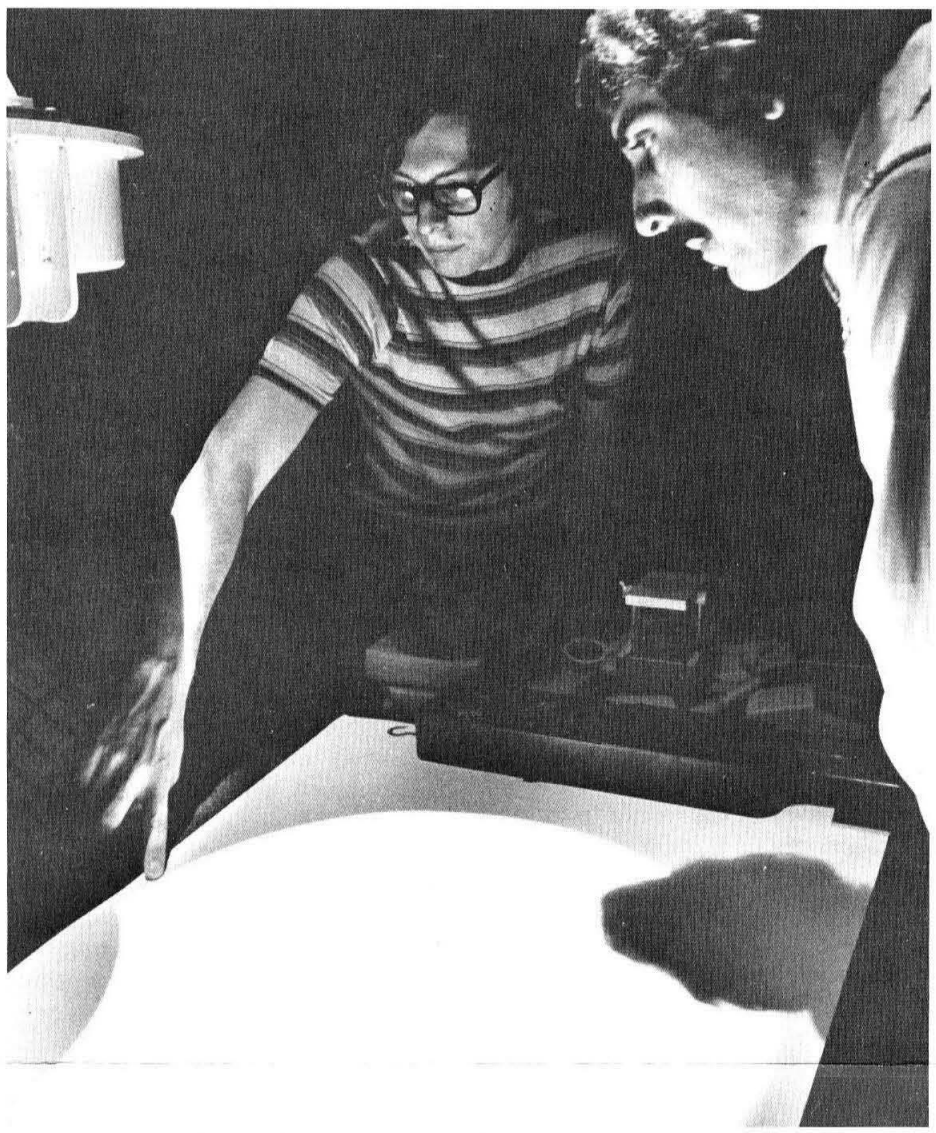
VOLUME 11, NUMBER 8, NOVEMBER 1977

CALTECH NEWS

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

Solar rendezvous eclipses daily routine



Solar eclipses have fascinated people throughout history and members of the Caltech community offer few exceptions. When the sun rendezvoused with the moon on October 12, the solar astronomy department was ready to satisfy their interest. In the basement of Robinson Laboratory, department members activated equipment that projected a large image of the solar disk from the 24-inch telescope in the observatory tower atop the building. More than 200 faculty, students, and staff filed past to watch the circle of sunlight as it reflected the moon's intrusion. Here, during an early stage of the eclipse, Barry Labonte, graduate student in solar astronomy, and Jon Romney, graduate student in radio astronomy, view the reflection.

Kresge Foundation challenge grant

$500,000 gift supports new infrared radio telescope

Caltech has received a $500,000 challenge grant from The Kresge Foundation of Troy, Michigan, toward the construction of a new infrared submillimeter radio telescope, according to Acting President Robert F. Christy.

This telescope will allow astronomers to make observations using shorter radio wavelengths and with greater resolution than is possible with equipment that now exists. A building will be erected to house the electronic systems and the computers that collect and process the astronomers' data.

The new instrument will be named the Kresge Submillimeter Telescope in honor of the donor. It will be part of a $ 3.5 million Caltech facility for astronomical research involving very short (millimeter and submillimeter) radio waves.

The other major component in this project is a three-telescope interferometer array for high precision mapping and other studies of planets, satellites, and cool interstellar dust clouds. This array is under construction at Caltech's Owens Valley Radio Observatory near Big Pine, California.

