CALTECH NEWS

PUBLISHED FOR ALUMNI AND FRIENDS OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

VOLUME 3 • NUMBER 5 • JUNE 1969 • PASADENA, CALIFORNIA

At a May 20 coffee hour, Harold Brown and students discuss problems of campus disturbances.

What Do We Do In Case Of?

On May 7 Norman Davidson, chairman of the faculty, sent the following memo to the faculty:

"In view of the events which have recently taken place in many academic communities, President Brown has asked an ad hoc group including faculty, students, and members of the Administration to consider the problems of potential disruption as they might arise at Caltech. He has asked them to recommend principles and procedures to deal with disruption, should it occur, fairly and effectively, both administratively during such events and judicially afterwards.

"It should be emphasized that no events have occurred at Caltech or are foreseen that would fall into such a category. Experience elsewhere suggests, however, that it is wise to consider the problem carefully in advance.

"The group's first meeting took place on April 30."

The group, consisting of 14 people (including four students), met three times by May 20, at which time they held an "open" meeting at a coffee-and-donuts session on the steps of Throop Hall. Subsequent meetings are being held weekly, open to anyone interested, in the Trustee Board Room. In addition, the faculty as a whole was invited to meet with the ad hoc group for further discussion on a Friday afternoon, a time used frequently to air topics of general interest.

On May 19 the group published a statement of purposes, which said that the first goal was "to suggest mechanisms: for identification of problems and frustrations, within the Institute community and in its interaction with the broader society, that could lead to disruptions; and for making vigorous efforts to deal with such matters early in a responsive and responsible manner."

A secondary goal stated by the group is to involve the Caltech community to the greatest extent possible in the work of the group. With regard to the mechanics of coping with a disruption should it occur in spite of precautions, the group identified four general areas to be considered:

"►The problems posed by the difficulty of making distinctions among acts that may be classed as legitimate, unjustifiable, or intolerable and the necessity of dealing with these by different forms of immediate and long-range actions.

"►The point at which external assistance may be required.

"►The decisions as to who applies eventual judicial treatment.

"►The structure of a standby group to provide immediate response to a crisis." □

Group Studying Caltech's Long-Range Goals Submits Its Report

After two years of study, a faculty committee studying the "aims and goals" of the Institute has released a 600-page preliminary report to the Caltech community.

The formation of the committee, which has ranged from 20 to 25 members, was prompted by a long and widely held belief in faculty ranks that there should be clarification of some of the immediate and long-range goals of the Institute and its place in society.

The report deals with general problems of growth and change, the social and behavioral sciences, decision-making processes, undergraduate life and education, the humanities, Caltech's off-campus facilities and cooperative ventures, community relations, and graduate students and research fellows.

Cornelius J. Pings, committee chairman and professor of chemical engineering, pointed out that while all of the committee's conclusions and recommendations obviously are not of equal importance nor held with uniform conviction by committee members, the report stresses six areas of particular concern.

►A commitment to continue the undergraduate teaching program, and the realization that there are needs and opportunities for major improvements.

►The belief that, given the choice of growing or of remaining excellent and unique, Caltech should pursue the second course.

►The support of continuation of strength in the humanities and social sciences, with cautious and controlled growth of our teaching and research in the social and behavioral sciences.

►A need for modernization of the faculty political structure and increased involvement of the faculty in advisory roles to various administrative officers.

►A serious review of Caltech's association with the Jet Propulsion Laboratory.

►Greater involvement by the Institute in the affairs of the Pasadena and Southern California community.

"The committee hopes," Pings said, "that the publication of these initial reports will elicit considerable thought and reaction from the rest of the faculty, administration, trustees, undergraduates,

Continued on page 3

INSIDE

Ground Broken, Work Starts on Baxter Hall

Alumni, Caltech Associates, faculty members, and guests gathered at Beckman Mall on May 21 for groundbreaking ceremonies marking the start of construction on the new Donald E. Baxter, M.D., Hall of Humanities and Social Sciences.

The hour-long festivities included brief talks, the groundbreaking ceremony, and entertainment by the students' *Threepenny Opera* orchestra. Speakers included Arnold Beckman, chairman of the board of trustees; Harold Brown, president; Hallett Smith, chairman of the division of humanities and social sciences; David Elliot, the division's executive officer; Kent Clark, professor of English; and Edwin Munger, professor of geography. William Corcoran, executive officer for chemical engineering, presided.

The building—a major step in the

Continued on page 3

Harold Brown tosses the first shovelful of dirt while division chairman Hallett Smith readies the second. Other groundbreaking participants are grandson Donald Haake and daughter Mrs. Joseph Baker (representing donor Mrs. Delia Baxter), and Trustee Chairman Arnold Beckman.

Scripps Women Sample Caltech

A touch of heaven at Caltech is having more coed undergrads than you can count on two hands. The Caltech-Scripps Interrelation Program brought 24 girls to live in the undergrad student houses on May 7 to 10.

The delightful visitors lived in an alley in each of the houses. (Maiden Lane was born in Ruddock.) Two coeds were in Page; two in Lloyd; five in Ruddock; five in Ricketts; four in Blacker; and six in Fleming. (Dabney has its SRA's.) Most everybody enjoyed their presence.

"The program shows that girls can really have an effect; at least it did in Ruddock. This house went pretty freaky," said Marc Aaronson, ASCIT director of student life. His house's sleeping hours were a bit adjusted due to unusually interesting bull sessions. The atmosphere became much more spontaneous, according to another member.

In Ricketts the reaction was similar. "There was a good deal of meaningful communication both ways," said Dwight Carey, a student host. Most of the girls he talked to would be willing to come back again for another program. One coed, a senior, was especially thrilled that something like this came off. She had had a negative image of Tech ever since a freshman exchange.

"I had a really good experience with one of them," said Don Smith, a Fleming house member. "I'll be taking her out."

Page and Lloyd were handicapped with only two girls in each house, but the girls still had a good time.

There were some complications. Most of the girls were previously attached to guys, according to a Blacker house member. There was a similar "boy-friend" situation in several other houses. Another deterrent to meaningful dialogue was occasional "swarming" around a girl.

