

CALTECH NEWS

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY



Earle M. Jorgensen and race car builder and driver Dan Gurney inspect the winner of this year's Indy 500, the Jorgensen Eagle, a Gurney creation.

Race car fan's ultimate dream

Jorgensen sponsors 1975 Indy 500 winner

While millions of auto racing fans cheered the race car drivers in the Indianapolis 500 on Memorial Day weekend, no fan had more to cheer about than Caltech Trustee Earle M. Jorgensen. Jorgensen and his company, Jorgensen Steel, are the sponsors of this year's Indy 500 winner, the Jorgensen Eagle, driven by Bobby Unser.

Jorgensen's winning car is one of Dan Gurney's All American Racers. The Jorgensen-Gurney relationship, which began in 1972, is one of the most logical sponsorship arrangements in racing, because Gurney's racing cars are made out of Jorgensen steel and aluminum.

Jorgensen has long been personally interested in racing, and in addition, he feels the activity is a good promotional vehicle for his firm. "Thousands of our customers in the metal working business are race fans, and the Jorgensen name is brought to their attention and to that of the general public through increasing TV and press coverage," he noted.

Jorgensen Steel has announced the signing of a contract to sponsor Gurney, one of today's most successful race car builders and drivers and a

member of the Racing Hall of Fame, in his All American Racers' efforts in a number of major races. The company also sponsors Gurney's Formula 5000 road racing team.

Jorgensen, chief executive officer and chairman of the board of the firm that bears his name, is a dynamic man who skis, plays tennis, is active in community affairs, and is one of the founders of the Music Center and the Art Museum of Los Angeles. He is also a member of the Board of Regents of St. John's Hospital, in addition to having served as a Caltech Trustee since 1957.

He came to Los Angeles in 1921 and began his company with little more than a steel storage yard. Since then, his operation has grown to include 22 major plants in 20 cities.

Jorgensen was raised in the San Francisco Bay Area. His first taste of racing came when as a child he used to watch drivers of the Barney Oldfield era run on the city streets of Hayward and Oakland. He has always maintained his interest in the sport, and now, the achievement of having his car win the Big One, the Indy 500, is the race car fan's ultimate dream come true.

Austin, Burke elected to Board of Trustees

President Harold Brown has announced the election of two new members to the Caltech Board of Trustees: J. Paul Austin, board chairman and chief executive officer of The Coca-Cola Company, and Walter Burke, attorney, business executive, financier, and president of the Sherman Fairchild Foundation, Inc.

Austin left law practice in New York City 26 years ago to become affiliated with the world's largest soft drink company. He was named executive vice president in 1961, president in 1962, chief executive officer in 1966, and board chairman in 1970.

After obtaining a degree from Harvard Law School in 1940, he practiced law in New York City in 1940-41, and joined the Navy during World War II. He returned to law practice after the war, and became a member of The Coca-Cola Company's legal department in 1949. Austin is a director of the Continental Oil, Morgan Guaranty Trust, and General Electric Companies, and Dow Jones & Company. He and his wife, Jeane, live in Atlanta, Georgia. They have two sons.

Long-time financial adviser to the late Sherman Fairchild, Burke was chairman of the board of Fairchild Camera & Instrument Corporation for five years. He now devotes full time to public service activities.

J. Paul Austin



Walter Burke



Burke is chairman of the board of Brunswick School, Greenwich, Connecticut, and of Union Theological Seminary in New York City. He is a director of the New York Public Library and a member of the Board of Overseers of Hopkins Center, Dartmouth College, Hanover, New Hampshire. He and his wife, Constance, live in Greenwich. The couple has five children.

Newly appointed

Owens Valley Observatory director: Alan T. Moffet



Alan T. Moffet

Alan T. Moffet, PhD '61, professor of radio astronomy at Caltech, has been appointed director of the Institute's Owens Valley Radio Observatory. He succeeds Gordon J. Stanley, who has headed the observatory for ten years and who will remain on the staff as a research associate.

Moffet has been associated with the observatory since its inception, and as a Caltech graduate student, he helped with its construction. At the observatory he discovered that most radio galaxies consist of twin sources of radio emission. He also made important contributions to the understanding of pulsars and quasars—distant celestial objects that are strong radio sources and have vast outputs of energy.

He joined the Caltech faculty as a research fellow in 1962, was named assistant professor in 1966, associate professor in 1968, and professor in 1971.