Under the Kresge Foundation challenge agreement, Caltech must complete the funding of the project by December 1978. Additional funding for the project is being provided by the National Science Foundation, the National Aeronautics and Space Administration, and the Oscar G. & Elsa S. Mayer Charitable Trust. A balance of $150,000 is being sought to meet the Kresge challenge.

Robert B. Leighton, Caltech professor of physics and principal investigator of the millimeter interferometer project, says the Kresge Telescope will open up exciting new fields in astronomy. He explains that it will enable scientists to analyze and study radio waves now inaccessible for precise astronomical research — those ranging from a few tenths of a millimeter up to several millimeters.

Present radio astronomy installations are limited to research at longer wavelengths or with less sensitivity and resolution. The Kresge

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Two new professorships

Endowed chairs strengthen computer science program

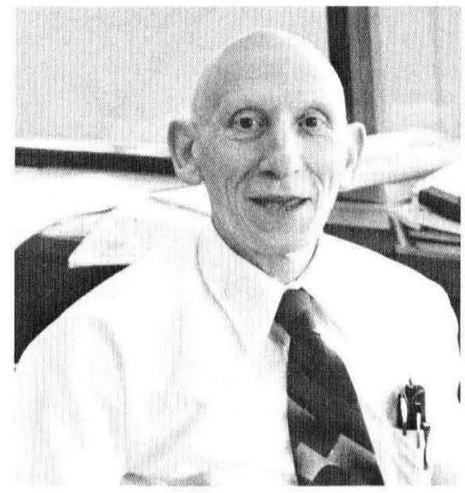
Two new professorships have been endowed at Caltech, both in the Division of Engineering and Applied Science, Acting President Robert F. Christy has announced. Each chair has been filled by an individual internationally known for his work in computer science, a field to which Caltech has recently made a major new commitment.

Caltech's effort in computer science brings together the engineering technology of integrated circuit design and the advanced concepts of programming for the new generations of computers that will be built in the future. Computers with almost 1,000 times more capability than at present are possible because of the increased efficiency of computer hardware that uses solid state devices.

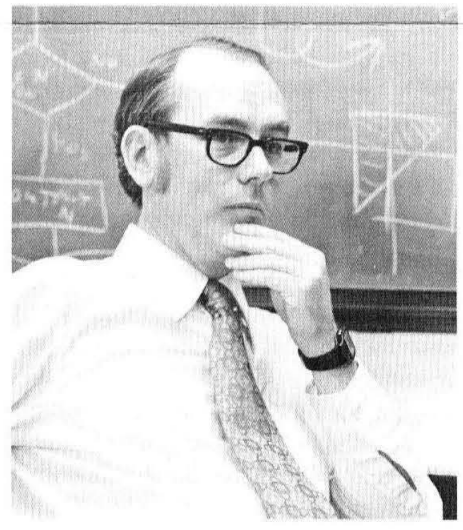
The Fletcher Jones chair

The Jones Foundation of Los Angeles has made a $1 million endowment to establish the Fletcher Jones chair in computer science, and Ivan E. Sutherland, MS '60, Caltech professor of computer science, has been appointed to fill the chair.

Christy said the Jones Foundation gift represents a major step in building Caltech's new computer science program. Sutherland, 39, came to Caltech last year from the Rand Corporation to play an important role in this work. One of the youngest members of the National Academy of Engineering, Sutherland gained recognition early in his career for his pioneering efforts in computer graphics, or programming computers to draw pictures. More recently he has turned to integrated circuits.



Alan Perlis



Ivan Sutherland

"The digital calculators, watches, and games now on the market are only the beginning of a continuing revolution in digital technology," Sutherland says. "We at Caltech want to play a leading role in this revolution."

Before Sutherland came to Caltech and Rand, he was the director of information processing techniques for the government's Advanced Research Projects Agency; he taught at Harvard and at the University of Utah; and he was co-founder of Evans & Sutherland, a company that manufactures special purpose display systems for scientific uses.

He earned a BS degree from Carnegie Tech in 1959, an MS from Caltech in 1960, and a PhD from MIT in

Continued on page 3

The Gordon and Betty Moore Professorship

The Gordon and Betty Moore Professorship in Engineering is named for Gordon E. Moore, PhD '54, president and chief executive officer of Intel Corporation of Santa Clara, California, and his wife, Betty, who are endowing it.

"We're grateful for the support of Dr. and Mrs. Moore, for their gift is highly important in Caltech's move to remain at the leading edge in computer science," Christy said. "And we're fortunate in having Dr. Alan J. Perlis, a visiting professor, as the first occupant of the new chair, for he brings to the Institute a record of pioneering contributions to computer technology. His abilities will add enormously to our emerging computer science program."

An internationally recognized authority on computers and computer language, Perlis is active in government committees on computing science and has written many scientific papers and books on the subject. He is the past president of the Association for Computing Machinery and edited its journal from 1958 to 1962.

A native of Pittsburgh, he earned his BS degree from Carnegie Tech and his master's and PhD degrees from MIT. He was a research associate at MIT from 1948 to 1949 and again in 1952, and he served as mathematics adviser of the Multi-Machine Computing Laboratory at Aberdeen Proving Ground.