Consequently, some activities were hampered by lack of participation. The reception on Wednesday morning had four girls. (The others arrived late in the afternoon.) The coed touch football game Friday afternoon had six or seven girls and a lot of guys participating.

But the ASCIT coffee hour on Thursday was a fine success. "There were a lot of people over in Winnett lounge, and we had a lot of donuts," said Aaronson. Some of the girls went around to classes, and one commented that an English class was better than hers at Scripps. There was some social life on Friday and Saturday nights at several house parties. All this attention made the girls feel special and really appreciated, in contrast with a "just another bod" feeling at Claremont.

Plans for a much more ambitious program began first term. The motivations were the social aspect, an experiment in coed housing, and a meeting of two different educational environments. Things were going fine—50 guys were going to Scripps, 50 girls here—but the night before the sign-up lists went out, the student body president at Scripps communicated that the college president had decided it wasn't the proper time for the visitation to occur. It would be a precedent for men to live in a women's dorm. He decided a separate proposal should be drawn up at Scripps, but the girls still could come here.

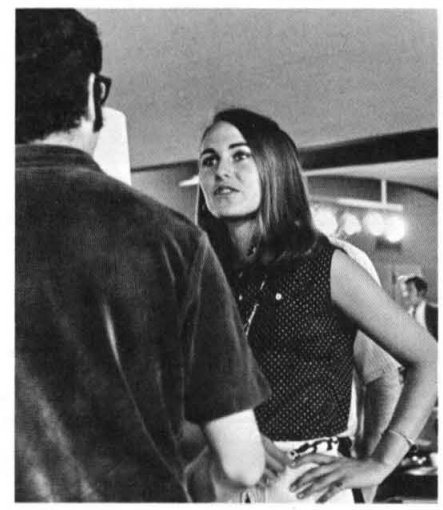
The second week in May was an acknowledged bad time to have the program because of Scripps' academic calendar. The original 50 fell to 36 and finally to the brave 24. Timing also caused some to leave early.

Some of the girls felt rather uneasy about coming to Caltech. To lessen this, each received a letter about the place from Aaronson and a hello-call from her student-host before arrival.

A significant result of the visit was a mutual tearing-down of stereotypes. On the Caltech side this was especially important. The program offered Caltech students an opportunity for more relaxed encounters with girls. "It was so much easier to talk to them than at an exchange; they didn't feel that they were on a cattle block," said Smith.

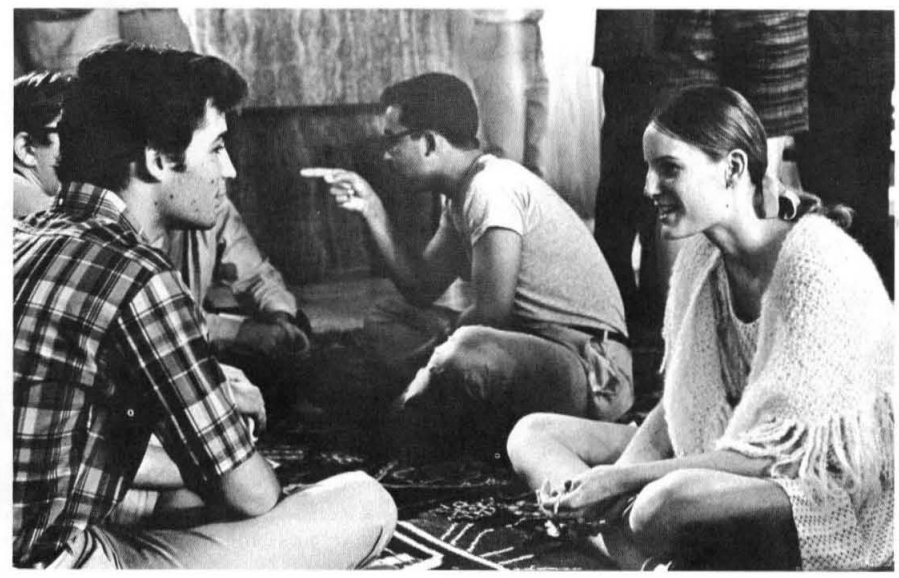
Caltech students are hoping for a repeat program—with more girls—in the fall.

—*John Healy '69* □



SCRIPPS VISITATION

The double attraction of girls and donuts, providing food for thought and stomach, results in a delightful coffee hour on May 8.



Promise of coed participation in a touch football game brings out plenty of fellows; the Scripps girls are understandably not quite as enthusiastic. But a half dozen show up and give it their best—which looks just fine.

Tuition Hike In 1970

An increase to $2,385 in the annual tuition fee for graduate and undergraduate students at Caltech—effective in September 1970—was announced by Robert B. Gilmore, vice president for business affairs.

Gilmore said the increase results from a recent study of the Institute's finances. The intent, he said, is to keep tuition fees more in line with those of other major independent universities. The fee will remain at $2,100 through the 1969-70 academic year.

Caltech tuition, which comprises less than 9 percent of the Institute's budget, was compared with fees at more than 20 other private universities and colleges across the nation. These fees now range from $1,300 at the University of Michigan to $2,300 at Tufts University, and most schools are contemplating increases of $150 to $400 per year. □

CALTECH NEWS
Vol. 3, No. 5 June 1969
Issued monthly except in August and September. Published by the California Institute of Technology and the Alumni Association, 1201 East California Blvd., Pasadena, California 91109.
Second class postage paid at Pasadena, California.
Editor: Bruce Abell '62
Associate Editor: Janet Lansburgh
Photographer: Floyd Clark

Athletic Year Ends With a Whimper

Golf

Golfers were the strongest team this spring, finishing the season with five wins and nine losses, the best record since 1962 when the team went five and five. Coach Hal Cassriel is looking to next year with enthusiasm, because none of the seven men on the team is a senior.

The low average score was 83, and the high was 88. The team was very consistent throughout the season. Winner of the J. Ben Earl Trophy for outstanding performance was number-one man Neil Holmes '70, who also won the trophy in 1968. Others on the team were Roger Goodspeed '72, Jim Simmonds '72, Bob Hammond '70, Jim Taylor '70, Sam Insana '71, and Allan Woodson '72.