The Owens Valley Radio Observatory was dedicated in 1958, and observers there have played important roles in the discovery of quasars and have contributed to other important advancements in the young science of radio astronomy. The facility is located 250 miles north of Pasadena in a deep valley between the Sierra Nevada and the Inyo-White mountain ranges, one of the best sites in the country for radio astronomical observations.

Now before Congress

Tax law changes threaten philanthropy

Caltech and other private colleges and universities face a serious financial threat through some of the proposed changes in the tax laws now being considered in Congress, according to President Harold Brown.

"We believe that tax laws affecting the private philanthropic gift will be strongly challenged in this session of Congress, and that some of the changes under study could be almost disastrous for private higher education," Brown said.

"If the present incentives to charitable giving are to be maintained, we need the help of alumni and friends of the Institute. We are asking everyone concerned with Caltech and its future to convey to their congressmen and senators the conviction that these tax incentives are vital to the future of institutions such as ours."

Brown pointed out that 14 percent of Caltech's income is derived from private philanthropic contributions, and that these funds are essential. He said that an additional 16 percent comes from the Institute's endowment program, and thus is the product of private gifts made in the past—a further indication of Caltech's dependence upon the charitable contribution.

"Like all colleges and universities today, we are facing tremendous inflationary pressures," he said. "Our need is for an increase in support from private sources. A decrease in this support would mean serious curtailment of our programs."

Brown alluded to a study by Martin Feldstein, professor of economics at Harvard University, who recently analyzed the effects of income tax treatment on charitable contributions.

Feldstein's figures indicate that contributions to education would decrease by 48 percent if the current charitable deductions were eliminated and if people in all income tax brackets changed the amount of their contributions by the same percentage in response to the new rules.

"Obviously, the effects of such reductions in giving would be calamitous for private colleges and universities," Brown said.

The most likely targets for tax change affecting private philanthropic gifts, Brown said, appear to be gifts of appreciated property and the unlimited deductibility of charitable bequests. Increases in the present minimum tax or a new minimum taxable income proposal may also be considered.

"Changes in any of these areas would strike hard at the large philanthropic gift, upon which we rely so

heavily," Brown said.

He pointed out that a survey by the American Council of Education—of 3.8 million gifts of more than \$5,000 each—showed that 75 percent of the funds were provided by less than 5 percent of the gifts.

"Tax provisions that encourage large gifts of appreciated property by



Harold Brown

individuals during their lifetimes or as bequests are of particular importance to higher education," Brown said. "Experience has shown us that any curtailment of the tax incentives that affects these gifts has a chilling impact on contributions.

Under current law, a taxpayer may make a charitable gift in the form of property. If he has owned the property for more than six months, then he may deduct the current market value of his gift. He is not taxed on its appreciation—the difference between its present value and what he paid for it. The principal proposal for tax reform in this area is to reduce the amount of the charitable deduction by one-half of the appreciation.

Incentives reduced

Such legislation would substantially reduce the incentive for charitable contributions of appreciated property—contributions that account for an estimated one-fourth of voluntary support to private higher education from all sources.

Brown called attention to a survey of major donors of appreciated property. This survey indicated that if the tax deductibility of their gifts had been removed, or restricted to their own costs rather than to the fair market value of the property, the donors would have reduced their gifts by more than 40 percent.

Brown also stressed the importance of the unlimited deductibility of estates left to charities—a deduction that critics have suggested limiting to 50 percent. He said that bequests are the largest single source of most colleges' endowment funds, and that most of these funds come from a few large estates.

"Charitable and educational beneficiaries would bear the full burden of a change in this tax law, even though the tax actually was paid by the decedents' estates," he said. "Such a change would create a grave risk that donors would limit their bequests to philanthropies to the portion of their estate that is deductible. The impact of such a change would be severe."

Brown said that the effect of a minimum taxable income proposal receiving some consideration in Congress would be to limit the total of all

deductions to a maximum of 50 percent of one's income.

Charitable contributions which almost invariably reduce the donor's net worth would be lumped with all other deductions, many of which do not. This proposal would penalize philanthropic giving, for taxpayers could only deduct for those contributions to charities that made up the difference between the total of all their other deductions and 50 percent of their income.

Contact congressmen

"If the tax incentives that encourage private philanthropy are to be maintained, those of us who are concerned with the future of private education must communicate our concern to the Congress and to the administration," Brown said. "In making these contacts, it is important to indicate that our views represent a broad group in American society that believes reliance on individual initiative and voluntary action are of vital importance in the achievement of societal goals. This group includes trustees, alumni, students, em-

ployees, volunteer workers, and all those served by private philanthropically supported institutions."