Perlis headed Purdue University's computing laboratory from 1952 to 1956. At Carnegie-Mellon University, he was professor of mathematics and

Continued on page 3

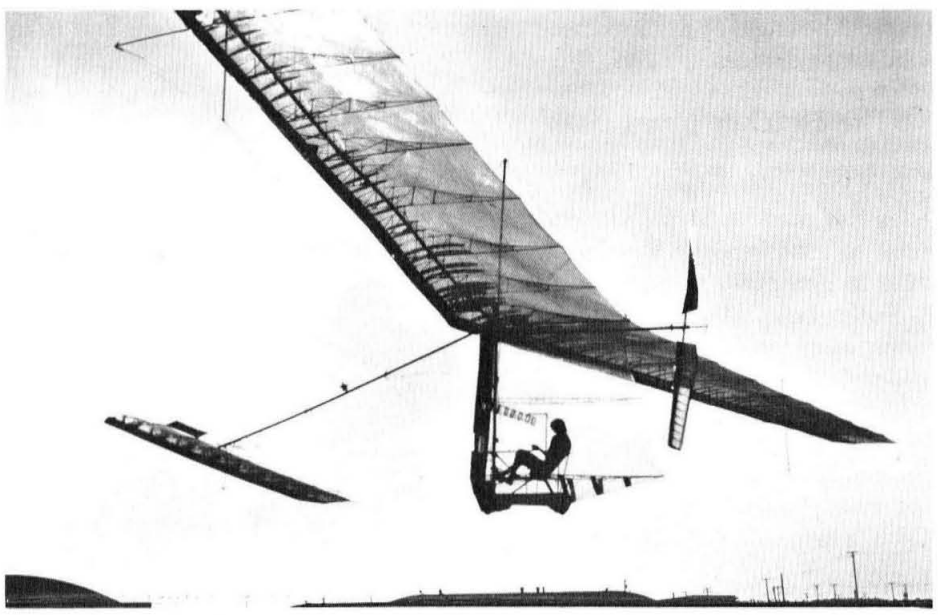
Human-powered flight

Alumnus fulfills a centuries-old dream

by Phyllis Brewster

When Paul MacCready steps from the British Airways 747 jet at Heathrow Airport this month he will have covered considerable distance to collect the £50,000 due him — distance not in terms of his flight from Pasadena to London, but in terms of aviation history.

For, as everyone who scans the news media must now surely know, Caltech alumnus MacCready, MS '48, PhD '52, has captured the Royal Aeronautical Society's Kremer prize for producing a man-powered aircraft — a vehicle that takes off and is kept aloft solely through human energy. The plane completed a set of maneuvers accepted as the criteria for human-powered flight.



Bryan Allen steers and pedals Gossamer Condor in a 1.4 mile flight that made aviation history. Produced by Paul MacCready, the plane won the Kremer Prize by meeting the requirements for an aircraft powered solely by human energy.

On August 23, in an airfield near Shafter, California, the man who designed and built the Gossamer Condor watched as his fragile plastic and aluminum craft was pedalled into the air. In seven and a half minutes it made a 1.4 mile sweep over a figure-eight course, executing two turns and rising over two 10-foot hurdles.

"We've done it!" the crew on the ground heard jubilant pilot Bryan Allen shout as he cleared the final hurdle. The road to London and to aeronautical fame was open.

How did aerodynamicist MacCready succeed in producing a human-powered aircraft when many centuries of dreamers and builders failed? Long involvement in aviation may be a part of the answer.

Fifty-one-year-old Paul MacCready has been flying since he earned his pilot's license at the age of 16. After participating in the Navy's flight training program during World War II, he took up soaring. He was the nation's soaring champion in 1948, 1949, and 1953, and was the first American to win an international soaring championship — in France in 1956.

Meanwhile, MacCready had earned his MS degree from Caltech in mechanical engineering, and his PhD degree in aeronautics. His education, his thinking, and his career revolved around things aeronautical, from cloud seeding to aviation research. He is the president of AeroVironment, Inc., of Pasadena, a company that offers "creative solutions to the environment — and energy-related problems of industry and government."

Although MacCready had been intrigued by the centuries-old challenge of man-powered flight, and by the 18-year-old unclaimed Kremer prize, he had not considered entering the competition until a year ago July. While driving the family on a long cross-country vacation ("with lots of boring stretches") MacCready says, "My mind put a few things together." He knew a successful design would have to produce the lightest and slowest-flying plane possible, so that the craft could be managed by man's limited (⅓ to ½ horsepower) capabilities. And the plane would have to be extremely simple, so that it could easily be repaired and modified.

When MacCready went to work on his design concept a month later, he assembled a working crew that included associates from soaring days, family members, and business friends, including Caltech alumnus and former faculty member Peter Lissaman, MS '55, PhD '66.

"Our design philosophy was to assume that everything in the plane was just about ready to break," MacCready says. "We used the lightest possible materials. If something didn't break, we made it thinner."

Their creation, the Gossamer Condor, weighs 70 pounds — incredibly light for its 96-foot wing span — and is skinned with a super-strength clear plastic, Mylar. Piano wire supports the main structural members — made of balsa wood, corrugated paper, Styrofoam sheets — all ordinary, over-the-counter materials.