Track

Caltech's track team had a disappointing season in 1969; quite a few of the 1968 lettermen either graduated early or passed up competition this year to concentrate on studies. The team won three dual meets, but lost all of its league meets. By finishing ahead of Whittier in the All-Conference Meet, Caltech managed a tie for last place in the SCIAC.

Coach Bert LaBrucherie listed several men who gave good performances in the All-Conference Meet. They are Captain Bob Tarjan '69, who placed fourth in the 440 and anchored the mile relay team that finished third; the 440 relay team of Bob Antaki '71, Louis Butterworth '70, James Andrews '69, and Steve Watkins '72 that picked up fourth; Chuck Thoele '72, who took fifth in the javelin; Joe Pool '72, fourth in the long jump, doing 22′ 2½″, a new freshman record; and Tom Blascho '71, who was fifth in the shot put. He also singled out Tim Tardiff '71, 880 and mile standout, who didn't place in the league finals but had a mile time of 4:22.1, just 0.1 second off the school record. Tardiff also won Caltech's Goldsworthy Award as the outstanding trackman of 1969.

Baseball

Baseball, like track, was badly hurt this year by the absence of several of last year's best players who chose not to play. The result was abysmal: one win against 26 losses.

There were some bright spots, of course. Lonnie Martin '69, was named to the All-SCIAC first team as a utility infielder. He had also been named to the first team in 1967, and to the second team in 1968.

Dave Turner '71 was voted winner of the Alumni Baseball Trophy by his teammates for coming to the team's rescue as a fine pitcher. With only a few days of batting practice throwing as experience, he almost beat Redlands (losing 7-6 in ten innings), allowed Claremont-Harvey Mudd only 5 hits (and lost 2-0), and gave up only three singles to conference champion Whittier while losing 3-1.

Other players cited for "heads up ball" by coach Ed Preisler were Dennis Carrie '70 at second base, Gerry Eisman '71 at center field and shortstop, and Martin Frost '69 at catcher.

Tennis

Tennis this year was only fair, with the team losing all its conference matches and finishing with an overall five win, fifteen loss record. Coach John Lamb rated the win over the USC junior varsity as the highlight of the season, with the victory over Pasadena College a close second in importance. Other wins came against Loyola, Los Angeles College of Optometry, and Biola.

Top man on the team was Ken Pischel '72, followed by Greg Evans '69, John Healy '69, Andy Chow '72, Jim Crawford '71, and Don Smith '71. Darryl Madura '72 filled in for Smith late in the season when Smith had an eye injury.

Winner of the Scott Tennis Tournament for the Caltech undergraduate tennis championship was John Healy, who defeated teammates Evans (defending champion) and Pischel. □

Humanities Building

Continued from page 1

Institute's continuing development program—was made possible by a generous gift from Mrs. Delia B. Baxter of Atherton, Calif. The building will be named in honor of her late husband, a physician who led in the development and production of solutions and associated equipment for intravenous therapy. Supporting funds came from Dr. and Mrs. Simon Ramo for use in building a lecture hall in the new structure, and from the U.S. Department of Health, Education and Welfare.

Beckman, in remarks to the gathering, said:

"We are abysmally ignorant about what goes on in the minds of people, and this problem gets very little attention. The major reason is that while the hard sciences were spending money in research and development, the social sciences were not. Tools for these studies have only recently become available."

Noting that Caltech has the tools and facilities to undertake such research, Beckman said, "We have the flexibility and freedom of operation that is often lacking in larger institutions."

Baxter Hall, he declared, is the first step in a major advance in this science.

Brown, after giving details of Mrs. Baxter's gift, said he believes the new structure "will set the pattern for Caltech's future activities in the humanities and social sciences. We intend, of course, to remain centered on science and engineering at Caltech, but we need not be rigidly confined to science and technology in all our teaching and scholarly activities." □

Multi-Media Criticism

Three freshmen created a ballet, an etching, and an oil painting, respectively, as term papers in a *Modern Literature* course. Flexing his innovative educational biceps, Charles Newton, lecturer in English, asked for volunteers to give book reports in media other than writing or reporting.

The class moved to Culbertson Auditorium one recent evening where Dennis Noe presented a choreography of a scene from Salinger's *Franny and Zooey*, complete with costumes and musical background. He was assisted by Dick Neu, a junior who was dance director for last year's student musical; and by three of the young women student research associates living in Dabney House: Betsy Oliver, Barbara Holland, and Jan Streiff.

Ray Waldo had learned how to prepare an etching from a member of the art faculty of a nearby college, and created his picture version of Ken Keesy's *One Flew Over the Cuckoo's Nest*. Steve List painted his impression of Sartre's *Nausea*. □

Faculty Honors

JOHN F. BENTON, associate professor of history, has been elected to membership on the council of the Mediaeval Academy of America. Benton, 37, has been on the Caltech faculty since 1965. As a member of the Mediaeval Academy's council, he will serve on the executive committee that administers the academy's affairs. It is the first time a council member has been chosen from a school of science or technology.

JULIAN D. COLE, professor of applied mathematics, has been appointed the first faculty research fellow in the Flight Sciences Laboratory of the Boeing Scientific Research Laboratories in Seattle. Cole has taken a one-year leave from Caltech and is now at Boeing.

ROBERT L. DAUGHERTY, professor emeritus of mechanical and hydraulic engineering, was appointed to a sixth three-year term on the hearing board of the Los Angeles County Air Pollution Control District. The board acts on appeals for variances to smog regulations.

Three Caltech faculty have won 1969 Guggenheim Fellowships. They are SHELDON FRIEDLANDER, professor of chemical and environmental health engineering; GEORGE SEIELSTAD, senior research fellow in radio astronomy; and FREDERIK ZACHARIASEN, professor of theoretical physics. The grants are made to assist the men in carrying out work which they have proposed to the Guggenheim Foundation. Friedlander will study the development of urban atmosphere models for air resource management; Seielstad will study extragalactic radio astronomy; and Zachariasen will conduct theoretical studies in elementary particle physics.

MURRAY GELL-MANN, Caltech's Robert A. Millikan Professor of Theoretical Physics, was one of five scientists named by President Nixon to his science advisory committee. Gell-Mann's term will run through December 31, 1972.