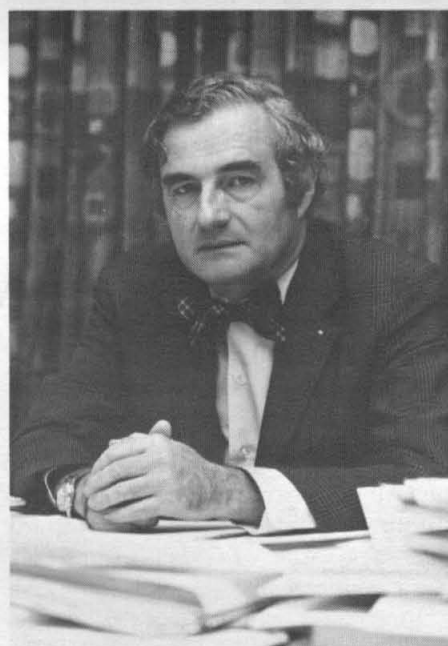
He said that communication with members of the House Ways and Means Committee and the Senate Finance Committee is particularly important. Al Ullman, chairman of the House Ways and Means Committee, has indicated that he plans to have a tax change bill out of the committee and on the floor of the House during October, Brown explained. He emphasized the likelihood that a major tax change will be passed by the House during 1975.

"If the congressman or senator with whom you are communicating is not a member of these committees, then ask him to convey the sentiments you have expressed to members of those committees and to the House and Senate leadership. Express your desire to be kept informed of the actions of both those committees as they are concerned with tax change," Brown said.

"It is crucially important that members of Congress hear from their constituents about the importance to people in their districts of activities supported by philanthropic gifts," Brown said. "If all of us who know the value of these gifts will communicate our concerns, then the present tax incentives can be maintained."

Sinsheimer advises

Know the consequences before altering the genes



Robert Sinsheimer

But he emphasized that this doesn't mean that "we should abandon all thought of human genetic intervention. If we can learn to bequeath to our progeny sounder bodies, more alert minds, freer imaginations, sturdier emotions, perhaps even kinder, sunnier natures, who would regard this as bad? Indeed I think we have a moral obligation to seek to lift our genetic burdens."

In this search, he pointed out that nature's old tactic of trial and error won't suffice because humans are not expendable.

Sinsheimer reviewed developments in genetics laboratories that have made it possible to incorporate the active genes of one organism into the genetic material of another—accomplished successfully at the level of the virus and bacterium.

The possibility that such an organism might escape from the laboratory and prove biologically destructive led first to a moratorium on the research and then to a conference of biologists and geneticists at Asilomar, California, for an assessment of the problem.

At the conference a consensus was reached that seemingly more dangerous experiments be deferred until means can be developed to greatly reduce the possibility of any genetically altered organisms escaping.

"It is difficult for a scientist to conceive that there are certain matters best left unknown, at least for a time," Sinsheimer added. "But science is a major organ of inquiry for a society—and perhaps a society, like an organism, must follow a developmental program in which the genetic information is revealed in an orderly sequence."

Does man have the right to develop new forms of life for his own purposes? No, because he doesn't yet have the insight to forecast the consequences, Robert L. Sinsheimer, chairman of Caltech's Division of Biology, declared at the annual meeting of the Genetics Society of America.

The world-renowned geneticist and professor of biophysics pointed out that the age of genetic engineering is here at the level of the microbe. He suggested that the extension of such techniques to higher organisms may be within the reach of human ingenuity.

"Can we really forecast the consequences for mankind, for human society, of any major changes in the human gene pool?" he asked. "The more I have reflected on this the more I have come, at this time, to doubt it."

