lecturer at the university. The lectureship is the highest honor the university can bestow on a senior faculty member. He was cited as "an outstanding teacher and an able contributor to the planning of curricula," with a reputation "national and international in scope." Kuethe delivered the Russel lecture on March 26.

**1935**

ROBERT C. WARNER became chairman of the department of molecular and cell biology at the University of California at Irvine on July 1, 1969. He was previously at New York University School of Medicine.



Kuethe, '33

Cohan, '49

**1938**

FREDERICK E. LLEWELLYN has been elected chairman of the board of trustees at the University of Redlands. He is president and general manager of Forest Lawn Memorial Park.

**1941**

JOHN R. WHITE, MS '52, has been elected a vice president of Arthur D. Little, Inc., where he has been a member of the staff since 1961. He was previously responsible for the management consulting division's work at the company's headquarters in Cambridge, Mass.

**1947**

EDWARD ARTHUR TRABANT, PhD, president of the University of Delaware, has been elected to the board of directors of Atlas Chemical Industries, Inc.

**1949**

HOWARD J. COHAN was appointed assistant chief research scientist in the Bureau of Reclamation's division of design at the agency's Denver engineering and research center. He has been with the Bureau since 1948 and had been chief of the water conservation branch in the division of research since 1964.

**1951**

PAUL L. ARMSTRONG JR., MS '55, has joined the Georgia-Pacific Corporation as senior chemical engineer in the central engineering department in Portland, Oregon.

FREDERICK E. WOOD JR., president of the

Alumni Association's New York chapter, has moved to St. Louis to become manager, GEM Field Systems Center, IBM Corporation. He was formerly a marketing associate with IBM in New York.

**1953**

THOMAS H. APPLEWHITE, PhD '57, has been named manager of edible oil products research at the Kraftco (formerly National Dairy Products) Corporation's R & D division at Glenview, Illinois. He was formerly research director and manager of the Richmond, California, division of the Pacific Vegetable Oil Company.

JOHN D. GEE is the new assistant manager of sales in the Los Angeles district for Bethlehem Steel.

**1955**

ROBERT HANSEN, PhD, manager of chemicals for Dow Chemical Company's European business development department, will transfer to Midland as a business strategist in the corporate product department.

WILLIAM A. RANK, MS, a colonel in the U. S. Army, was graduated from the U. S. Army War College at Carlisle Barracks, Pa., on June 16. He is scheduled for a new assignment with the staff and faculty of the U. S. War College.

**1956**

JOSEPH P. GIBBS has been appointed vice president and general manager of the instrumentation division of Microdot, Inc. He will direct the company's Dynisco facility in Westwood, Mass., and direct the manufacturing of instrumentation products in South Pasadena. Gibbs joined Microdot in 1962 as chief engineer for transducer products, and he was most recently general manager of Dynisco.

ERIC WARD, Ex, has been appointed by Lee A. DuBridge, science advisor to President Nixon, to head the Council on Science and Technology in Washington, D.C.

**1957**

JACK J. STIFFLER, MS, PhD '62, a principal engineer with Raytheon's equipment division, Sudbury, Mass., was organizer and chairman of the "modern technology for signal handling" session of the IEEE's International Convention and Exhibition held recently in New York.

**1958**

DENNIS G. PETERS, associate professor of chemistry at Indiana University, has been named this year's winner of the annual Ulysses G. Weatherly Award for distinguished teaching. He was cited for "combined excellence in teaching with the authoring of excellent textbooks. Gifted and dedicated as a teacher, he devotes extra time and effort to ensuring that as many of his students as possible acquire a thorough knowledge of the subject matter."

RICHARD TANAKA, PhD, has been elected president of the American Federation of Information Processing Societies (AFIPS) by the Federation's board of directors. Tanaka is vice president of California Computer Products, Inc., in Anaheim.



Rank, '55

Stiffler, '57

**1959**

RAYMOND W. ALLARD, MS, was recently appointed vice president, midwest operations, of Data Central Incorporated, New Brighton, Minnesota. Allard, one of the founders of the company, which offers computer-related services in the midwest and western United States, was formerly with Control Data Corporation.

**1962**

ARTHUR C. LUDWIG received his PhD in electrical engineering from USC in June 1969. He previously earned masters degrees in electrical engineering and mathematics at USC, in 1967 and 1968, respectively. Ludwig has worked at the Jet Propulsion Laboratory since 1962 and will now become the supervisor of the spacecraft antenna systems group there.