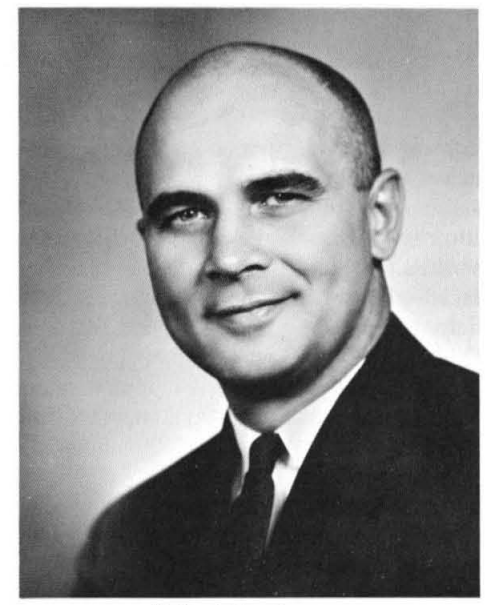
Three young faculty members have won Alfred P. Sloan Foundation Fellowships for research in the physical sciences. DAVID GOODSTEIN, assistant professor of physics; BASIL VINCENT MCKOY, assistant professor of theoretical chemistry; and MICHAEL RAFTERY, assistant professor of chemical biology, won the two-year grants which are given to promising scientists early in their careers when support from other sources may be difficult to obtain. The three men are among 76 chosen this year.

CORNELIUS J. PINGS, professor of chemical engineering, has been named recipient of the 1969 Chemical Engineering Division Lectureship Award of the American Society of Engineering Education. The $1,000 award, given annually, is presented in recognition of "outstanding achievement in fundamental chemical engineering theory or practice." Pings was cited for his experimental contributions in liquid state chemistry and physics and for work in chemical engineering thermodynamics.

JOHN D. ROBERTS, professor of chemistry, was the fifth Kilpatrick lecturer at Illinois Institute of Technology in March. The annual lectures are in honor of Dr. Martin Kilpatrick, who was chairman of the department of chemistry at IIT from 1947 to 1960.

ROGER W. SPERRY, Hixon Professor of Psychobiology, was awarded the 1969 Warren Medal of the Society of Experimental Biologists for distinguished research on cortical function. He is the 34th scientist to receive the honor since it was first awarded in 1936.

WILLIAM B. WOOD III, associate professor of biology, won the U.S. Steel Foundation Award in Molecular Biology for his successful reconstruction of the T4 virus *in vitro* and for studies of its assembly mechanism. The award is given for recent, notable discoveries in molecular biology by a young scientist. Wood was one of five men who received awards at the 106th annual meeting of the National Academy of Sciences, April 28. □



Robert Hansberger

New Caltech Trustee

Robert V. Hansberger, president of Boise Cascade Corp., a major American forest products company, has been elected to membership on Caltech's Board of Trustees. A native of Worthington, Minn., Hansberger, 48, became president of Boise Cascade in 1957. He received a bachelor's degree in mechanical engineering at the University of Minnesota in 1942, and in 1947 a master's degree in business administration at the Harvard Graduate School of Business. He lives in Boise, Idaho, where the corporation has its headquarters. □

Aims and Goals Report Follows Two-Year Study

Continued from page 1

graduate students, employees, alumni, and friends of the Institute."

The ultimate disposition of the report, he added, will depend on the will of the general faculty. "Possibly our own reflections and the reactions of others will lead us to want to submit a revision as a final draft. In any event, we anticipate the dissolution of this committee before the end of 1969."

An extensive summary of the report appeared in the May *Engineering and Science* magazine. Alumni can request copies of the complete document (a limited number are available) from Dr. Pings, room 127 Spalding. Copies have also been placed in Millikan Library and the Public Affairs Room. □

Sharp: Searching for a New President Can Help a College Find Itself

"Choosing a college president is like getting married—we don't do it often enough to be practiced at it." That's how Robert Sharp, professor of geology and former chairman of the division, described the problem he and fellow faculty faced when Caltech's trustees asked their help in finding a successor to Lee DuBridge.

A committee of 14 senior faculty members was appointed by chairman of the faculty Jesse Greenstein in May of 1967. Its stated function was to assist and advise a trustee committee composed of Arnold Beckman, Thomas Watson, and Norman Chandler. In actuality it did much of the job of evaluating candidates and winnowing the list. Up to the final decision, which was theirs alone to make, the trustees served more as a sounding board than as a directing force.

"Their steering," says Sharp, "was most discreet, being more by negation than by advocacy, and they carefully avoided pressing the faculty group toward any trustee-preferred candidate." They did suggest names to the faculty from time to time, which were then evaluated as were any other "nominations."

The committee's charter from the trustees prescribed that it first determine the long-range goals of the Institute, then draw up a list of qualifications for the man who could lead Caltech in those directions, and then find him.

The faculty group declined to attempt definition of goals for Caltech because another faculty committee was just then beginning a long-range study of the same sort. [*See related story on page 1.*]

The committee also decided not to make up a highly specific list of qualifications. "We realized that the man who could meet all the qualifications of such a list died nearly 2,000 years ago."

The third suggestion—that they help find the man—they accepted with enthusiasm. They started with a list of about a dozen names suggested to Arnold Beckman from various sources, although Sharp observed that none of those men was a final candidate. The faculty also got lists from other sources, particularly other schools which had recently experienced similar searches. The Caltech faculty was solicited for names; alumni were invited to submit names through an article in *Engineering and Science* magazine; and students were approached through the ASCIT board of directors. Outside individual sources were also contacted.

As names were added to the lists, biographical sketches were assembled, and the faculty committee members started calling close friends at other schools to get frank opinions of potential candidates.

"We always maintained a list of five or six favored candidates, but we also had a considerably longer working list. Names were continually switched from one to the other. We even had a dark-horse list."