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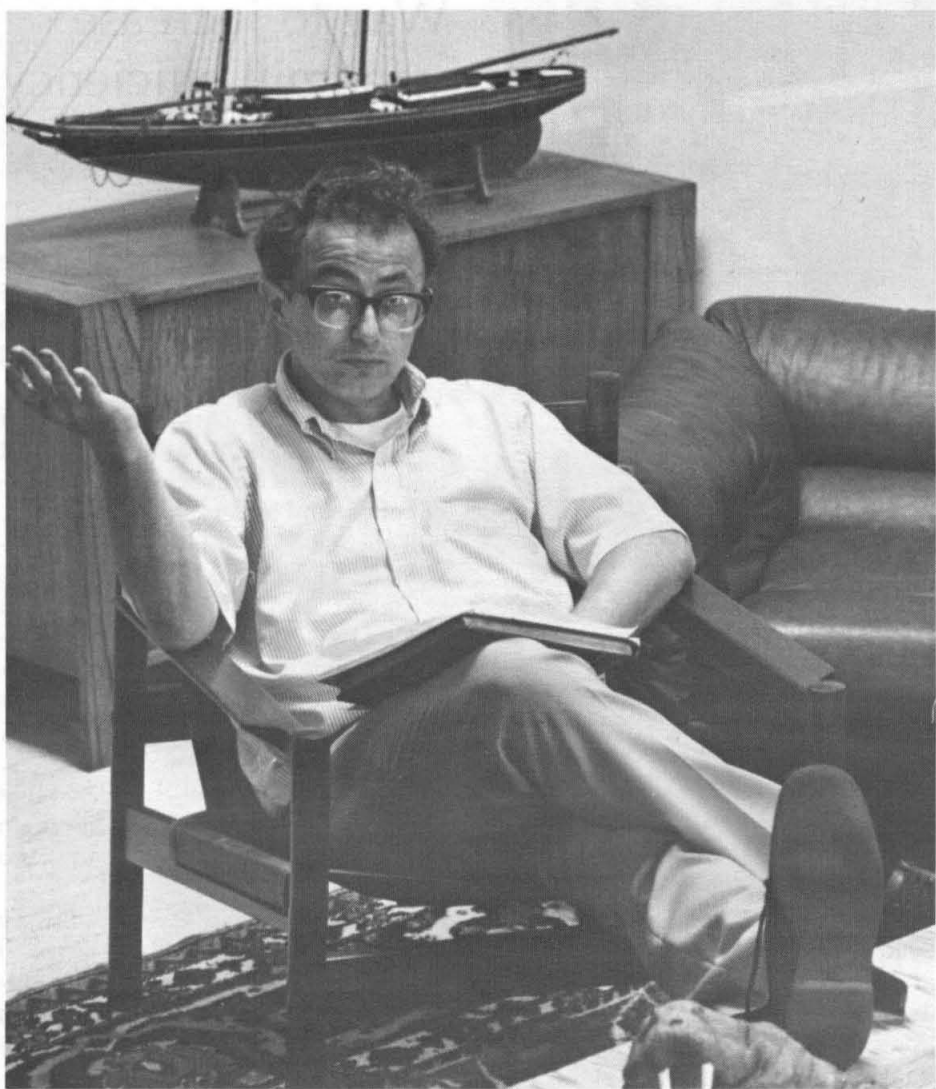
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Jim Mayer talks about his new role as master of student houses.

Master of student houses

Fringe benefit for Mayer: meeting interesting people

James W. Mayer finds Caltech students as stimulating a group of people as he's ever met. That's one of the reasons why he's taken on the job of master of student houses in addition to the rigorous research and teaching load he carries as professor of electrical engineering. Mayer assumed his new responsibilities when David R. Smith retired from being master of student houses at the end of the 1974-75 academic year.

Doing things that help him get to know and appreciate Caltech students as the interesting people they are is no new experience for Mayer. For the past four years he's been teaching scuba diving to graduates and undergraduates and for three years he's been chairman of the Physical Education Committee which determines Caltech's policy in this field as it relates to students.

"Techers are tremendously creative, full of unexpected questions, and exciting to be with," Mayer said. "All of them are bright; and as bright people usually are, they're interesting. Talking with them is enormously stimulating because their insights help you to gain new insights."

It was because of his concern for students that Mayer accepted the job of master of student houses.

"I want them to get the best possible deal out of their experience at Caltech," he said. "Their lives at the Institute can be austere, because of the rigor of the courses, and to relieve the tensions, they need to blow off steam—through activities like the Mudeo and Interhouse, and the pranks for which they're famous. One of my roles will be to help them find additional creative ways to ease the pressures."

To get to know the students and their needs, Mayer has been inviting

small groups of them to his home for dinner. In this endeavor he's found his wife, Betty, a "fantastic asset" and an active partner whose concern for the undergraduates matches his own. At these dinners the Mayers explore methods for faculty and students to get together informally, and additional ways in which faculty can contribute to student life.

Meanwhile, Mayer has been involved in some of the traditional responsibilities of his job, such as working with the Interhouse Committee in planning and conducting Rotation Week—when freshmen select their student houses, and counseling resident associates concerning their roles in the houses. And all the while, he's enjoying his growing number of friendships with one of the world's most interesting groups of people.