The wheels were originally made for a toy fire engine. The stabilizer doubles as a rudder. That is, it provides lift as well as control. From his supine position in the cockpit, the pilot pumps pedals that are attached by a long bicycle chain to a rear propeller shaft.

For months, through trial and error, crash and reevaluation, the Gossamer Condor was in a constant state of adaptation and modification. Its builders created 12 versions of the plane and made more than 400 test flights.

Like its namesake, a giant bird of California, the Gossamer Condor is large and slow flying. Its best altitude is four feet, although it has flown as high as 30, and its average speed is about 10 miles an hour.

A question frequently asked MacCready is, "What good is it?" In reply MacCready likes to quote Scottish physicist James Clerk Maxwell, "What good is a newborn baby?" But he also has some more specific answers.

An advocate of physical fitness, MacCready believes that advanced editions of the Gossamer Condor could be "stupendous educational tools," both in aeronautical engineering and for physical conditioning.

Because the craft is relatively inexpensive and easy to build (provided you have a large building in which to house it), because it is safe at its low altitude and slow flying speed, and because it can be piloted by anyone regardless of flying experience who is in good physical condition, high school classes could put one together and fly it, MacCready says.

He also believes that getting into the condition necessary to fly the Condor provides a good motive for working hard in a physical fitness program. The designer himself trained so that he could pilot the craft, and did fly it for one-and-a-half minutes.

Now the Gossamer Condor apparently has found a permanent location. It will probably be exhibited in the Smithsonian, along with the Spirit of St. Louis and the Wright brothers' plane.

What of future Condors? MacCready will probably develop a lighter, more efficient model that can be kept airborne longer. He even envisions — some day — a man-powered flight to Catalina.

One thing is certain: MacCready will *not* try for the new prize of £10,000 now being offered in England for the *second* human-powered plane to master the Kremer course. The competition is open to everyone — *except* citizens of the United States.

Chemistry kudos

Two Caltech chemists will be honored in 1978 with awards from the American Chemical Society. Jesse L. Beauchamp, professor of chemistry, will receive the ACS Award in Pure Chemistry sponsored by Alpha Chi Sigma Fraternity; and Harry B. Gray will be recipient of the 1978 ACS Award in Inorganic Chemistry sponsored by the Monsanto Company. Gray is the William R. Kenan, Jr. Professor and Professor of Chemistry.

Beauchamp's award is bestowed each year on a chemist under 36 for research of unusual merit. It recognizes his fundamental contributions to the development of the ion-cyclotron resonance, a technique for incisively studying details of ion-molecule reactions in the gas phase.

Considered one of the most influential figures in chemistry today, Gray is a founder of the exploding new field of bioinorganic chemistry, which bears upon such important areas as hemoglobin, enzyme action, and photosynthesis.

ALUMNI ACTIVITIES

December 7
Alumni Dinner — Earnest C. Watson Caltech Lecture. Cocktails, 6 p.m.; dinner, 6:30 p.m., the Athenaeum. Cost: $9.00 per person. Lecture, 8 p.m., Beckman Auditorium. Speaker: Murray Gell-Mann, Robert Andrews Millikan Professor of Theoretical Physics.

January 2
Rose Parade Special. 7:30-9:30 a.m. — Continental Breakfast in the Athenaeum; 9-11:15 a.m. — Walk to Colorado Boulevard to watch the 89th Annual Tournament of Roses from reserved grandstand seats; 12 noon — Buffet lunch in the Athenaeum. For those with tickets to the game, a box lunch and bus transportation to the Rose Bowl will be provided.

Radio telescope

continued from page 1

telescope will fill the last remaining significant observational gaps between radio waves and visible light. Later, as a part of a follow-up to the project, a fourth telescope will be built which will replace the Kresge telescope as part of the millimeter array. Then the Kresge telescope will be relocated on a high mountain site.

All of the telescopes are 10.4 meters (34 feet) in diameter. The telescopes' reflectors are being constructed in the Caltech laboratory that was built 40 years ago for grinding and polishing the 200-inch mirror of the Hale Telescope at Palomar Mountain.

A pioneer in the relatively new field of radio astronomy, Caltech began operating the Owens Valley Radio Observatory in 1958 with two radio telescopes in the meter and decimeter range. Another was added in 1969. The use of these radio telescopes has led to the discovery of important information about the universe, including the identification of the first quasars, detailed mapping of the radiation belt around Jupiter, and the mapping of the distribution of hydrogen in nearby galaxies.

During the past 54 years, The Kresge Foundation has made appropriations of more than $283 million to institutions in higher education, health services, the arts, social welfare, and the care of the young and aging. The foundation is one of the largest in the United States in size of assets and appropriations; it was created through the gifts of the late Sebastian S. Kresge, founder of the S. S. Kresge Company, now known as the K mart Corporation.

NAE honors Pierce

John R. Pierce, Caltech professor of engineering, is the recipient of the 1977 Founders' Award of the National Academy of Engineering. The award is given for outstanding engineering accomplishments over a long period that benefit the people of the United States. It consists of a gold-plated medal and bronze replica accompanied by a citation.

Pierce received the award at the NAE meeting in Washington, D.C., where he presented the annual Founders' Lecture on November 10.

Space-age prospectors survey mining sites

Asteroids: rich source of minerals?