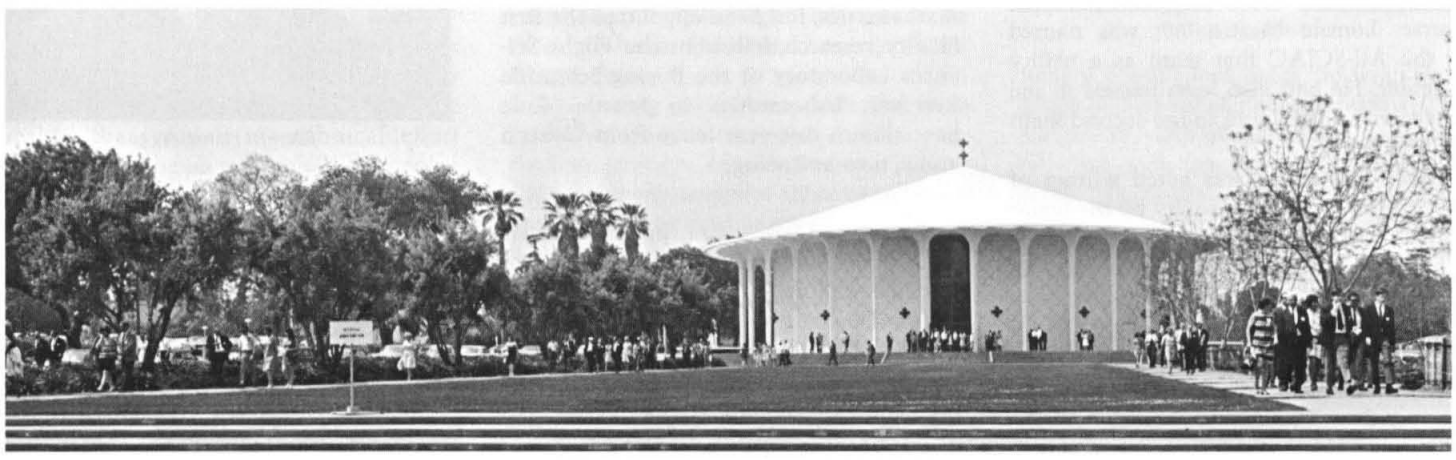
People who survived preliminary scrutiny then had to be seen in person—in some instances without any awareness that they were being considered. Toward the end, when things got serious, candidates were invited to the campus for extensive visits. In those cases they knew why they were at Caltech, and so did the faculty and students with whom they talked.

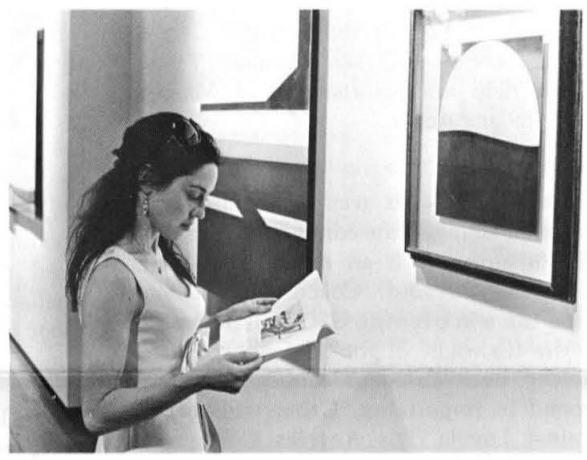
"We had to use discretion in these matters to protect the feelings of the candidates. Nobody likes to have it known that he didn't get a job, even though he never applied for it.

"We were able to get four important candidates on campus. One spent nearly three days with small groups of students and faculty, and was seen by about 70 percent of the faculty. For others we had a 'town meeting' format in the trustees' board room. People came and went throughout the day. We also pulled a group of 35 students together to spend a few hours with a candidate, and a group of young faculty spent evenings with some candidates."

The faculty committee finally submitted just two names to the trustees. "Either man would have made a splendid president," said Sharp. "The faculty's preferred candidate fortunately proved to be the trustees' first choice."

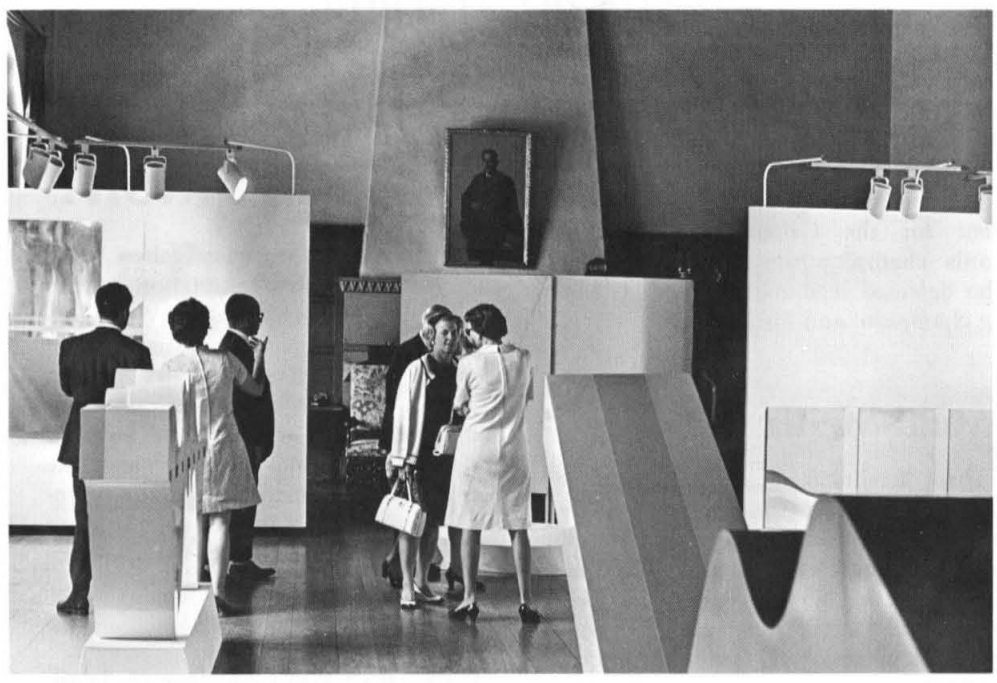
Sharp reflected that the presidential search had provided a valuable by-product. "A major problem for all colleges and universities," he said, "is to find ways to involve the family without compromising the power of decision. I think the record shows that in this instance we were successful." He added that such participation must be meaningful, not a charade. "It should become a state of mind, not a procedure. One should instinctively solicit participation in important decisions. Given the importance of