Fowler awarded National Medal of Science

William A. Fowler, PhD '36, Institute Professor of Physics at Caltech, has been awarded the 1974 National Medal of Science.

Fowler is one of 13 people who will receive the federal government's highest award for "distinguished achievements in outstanding contributions to science and engineering development."

According to an announcement from the White House, he is being honored for his "scientific contributions to both nuclear physics and to astrophysics, which permitted him to span both disciplines and to unravel the nuclear processes that contribute to the evolution of stars."

With new optical device

Some language ability found in the right brain

The right hemisphere of the brain of an adult—once thought to be severely lacking in language ability—has the vocabulary of a 14-year-old and can read simple sentences.

These are the findings of Caltech scientists based on their experiments with a new optical device that allows them to communicate visually with either hemisphere of the brain.

Its inventor is Eran Zaidel, a Caltech research fellow who works with a pioneer in split-brain research, Roger W. Sperry, Hixon Professor of Psychobiology.

The discoveries support an emerging view that the two halves of the brain are not as specialized as researchers had once thought. And the current experiments raise the hope that patients whose left hemispheres have been damaged by a stroke or other disability will be able to regain considerable language ability.

In the past, scientists have learned most of what they know about the functions of the two hemispheres by studying those people whose brains have been split because the nerves that join the two halves had been severed.

One of the difficulties in this research is that part of the image perceived by each eye is transmitted to both hemispheres of the brain. Formerly, in order to send a visual signal to only one hemisphere, research subjects would have to stare at a dot on a screen while a word or picture was flashed beside it for a tenth of a second. The image they perceived would fall on only one side of their retina, and thus would be transmitted to only one side of the brain.

This system was flawed and cumbersome because people's eyes move almost constantly. The new optical device used at Caltech passes images

through a contact lens and so makes research conclusions more reliable.

The experiments were conducted in Church Laboratory, utilizing two individuals whose brain hemispheres have been severed and who have been subjects in many of Sperry's split-brain experiments. A Caltech graduate student acted as a control.

Zaidel explained that the contact lens is attached to a small tube through which the right eye looks, and also to a patch that blocks any light from entering the left half of the right eye.

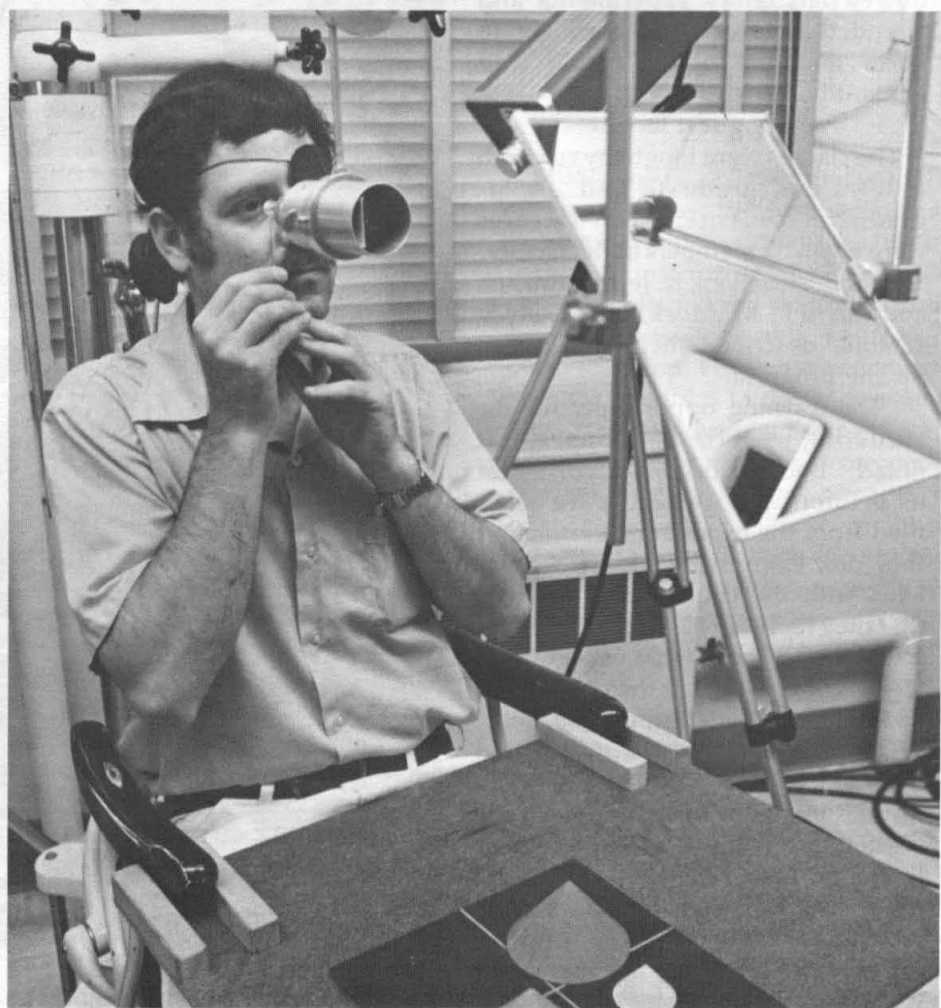
The left eye is completely blocked by an ordinary patch. No matter which way the eye looks, it can't see images with the part of the retina that is connected to the left hemisphere of the brain. Only the right hemisphere can register sight.