The grizzled prospectors who scoured the old west in search of rich mineral claims would be awestruck if they could see what's happened to their occupation. For today's prospectors are thinking of staking claims in outer space.

Two Caltech planetary scientists believe that asteroids may help to answer the earth's increasing need for mineral resources. They suspect that several dozen of the thousand or so asteroids that loop around the sun and cross the orbit of the earth may be mother lodes for future space miners, as well as excellent targets for exploration.

Planetary Scientist Eleanor F. Helin and Professor of Geology Eugene Shoemaker have reached this conclusion after a four-year systematic search for "planet-crossing" asteroids, particularly those that cross the orbit of the earth and are known as "Apollo" asteroids. Based on their own and other data concerning asteroids, they predict that many of these orbiting rocks contain mineral content high enough for profitable mining, and orbital characteristics suitable for easy rendezvous with space ships.

Since 1973, when Helin began a search for near-earth asteroids in collaboration with Shoemaker, the number of these objects that have been located has doubled. The Caltech scientists and their colleagues have found 12 new asteroids crossing the earth's orbit in the past four years — as many as were found in the previous 40 years. Craters on the earth, moon, and the planets were produced mainly by impact with this type of object.

Recently the asteroids have attracted the attention of space colony advocates who envision projects to transfer them to earth orbit or to project chunks of refined asteroidal material to space colony sites to be used in construction. Using asteroidal material will prove much less costly than launching material from either the earth or moon because of the gravity that must be overcome in breaking away from these bodies.

Among the Caltech scientists' most significant discoveries is an asteroid one thousand meters in diameter that was discovered in January 1976. This was the first exclusively earth-crossing asteroid to be found. Its discovery led

Eleanor Helin

to the prediction that a population of similar bodies could be located through future searches. The planetary scientists' prediction received further support nine months later when they discovered 1976UA, the second asteroid with this type of orbit. Asteroid 1976UA, a 200- to 300-meter asteroid, has the distinction of being the second closest minor planet ever known to approach the earth. It passed within 750,000 miles of this planet.

To be a good candidate for a space mission, an asteroid must have an orbit approximating that of the earth. It must also move in approximately the plane of the earth's orbit, so that a spacecraft will need to use little fuel to boost itself from the earth to the asteroid. To be profitably mined, the object must also be rich in iron/nickel or silicon/aluminum compounds, or other useful materials.

One space colony proponent has contended that a 100- to 200-meter asteroid could provide the earth with enough iron and nickel to last for years. If this is true, then some of the asteroids discovered in Helin's searches should make her one of the most successful prospectors of all time.

Many scientists believe that asteroids were formed by the accretion of material during the formation of the solar system, but that these bodies did not accumulate enough material to become full-fledged planets. If this is so, says Mrs. Helin, then these small "planetesimals" almost certainly represent samples of unaltered primordial material — the building blocks of the early solar system.

Alumni Audit

ALUMNI ASSOCIATION
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

BALANCE SHEET
June 30, 1977

ASSETS

Cash on Hand and in Bank	$ 5,516.28
Investments:	
C.I.T. Consolidated Portfolio	352,877.16
Deposits in Savings Account	30,846.40
Investment Income Receivable	16,746.00
Other Receivables	3,334.66
Postage Deposit and Deferred Expenses	549.49
Furniture and Fixtures, at nominal value	1.00
Total Assets	$409,870.99

LIABILITIES, RESERVES AND SURPLUS

Accounts Payable	$ 1,367.77
Deferred Income:	
Annual Membership Dues paid in advance	27,492.53
Investment Income from C.I.T. Consolidated Portfolio	16,746.00
Life Membership Reserve	359,197.16
Reserve for Directory	5,000.00
Surplus	67.53
Total Liabilities, Reserves and Surplus	$409,870.99

INCOME

Due of Annual Members	$ 48,002.26
Investment Income:	
C.I.T. Consolidated Portfolio	16,228.33
Deposits in Savings Accounts	2,221.26
Annual Seminar	10,454.35
Program and Social Functions	27,217.15
Area and Chapter Meetings	4,309.50
Total Income	$108,432.85

EXPENSES

Publications	$ 12,000.00
Annual Seminar	11,345.10
Program and Social Functions	32,804.51
Area and Chapter Meetings	10,370.04
Student Programs	9,398.74
Institute Secondary School Relations	1,602.71
Administration	21,781.51
Membership	5,532.62
Directory	5,209.92
Total Expenses	$110,045.15
Excess of Expenses over Income	$ (1,612.30)
Balance, June 30, 1976	$ 1,679.83
(Surplus, July 1, 1976)	(1,612.30)
Surplus, June 30, 1977	$ 67.53

AUDITOR'S REPORT

Board of Directors, Alumni Association, California Institute of Technology:

I have examined the balance sheet of the Alumni Association, California Institute of Technology as of June 30, 1977, and the related statements of income, expenses, and surplus for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as I considered necessary in the circumstances.

In my opinion, the accompanying balance sheet and statements of income, expenses, and surplus present fairly the financial position of the Alumni Association, California Institute of Technology at June 30, 1977, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Calvin A. Ames
Certified Public Accountant

September 27, 1977

Moore chair funded

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director of the computing center from 1960 to 1971; head of the department of mathematics from 1961 to 1964; and head of the department of computer science from 1965 to 1971. Since that year he has been at Yale University as the Eugene Higgins Professor of Computer Science.