**1963**

DAVID W. HALL, PhD, will become an assistant professor of chemistry at the Colorado School of Mines in September 1969. Hall recently completed his postdoctoral fellowship at the University of British Columbia.

**1964**

ELLIOTT R. NAGELBERG, PhD, has been promoted to head of the military optics and electromagnetics research department at Bell Telephone Laboratories. Nagelberg joined Bell Laboratories in 1964.



Tanaka, '58

Nagelberg, '64

**1965**

RAJESHWAR K. MALHOTRA, PhD, who is technical director with American Universal Electric (India) Ltd., writes that he and his wife Neena became the proud parents of a boy on March 26, 1969.

PAUL G. MIKOLAJ, PhD, assistant professor of chemical engineering at the University of California, Santa Barbara, delivered a paper on the use of computers in the design of oil separation columns before the American Institute of Chemical Engineers at its 65th national meeting in Cleveland in May. Mikolaj, who is a consultant to the Santa Barbara firm of California Oceanography, Inc., recently received a grant from the National Science Foundation to study the effects of petroleum pollutants on resources of the Santa Barbara Channel and to chemically identify the source of submarine tar seepage.

**1966**

PETER W. WYATT, studying at Yale University for a PhD in engineering and applied science, has received a second one-year fellowship from the Schlumberger Foundation of Houston, Texas.

**1967**

MARTIN D. COOPER was married to Miss Beverly Yassim on June 22, 1969. Cooper is studying for his PhD in physics at the University of Maryland.

**1968**

LARRY R. BROWN has joined the Peace Corps and is stationed in the Fiji Islands.

SAMUEL E. LOGAN, MS '69, won first place for his paper on "A Simple Analytical Model for the Dust Devil" in the master of science division at the 19th annual AIAA region VI conference. Logan was presented the award by Cal Poly, Pomona, president, Robert C. Kramer, during the conference there.

## OBITUARIES

**1918**

WILLIAM A. KROUSS. He was formerly a sales engineer with General Electric in Los Angeles, retiring in 1965. He is survived by his wife and two sons.

**1923**

D. G. HARRIES JR., January 6, 1969. He was supplies requirement supervisor at Pacific Telephone and Telegraph Company in San Leandro, California.

**1929**

FRITZ K. SCHUMACHER, September 17, 1966. He was formerly a hydraulic engineer with the U. S. Geological Survey.

**1939**

ROBERT L. SMITH, February 28, 1969. Smith was a retired U. S. Marine Corps colonel and former resident engineer with Koebig & Koebig, Los Angeles. He is survived by his wife, Phyllis.

**1943**

DANIEL A. BENNETT, MS, December 14, 1968. Survived by his wife, Bennett was formerly the assistant secretary of the Joint Pole Association in Oakland.

**1963**

JOHN W. DAVIES, MS, March 12, 1968.

**1966**

MICHAEL A. ERLE, June 3, 1969. Erle died as a result of a fall in Houston, Texas.

**1969**

ROBERT D. WILSON, as the result of an auto accident on June 5, 1969. The tragedy occurred nine days before he was to have been graduated from Caltech.

Membership in the Caltech Alumni Association (\$10 a year) brings:

- *Engineering and Science* magazine nine times a year
- Alumni Directory, to be issued this year
- Athenaeum membership privilege

ARTICLES IN THE JUNE  
*ENGINEERING AND SCIENCE*  
MAGAZINE

- *To Charles Lauritsen and His Heritage*. Introduction by Carl Anderson.
- *Kellogg Laboratory: The Early Years*, by Thomas Lauritsen. When C. C. Lauritsen came to Caltech in 1926, the stage was set for 20 years of enthusiastic and prodigious research in nuclear physics.
- *Nuclear Astrophysics—Today and Yesterday*, by William A. Fowler. Nuclear research at the Institute dates back to 1934, when Willie Fowler was a first-year student. Here he reports on the development of this field and the Caltech men responsible.
- *Radiation Therapy*, by R. Stewart Harrison.
- *Mirror Nuclei and Charge Symmetry*, by Thomas A. Tombrello Jr.
- *Nuclear Beta-Decay Studies*, by Charles A. Barnes.
- *Where Does the Sun Get Its Energy?* by Ralph W. Kavanagh.
- *Atomic Spectroscopy and the Abundance of the Elements*, by Ward Whaling and George M. Lawrence.
- *Relativistic Astrophysics at Caltech 1923-1969*, by Kip S. Thorne.
- *The Time Scales of Nucleosynthesis*, by Donald S. Burnett and Gerald J. Wasserburg.
- *Accelerators, Channeling, and Solid State Physics*, by James W. Mayer.