"Our conclusions indicate that the right hemisphere can support much more language than we had believed it could, but it has to be trained in special ways that fit its own mode of processing information," Zaidel said.

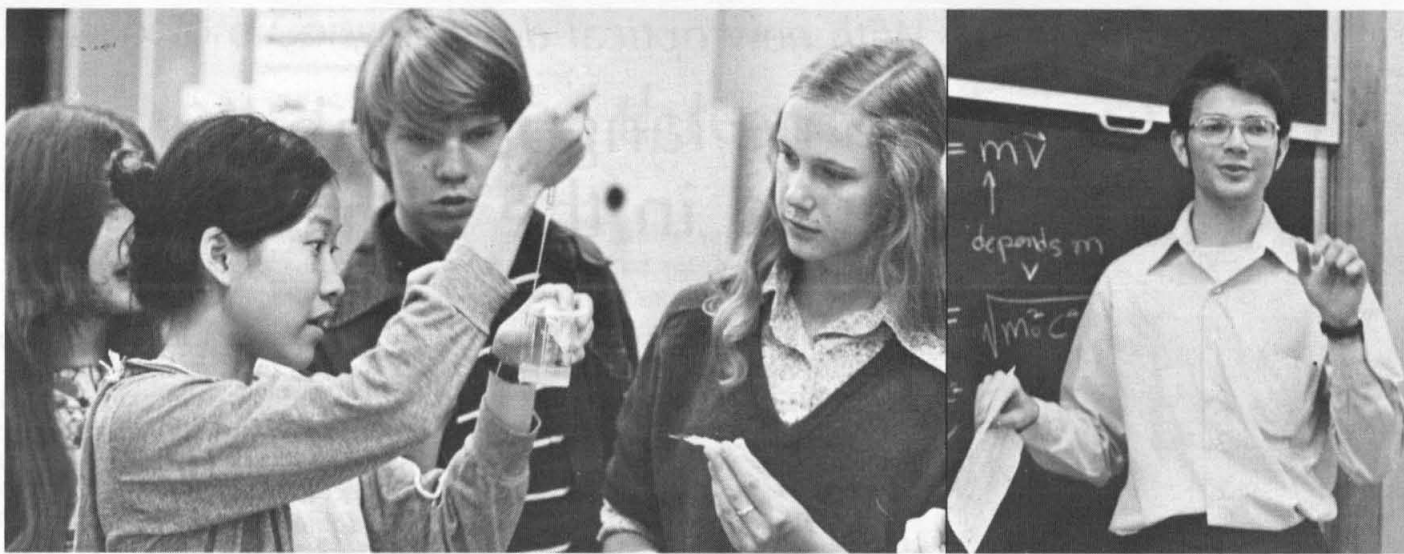
Becklin given Astronomical Society honor

Eric E. Becklin, research associate in physics at Caltech, is recipient of the second Newton Lacy Pierce Award presented by the American Astronomical Society.

The award consists of \$1,000. It is given to young astronomers under the age of 35 to encourage their interest in instrumentation or observational work. Becklin received the honor for his research in infrared astronomy.



Eran Zaidel demonstrates use of the Z lens, a new optical system that makes it possible to show pictures or printed words to only one hemisphere of the brain at a time. With the new lens, researchers can use visual tests for precise studies of the capabilities of the mute right hemisphere of the brain.