Moore, who obtained his PhD degree from Caltech in 1954, was a recipient two years ago of a Distinguished Alumni Award, the highest honor that Caltech confers on a graduate.

Moore is a cofounder of the Intel Corporation and of the Fairchild Semiconductor Corporation. As the latter firm's director of research and development, he supervised much of the innovative work on which the semiconductor industry is based. At Intel he led in the creation of many advanced semiconductor products that are now in general use. He is considered a pioneer and leader in the semiconductor industry.

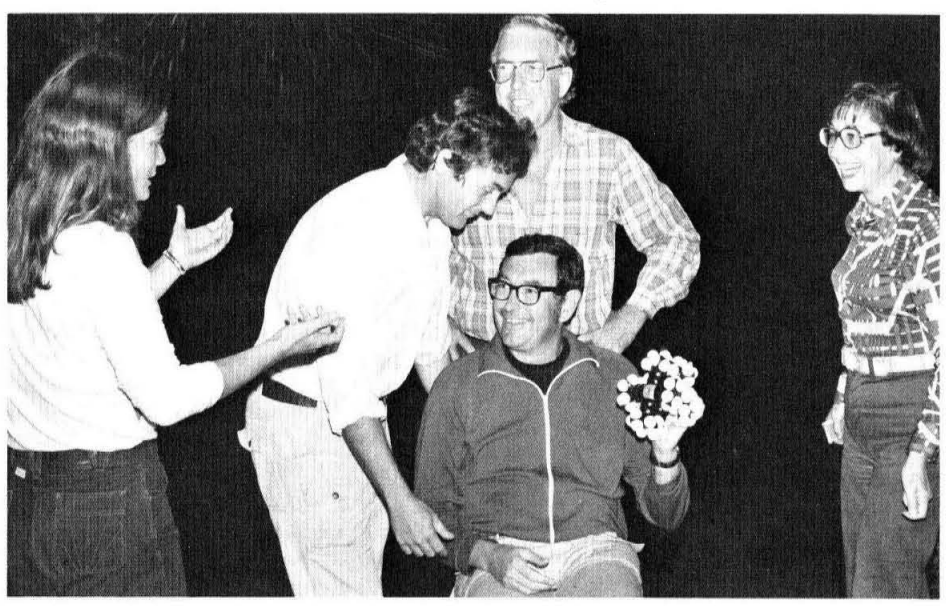
Jones chair endowed

continued from page 1

1963, all in electrical engineering. In 1972 he received the NAE's Zworykin Award for outstanding achievement as a young engineer. Sutherland is a member of the nation's Defense Science Board.

Established with funds from the estate of the late Fletcher Jones, one-time chairman of Computer Science Corporation, the Jones Foundation is dedicated to fostering excellence in the sciences.

All-star cast at Freshman Camp



Cheered on by his colleagues, Harry Gray prepares to take the stage at the Freshman Camp talent show to discuss his newly developed energy-converting molecule. From left: Louise Kirkbride, BS '75, MS '76, JPL engineer and an alumni representative at the camp; Walter Meader, director of the Caltech Y; Edwin Munger, professor of geography; Gray (seated), the William R. Kenan, Jr. Professor and Professor of Chemistry; and Valentina Zaydman, lecturer in Russian.

PERSONALS

1927
ALAN E. CAPON writes that he is a member of a newly formed utilities commission for the City of Burbank, California, after four years of retirement. The Commission is an advisory body reporting to the Burbank City Council on operations of the City's electric and water utilities.

1930
RAY W. HOEPPEL, MS '31, manager of Sespe Laboratories of Oak View, California, is the inventor, designer, and producer of a new product called an audio compass. According to Hoeppel, the compass acts as a guidance system and is useful for outdoorsmen, search and rescue missions, the military, survival parties, and blind persons. A hiker wears the compass on his belt, dials a desired course, and walks at any speed. The compass ticks slowly when the user strays from his course and ticks faster as the error in course increases. When the hiker is on his course it remains silent. The compass was cited by *Industrial Research Magazine* as one of the 100 most significant industrial products of 1977.

1936
DONALD F. FOLLAND, MS, has retired from Sperry Univac of Salt Lake City.

1938
WILLIAM R. SEARS, PhD, received the von Kármán Medal from the Advisory Group for Aerospace Research and Development (AGARD), an arm of NATO, in Copenhagen, Denmark, on September 15. Sears is a professor of aerospace and mechanical engineering at the University of Arizona.

1944
WARREN G. SCHLINGER, MS '46, PhD '49, manager of Texaco's Montebello, California, Research Laboratory, has been named a fellow of the American Institute of Chemical Engineers for his contributions in the development of new hydrocarbon processing techniques.

1948
JAMES C. FLETCHER, PhD, former NASA administrator and former president of the University of Utah, has been named to lead the Gulf-Whiteford program for energy resources development and management in the School of Engineering at the University of Pittsburgh.

1957
FRANKLIN P. DIXON, MS, PhD '60, has been active as project management advisor for large ERDA advanced energy and physical research developments for the past year and is currently consulting on the $94.2 million Magnetic Fusion Test Facility project for UC-Lawrence Livermore Laboratory. Dixon is president of Catalytic Management of San Mateo, California.