ALUMNI SEMINAR DAY

The Seminar offered 12 different lectures in addition to a general session and dinner speaker, but many alumni were equally interested in renewing their acquaintance with the always changing campus. This year, on an unseasonably hot day, they were grateful for air-conditioned Beckman Auditorium (top), but, undaunted, shed their coats and stuck it out in unrefrigerated Kerckhoff Laboratory (below, right). Caltech provided an art exhibit in Dabney Lounge (above, right; and right) and a "historical" exhibit (above, left)—initialed bricks from the 1920's transferred in 1962 from the razed Throop Club fireplace to the wall of Winnett Student Center. But the most popular exhibits on a day that saw 1,328 attendees were chairs—or just low walls—in shady spots (below, left). □



Robert P. Sharp

our search, we found that the faculty displayed a heart-warming devotion to the community, and the students were perceptive, thoughtful, and constructive. Their impact on the final decision approached that of the faculty in significance and weight.

"Participation produced not only a wise and widely accepted decision, but it permitted our new president to come aboard in a pleasant and favorable atmosphere. One thing further that the committee learned of was the fantastic devotion of the trustees to the California Institute." □

Goldreich: Pulsars May Be "Hot" Spots on Rotating Neutron Stars

The pulsar—astronomy's newest enigma in the sky—is providing some exciting clues and some perplexing new puzzles for scientists who are trying to understand the universe.

"When radio astronomers first detected pulsating radio signals, their immediate reaction was that they were getting local interference, perhaps from nearby neon signs," said Peter Goldreich, Caltech associate professor of planetary science and astronomy.

Goldreich said the first pulsars, discovered by radio astronomers at Cambridge University, England, in 1967, were referred to as "LGMs."

"LGM stands for little green men, since the first reaction to finding regularly pulsating radio sources was that they might be navigational beacons for advanced space travelers." The LGM idea didn't last long, however, and since then a total of 38 pulsars have been discovered.

Goldreich said all the pulsars located to date are in our own galaxy," and most are rather close to us. We believe there are others scattered around further out, but we can't detect them because the interstellar gas tends to smear out the signals, especially at low frequencies, where they are best observed."

He added that pulsars at first seemed to be providing an extremely accurate pulse of radio signals which might serve as astronomical clocks, but it was later found that the pulses are slowing down.

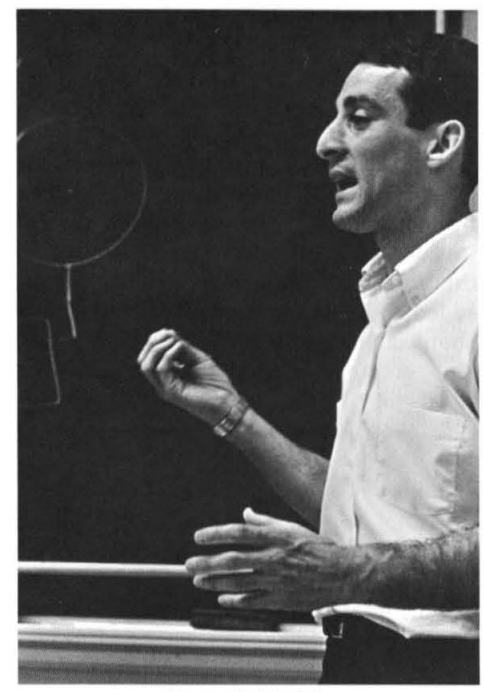
"But there was a big fly in the ointment when radio astronomers began studying the pulsar in the Vela nebula," Goldreich added. "It was slowing down as expected, but then—in the period of about one week—it picked up speed suddenly, then began slowing down again. Now we believe that the quick jump in speed was caused by a slight contraction of the star. A contraction of only one centimeter would be enough to account for it.

"So here we think we're seeing a neutron star that may be crystallizing. What we witnessed may have been an earthquake on a neutron star."

Goldeich said the best explanation so far for pulsars is that they are neutron stars—stars that have reached the end point of stellar evolution, having collapsed into bodies of perhaps ten miles radius, being made up almost entirely of neutrons.

"Since such a star might be as massive as the sun—compressed to such a small radius—a thimbleful of material from a neutron star, if dropped, would push right on through the earth as if earth didn't exist. It would be that heavy," he explained.

He also said that the best explanation for the periodicity is in the neutron star's rotation, adding there were also theories that it might be caused by an orbital mechanism, or by a pulsating motion (the star expanding and contracting);



Peter Goldreich

these theories are increasingly untenable.

He said the most favored theory now is that a spot of violent activity on the surface of the pulsar—radiating 10^{18} watts of power per square centimeter—is responsible for the on-off nature of the pulses. The beam of radiation is detected only as the hot spot on the star sweeps past the earth.

Goldreich said the only pulsar identified optically is in the well-known Crab Nebula, which is believed to be the remnant of a star that exploded 915 years ago. The pulsar, a star visible in the center of the nebula, is believed to be the remnant of the star that exploded, spewing material far into space. □

REPORTS OF ALUMNI SEMINAR LECTURES

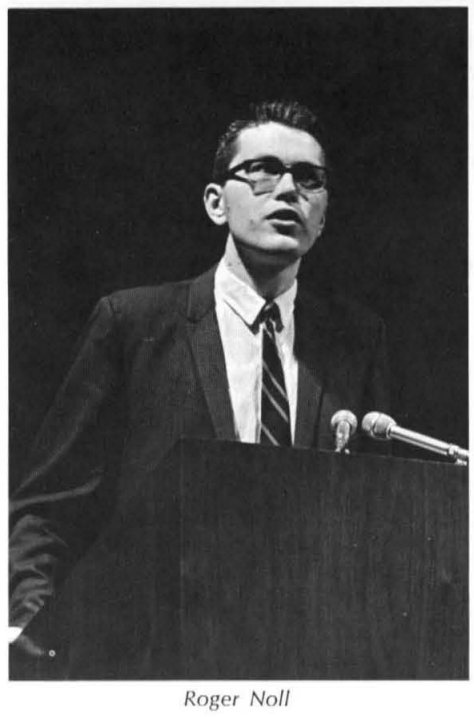
Noll: Post-Vietnam Economy Can Thrive

Will there be another recession after the Vietnam War? Roger Noll, assistant professor of economics, says there needn't be if the federal government doesn't pull out the economic underpinnings by causing sizable reductions in total private and public spending. "With appropriate well-timed actions, there is no reason why unemployment should rise much above the 4 percent 'full employment' target set by President Kennedy in 1962," said Noll.