Erna W. Hsieh, a Caltech junior biology major, shows high school students in an accelerated summer biology class how to extract DNA from pea fibers in the picture at left. Observers are Karen Patterson, St. Lucy's Priory School, Glendora; Jeffrey Shryer, Polytechnic School; and Ginny Humphrey, Blair High School, daughter of Floyd B. Humphrey, Caltech professor of electrical engineering and applied physics. Right: Caltech senior David Murdock explains physics concepts to students enrolled in accelerated high school course.

High school students learn science in Caltech laboratories, classrooms

A unique opportunity for scientifically talented high school students was offered at Caltech this summer under the auspices of Lee F. Browne, Caltech's director of secondary school relations.

Seventy-four students from throughout Los Angeles County converged on the campus for accelerated classes in biology, chemistry, and physics. They packed the equivalent of a normal 28-week course into a period of 7 weeks.

In describing the program, Brown said that participants came from Monrovia, San Marino, South Pasadena, Arcadia, La Canada, San Gabriel, Montebello, Glendale, Glendora, Los Angeles, and the San Fernando Valley, as well as from Menlo Park and Portola Valley in the San Francisco Bay Area.

"The classes gave them an exceptional opportunity to learn science at one of the world's leading scientific institutions while they're still in high school," Browne added.

On the campus the students conducted laboratory experiments and attended lectures. And they got to know members of the faculty and student body.

Faculty guest lecturers

The classes were taught by research fellows and graduate and undergraduate students; guest lectures were given by members of the faculty. Two of the teachers, K. Jeffrey Eriksen and David P. Murdock, both Caltech seniors, described their enthusiasm for the program.

"The learning opportunity for the students was tremendous," Jeff noted. "Lots of work was involved for us as tutors, but we believe we benefited from the experience as much as they did. Even those who had problems with the course work told me that they had really learned a lot about science, and about what college-level work is like. They felt the classes had been great preparation for college."

David added, "My students told me that they had learned more in my physics class during the seven-week session this summer than in all of their high school science work. The experience was tremendous for us, too; these kids were sharp, and we really had to know our material when we were teaching them. My own experience with the class convinced me that I want to teach and conduct research in neurobiology in my career."

The classes were a feature of Caltech's Secondary School Science Project which receives support from the Institute, the J.T. McCarthy Foundation, J.T. Thorpe Corporation, Xerox Corporation, General Electric Company, Union Oil Company, and the late Henry Dreyfuss.

In addition to the accelerated science classes, Caltech this summer also offered Project Catalyst—a program sponsored by the American Chemical Society to encourage minority students to consider careers in the fields of science and mathematics.

As participants in this project, four students worked in the chemistry and chemical engineering laboratories for about four hours a day and earned \$360 a month during their on-the-job training—which ranged from analyzing pollutants in the atmosphere to studying the synthesis of hemoglobin in male rabbits.

Ronald Lopez, a 17-year-old student at Pasadena High School, was one of the participants. His father, Manuel Lopez, is chairman of the mathematics department at Blair High School.

Ronald, who had been undecided about a career, now says he's thinking of majoring in chemistry or physics in college.

"Science is really exciting," he said. "I gained a lot of appreciation this summer for the methodical process that scientists use in obtaining new information. I learned much more through my work this summer than in any course I could have taken, because I received training in a Caltech laboratory and worked closely with the research people there."

The other three students, from Crenshaw High School in Los Angeles, were Sandra Mitchell, Darius McGee, and Evelyn Sellers.

Way to increase windmill efficiency found by engineer

A Caltech aeronautical engineer who pioneered in harnessing the wind to generate electricity has found a more efficient way for windmills to do this task, especially at lower wind speeds.