KIRK S. IRWIN is president of Aero Spacelines, Inc., of Santa Barbara, California, which is involved with aerospace engineering and manufacturing.

TRUMAN E. LONG writes, "During 1977 I got married for the second and last time; I have two children, Gus, 6, and Lori, 11; and I opened a new office for practice of internal medicine in Monterey, California."

PETER M. MORETTI, MS '58, is spending a year as a program manager at the Energy Research and Development Administration in Washington, D.C. After that, he will return to his position as professor of mechanical engineering at Oklahoma State University in Stillwater.

HARRISON (JACK) SCHMITT received an honorary doctor of science degree and gave the main address at the Franklin and Marshall College commencement on May 29. Schmitt was honored for his scientific achievements.

1958
JOHN M. CLARK, JR., PhD, associate professor of biochemistry at the University of Illinois in Urbana, received a faculty award of $1,000 for excellence in undergraduate teaching.

1959
NICHOLAS GEORGE, PhD, is director of the Institute of Optics at the University of Rochester in New York. He was professor of electrical engineering and applied physics at Caltech.

PHILIP D. HARRIMAN moved to Washington, D.C., in August to spend a year as program director for genetic biology with the National Science Foundation.

AKIRA KOBAYASHI, MS, associate professor of solid mechanics at the University of Tokyo, has been appointed visiting associate in aeronautics at Caltech from December until August 1978.

1960
EDWARD A. FLINN, PhD, is chief scientist of the earth and ocean sciences programs at NASA Headquarters in Washington, D.C.

1963
JOHN M. HOSACK has joined the New Mexico Highlands University department of science and mathematics. He was an assistant professor at UC Irvine.

1964
R. JAMES ARENZ, PhD, is chairman of the mechanical engineering department at Loyola Marymount University in Los Angeles. He is also a member of the JPL technical staff where he conducts research on aerospace materials.

JOHN P. SLONSKI, JR., received NASA's Exceptional Service Medal in recognition of his contributions to the Viking Project. Since 1969 he has worked for JPL on the design and development of the Viking Orbiter spacecraft, and on flight operations during the primary mission.

1965
ANGELO A. LAMOLA, PhD, a chemist with Bell Telephone Laboratories in Murray Hill, New Jersey, is the recipient of the Leo Hendrik Baekeland Award from the New Jersey section of the American Chemical Society for his research in biophysical chemistry, including work on the biochemistry of lead poisoning and other diseases.

IGNACIO RODRIGUEZ-ITURBE, MS, and PAUL G. RICHARDS, MS '66, PhD '70, are two of three southern California-trained scientists sharing the James B. Macelwane award given by the American Geophysical Union for significant contributions to geophysics by persons under 36. Rodriguez-Iturbe was cited for research in flood and drought prediction, more effective design of hydraulic structures, and better management of water resources. Richards, professor at Columbia University's Lamont-Doherty Geological Observatory, was credited with research "of critical importance to understanding the damage caused by earthquakes and predicting the intensity of ground shaking to which structures such as nuclear power plants may be subjected."

ROBERT E. SPITZER, Eng, was selected by the Boeing Company in Seattle, Washington, to be the 1977-78 Sloan Fellow at the Sloan School of Management, MIT. Spitzer is a senior engineer with Boeing.

1967
PETER N. CROSS and Mrs. Cross are the parents of a daughter, Shimae, born on November 17, 1976. Cross is a management analyst and economist with the U.S. Department of State in Kabul. The family is due back in the United States in the fall and expects to return for two more years in Afghanistan beginning in December.

THOMAS C. McKENZIE and his wife, Mimi, are the parents of a son, Kevin Denison, born March 14 — Einstein's birthday, the McKenzies note! McKenzie is a senior research chemist at Lederle Labs in Pearl River, New York.

1968
PETER S. BLOOMFIELD was promoted to manager of telephone industry accounts in the marketing department of General Electric Company's Information Services Business Division in Rockville, Maryland. They are the parents of a daughter, Alexis, born on June 9.

PAUL DIMOTAKIS, MS '69, PhD '73, Caltech assistant professor of aeronautics and applied physics, has been appointed by the Greek government to its advisory committee on science and technology.

RENA FERSHT, PhD, member of the senior technical staff of Guidance and Control Systems, Litton Industries, Inc., received a silver achievement award from the Los Angeles YWCA in recognition of her capability in directing research and development programs.

1970
JOHN J. COYLE, JR., received his MD degree in May from the University of Oklahoma College of Medicine and is doing his residency in diagnostic radiology at the University of Oklahoma Hospital, Oklahoma City.

GILES A. DUESDIEKER received his MD degree from the UC San Francisco School of Medicine and is interning at Seattle's Swedish Hospital, an affiliate of the University of Washington.

JACK L. FALK writes, "The firm of Falk & Falk, in Portland, Oregon, announces with great pride the introduction of its new generation product on August 20. The new product, entitled Samuel Taylor Falk, bears strong resemblance to earlier generations of Falk releases, but contains important features new to the Falk line. To commemorate this event, the firm will now be known as Falk, Falk & Falk. Stock in the Falk firm has risen sharply with the news that Jack Falk, founding father of the company, is now affiliated with Tektronix, Inc., of Beaverton, Oregon, as technical editor with the logic development products group."