One big question, he said, is what will happen to the $30 billion that has been added to the defense budget since 1965. The answer will be determined through the political process, and the cut in defense spending could range from a full $30 billion to almost nothing at all.

Noll suggested that the $30 billion cut was highly unlikely, if for no other reason than that to maintain the real value of defense purchases would have required a rise in defense expenditures of perhaps $8 to $10 billion since 1965 simply because of inflation. Whether some currently sidetracked defense programs—such as the ABM or the all-nuclear navy—are given the go-ahead will have a major impact on how much current Vietnam expenditures are transferred out of the defense budget.

He emphasized that the Vietnam War is less of an economic burden than was the Korean War (or, of course, World War II). At the height of spending for Korea we were committing about 13.4 percent of the gross national product to



Roger Noll

defense. Last year we spent 9.2 percent of our GNP on defense. (In World War II it was a high of 41.6 percent of the GNP in 1944.)

To illustrate a possible, if not probable, case, Noll assumed that between half and two-thirds of the Vietnam money would be taken out of the defense budget. He pointed out that "this assumption is not based on an assessment of the social needs of the nation. It is merely a guess as to the likely political outcome of present debate in and out of government as to the best disposition of the 'peace dividend.' " He added that after every war fought in this century defense expenditures have failed to fall to prewar levels after demobilization.

Consequences of the assumed cut would be to unemploy about 750,000 to 1,000,000 civilians and discharge about 500,000 military personnel. Even if this transition took place in as short a time as a year, he said, the increase in the labor force would be relatively small—about 100,000 more people looking for jobs each month than would normally be the case. At the same time there would be some $15 billion *not* being spent on defense. The key to the economic climate, said Noll, is what is done with that $15 million.

He pointed out that after the Korean war there was a decline in defense expenditures (relatively larger than that assumed for post-Vietnam), but the temporary taxes imposed to pay for the war effort were not rescinded. Instead, the net surplus in the federal budget increased $13 billion by the end of 1955. As a result, unemployment rose from 2.8 to 6.0 percent, national output stagnated, and profits fell.

The problem facing the country at the end of the Vietnam War is very similar. Noll predicted that in the absence of economic policy (the case in the mid-1950's), unemployment might rise to about 5 percent, reflecting the somewhat smaller part of our GNP going to Viet-

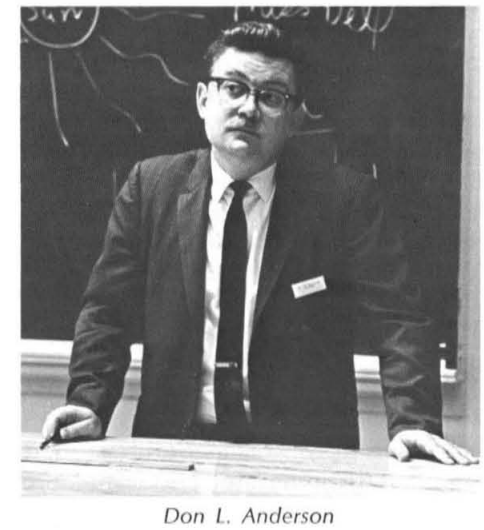
Continued on page 7

Anderson: New Theory Of Earth Solidifying

Not long ago scientists would have little to do with people who, looking at a map, suggested that South America and Africa might have been joined at one time. Now, said Don Anderson, director of Caltech's Seismological Laboratory, geologists have taken a took at some special maps of their own and come up with similar conclusions.

Anderson said that many of the various earth sciences—seismology, paleontology, climatology, geophysics, geochemistry, geomorphology—are now fitting together into one overall theory of the tectonics of the earth. It appears, he said, that the crust of the earth is composed of a few major blocks that are continually moving against one another. The driving forces seem to come from deep within the earth's mantle, and appear along the several mid-oceanic rises where molten

Continued on page 7



Don L. Anderson

Brown: Public Support For Research Flagging

Public attitudes toward research and development have nearly reversed in the last decade, said Caltech President Harold Brown at the Alumni Seminar general session, and the result is being seen in the impact on national policy. Brown added that the public needs reeducation about the ultimate practical as well as the vital and primary intellectual values of basic and applied research.

In the years following World War II, he said, the major national science policy assumptions were: that research and development are an unmixed good, that support for them should grow, that they contribute to the country's economic health, that growth in technical effort should continue as more qualified people are available to conduct research, that work should be done where it can be done best, and that research projects should be chosen by the researchers themselves.

Harold Brown

Brown said that there seems to be a growing feeling now, held by various groups, that research and development are a source of more problems than solutions, that they compete for funds needed for important programs for social welfare, that funds should be distributed geographically, that growth should be slow, that work should concentrate on problems of the urban environment, that R&D personnel should not be the ones to determine the work to be done, and that the kinds of work done are often wasteful.

Brown characterized these current attitudes as overreactions and half-truths, but cautioned that in thinking about applied research and development it is important to recognize society's problems. Some areas—for example, environmental pollution—are now being vigorously studied. But others, he warned, simply don't have the applied research base on which to develop solutions to social problems.

Basic research and applied research—although differing particularly in the motivation behind them—do have links. "Without support of basic research at a high level, applied research will dry up." Brown admitted that the danger of such an arrangement is that the Congress (and the public) might cut back both together because of supposed shortcomings of either.