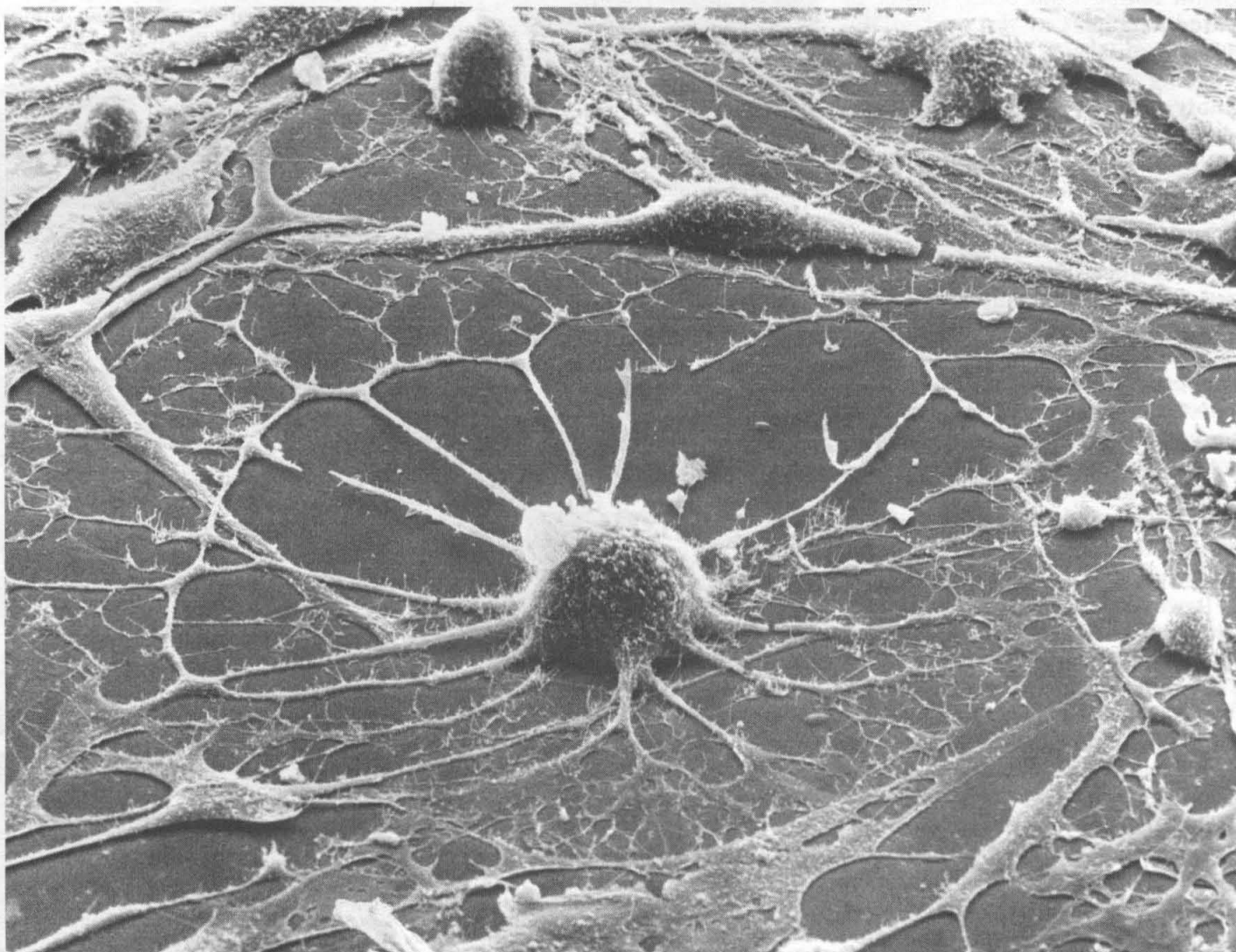
Homer J. Stewart, professor of aeronautics, has calculated that blades up to twice as wide as the present ones, and lower blade-tip speeds, will increase the efficiency of windmills by as much as 10 percent.

Stewart, who believes the wind should be explored as a source of electrical power, teaches a Caltech undergraduate course in windmill technology with his colleague, Ernest E. Sechler, professor of aeronautics. Both Stewart and Sechler believe that the wind eventually may serve to supplement power supplies by 10 to 20 percent.

Windmill power is nonpolluting and uses an inexhaustible source of fuel. The federal government is building a large experimental windmill at Sandusky, Ohio, to learn whether this primitive power source can compete economically with fossil fuels and nuclear power plants.

The blades of the government-built windmill facility are 125 feet in diameter and traditionally shaped. Stewart's calculations indicate that greater efficiency would be obtained if wider blades and a lower tip speed were used.

Several modern windmills, designed to generate power, have tip speeds 10 times greater than that of the wind. But Stewart's calculations in fluid mechanics show that such speeds are probably too fast for top efficiency because the friction drag of the blade through the air is more significant at high speeds than had previously been estimated.



It's not a picture of a spider in a web, but a mouse cell rounding up to go through cell division, as seen through the scanning electron microscope. Jean-Paul Revel, professor of biology at the California Institute of Technology, has found a new window to the submicroscopic universe of the cell with this powerful microscope which magnifies this material some 400 times.