CRAIG E. TYNER received his doctorate in chemical engineering in May from the University of Illinois. He, his wife, Katherine, and their children, Kelley and Ryan, live in Albuquerque, New Mexico, where Tyner works for Sandia Laboratories.

J. ROBERT VANCE III writes, "After receiving my BS in geophysics at Caltech in 1970, I went back home to Georgia and did one year of graduate study in geology and geophysics at the University of Georgia. Then I decided on a complete change of life and left academia for the business world.

"One summer of fulltime study at the Honeywell Institute of Information Sciences prepared me for a career in data processing. In the fall of 1971 I took a position with National Data Corporation in Atlanta as a programmer in the systems group. I have remained in the systems area now for six years, progressing to senior analyst in the advanced systems/special projects group, with emphasis in the communications area.

"My current hobbies include running, tennis, white-water rafting, bowling, chess, and rooting for the Atlanta Flames hockey team. Also, I have recently developed a passionate interest in backgammon."

DAVID C. WILCOX, PhD, is the president and founder of DCW Industries, Inc., in Sherman Oaks, California. As a sideline, Wilcox writes that he likes to computerize the local Little League batting statistics.

1971
WILLIAM K. DELANEY, PhD '75, took his perpetual vows as a Jesuit on August 27 and is continuing his studies for the priesthood in St. Louis.

1972
EDWARD M. GATES, MS, PhD '77, is assistant professor of mechanical engineering at the University of Alberta in Edmonton, Canada.

1973
WILLIAM BERANEK, JR., PhD, is research associate and staff officer at the Holcomb Research Institute of Butler University in Indianapolis, Indiana.

DEBORAH D. L. CHUNG, MS '73, one of the first four women to be awarded BS degrees from Caltech, received her doctorate in materials science from MIT and is assistant professor of metallurgy and materials science and electrical engineering at Carnegie-Mellon University, Pittsburgh. She was married on May 29, 1976, to Lan K. Wong, assistant professor of pharmacology, The College of Medicine, Ohio State University, Columbus.

JEAN F. SAINT-MARCOUX, MS, is working for the French General Offshore Contractor as a project engineer for oil production platforms equipment.

1976
THOMAS A. GERARD, MS, a captain in the U.S. Army, received his professional engineer's license in Virginia in November 1976 and in January married Maribeth Stancik of Pasadena.

ROBERT KORODY writes that he is "alive and well in Palo Alto, California," and would be interested in hearing from other graduates or transfer students now in the Palo Alto area who have studied under Tsutomu Ohshima and would like to continue their training in the art of Sliotohan. Korody is a graduate student at Stanford; his address is 1837 Clarke Ave., #9, Palo Alto 94303.

OBITUARIES

1921
GERALD LAVAGNINO on September 22. He was retired from the Pacific Telephone Company where he had worked since graduating from Caltech. He and his wife moved from Pasadena to Lakeport, California, three months before his death. Surviving are his wife, Isabella, a daughter, Elaine, and a son, John.

1930
ERNEST C. HILLMAN, JR., president of Hillman, Biddison & Loevenguth, Structural Engineers, of Los Angeles, in September, of a heart attack.

1932
JAMES R. BRADBURN on July 4 at his home in Mirror Lake, New Hampshire. He had retired from the Burroughs Corporation and was working as a management consultant. Surviving are his wife, King, a daughter, Gayle, and two sons, James and Kenneth.

1937
JACK MAGINNIS, MS, on February 25 in Alexandria, Virginia. Maginnis was a retired captain in the U.S. Navy and had been awarded the Legion of Merit and Bronze Medal. He is survived by his wife, Grace.

1942
CHARLES M. BROWN on November 19, 1976, of cancer, at his home on the island of Kauai, Hawaii. Brown, a retired electronics engineer, is survived by his wife, Kathleen, two sons, and three daughters.

1948
ELROY K. C. CHINN on May 10 in Hawaii.

W. LAWRENCE NOON, MS '49, of a heart attack on September 13 in Santa Clara, California. He was a co-founder of the Memorex Corporation and retired in 1968 to begin cattle ranching near Mount Hamilton, California, and in Ellensburg, Washington. He is survived by his wife, Dorothy, and two sons, Eric and Arne.

1953
NOEL E. REED in March. Reed was a member of the technical staff of Hughes Aircraft Company in Malibu, California. He is survived by his wife, Marjorie.

1954
GAYNOR J. ADAMS, Eng, on November 6, 1975, of a cardiovascular heart condition. He was living in Nevada City, California, and is survived by his wife.

1972
THOMAS E. OSHEROFF on March 16. ROBERT McNAMARA, BS '73, MS '73, and Mrs. McNamara notified the Alumni Association: "It is with the most profound sorrow that we must report the passing of our beloved friend, Thomas Eugene Osheroff. He was a most distinguished member of the class of 1972 and was greatly admired for his tenderness, fine sense of honor, and intellectual attainments. We who are his dearest friends will miss him deeply and the tragedy of his loss will leave all our lives the poorer."

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