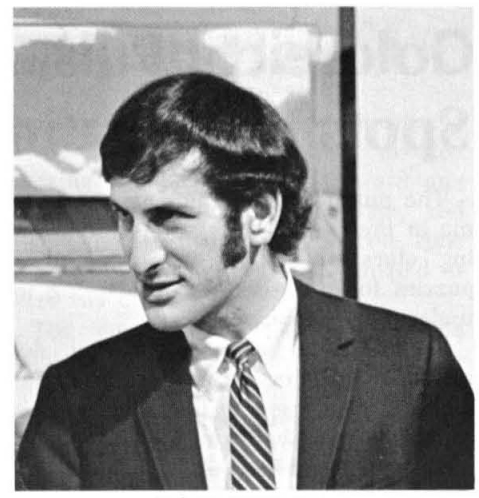
"One widely used criterion for awarding grants is to measure the quality of the work being done. Applied research quality," admitted Brown, "has often left something to be desired. Still, one must examine the priorities and relation to national programs and proceed." □

Rosenstone: Pop Music Is Youth's Newspaper

"To see America through the eyes of popular music is to see not the land of the free and the home of the brave, but a country in which people are basically victims, oppressed by a political, social, and economic system over which they have little control," said Robert Rosenstone, associate professor of history, to an overflow crowd on Alumni Seminar day. In his lecture in Culbertson Auditorium he attempted to help the audience take that "look" by playing pop records and supplying a dazzling light show put on by three Caltech students, known as St. Elmo's Fire.

Rosenstone pointed out that the most "popular" victim is youth itself, a reflection perhaps of the younger age of today's songwriters over those of a decade ago. In fact, he said, most of the popular recording artists write their own material. Consequently, the list of targets includes the Vietnam War ("Kill, Kill, for Peace" and "I ain't marching anymore."), modern thought processes ("All your children are poor unfortunate victims of lies you believe."), police harassment of young people ("Step out of line, the Man come and take you away."), loss of individuality ("What will it take to whip you into line? / A broken heart? / A broken head? / It can be arranged."), emptiness of affluence ("TV dinner by the pool? I'm so glad I finished school."), artificiality ("I know true love can never be / A product of plasticity."), chastity ("I don't want no woman wrapped in cellophane. . . (She) will do you in / Bending your mind with her talking about sin.").

Yet, Rosenstone points out, the young songwriters' seeming distaste for most of



Robert Rosenstone

society doesn't lead them "to wrap themselves in a mood of musical despair. They are young—and often making good money—and such an attitude is foreign to them. Musically they are hopeful because, as the title of the Dylan song indicates, 'The Times They Are A-Changin.'"

What are the values esteemed in the music? Youth, for one, of course, particularly contrasted with the "antique people." Rosenstone explained that it is a "pagan world, the antithesis of the Christian ideal that would postpone fulfillment to some afterlife. As the Doors' Jim Morrison states, 'Cancel my subscription to the resurrection,' and in the same song literally shrieks, 'We want the world and want it now.' "

Rosenstone said that the songwriters do recognize the often inpenetrable barriers of the existing social structure, so they try to find ways to live within it. Their step one, he says, is to forget it ("Stamp out reality . . . / Before it stamps out you.").

"The most frequent theme," he adds, "is the call to freedom of the individual

Continued on page 7

REPORTS OF ALUMNI SEMINAR LECTURES

Thompson: Caltech's Computer Is a Precise Conversationalist

Computers have long been the special province of the programmer, but now, at Caltech, there's a new way to communicate with the machine—in English—and it sometimes sasses back.

"It's now possible—with our rapidly extensible language system—to converse with the computer in English through an ordinary electric typewriter keyboard," said Frederick B. Thompson, professor of applied science and philosophy.

Thompson demonstrated how the computer, which has a store of information about several families, their activities and histories, can answer complex questions. He asked the computer, via the keyboard:

"How many children did John Smith and Mary Jones have?"

Replied the computer, in effect:

"Sorry, that's an improper question."

Thompson explained that his mistake was in not supplying a time element.

"Since we've added children to the memory several times, with their birth dates, we have to let the computer know dates too. I should have asked 'How many children do they have?' or I should have asked 'How many children did John Smith and Mary Jones have as of last January 1?' "

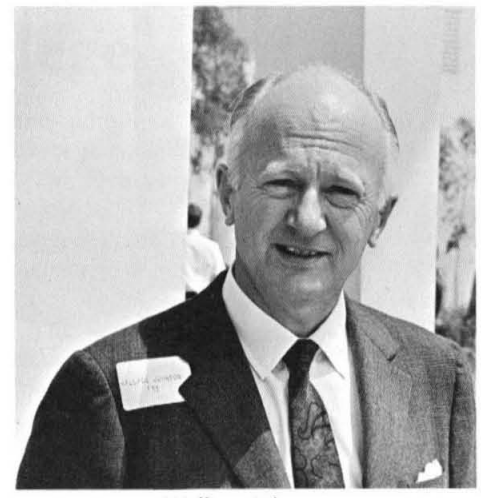
Thompson rephrased his question, and the computer promptly responded, listing them according to age.

The computer quickly supplied answers to much more complex questions such as where the family members were at what date, who married whom, and where they lived and for how long.

Essentially, once the memory bank has been filled with the right information, the computer "can converse and provide answers in any field desired," Thompson

Continued on page 7

Frederick Thompson



Wallace Johnson

Johnson: Berkeley, Nation's Barometer

Wallace Johnson '35, president of Upright Scaffolds, Inc., became a politician seven years ago upon realizing that "he" was one of the "they" who never seemed to be doing anything. As a consequence of that revelation, he told 200 people at the dinner following the Alumni Seminar, he ran for and was elected mayor of his community—Berkeley, California. He is now serving his second term of office, and said he has come to regard Berkeley as "the barometer of the nation." Time and time again, he emphasized, events that have taken place in Berkeley have been repeated later in other cities.

What new developments are currently taking place in Berkeley? For one, he said, Berkeley now has balanced representation on its City Council; three of the nine

Continued on page 7

Seinfeld: Technology Ready, But Politics Stymie Smog Control

The almost daily ebb and flow of noxious smog in the Los Angeles Basin may soon be precisely predictable—in time to do something about it—according to John H. Seinfeld, assistant professor of chemical engineering.

"There's a close relationship—especially in the atmosphere—between what we put into it and what we get out, and that can serve as the basis for building an accurate model." He said we can look at the atmosphere as a giant chemical reactor and, knowing what goes into it, predict what it will do. That way we can

Continued on page 7

John Seinfeld

Berkeley Foretells Your Future

Continued from page 6

councilmen are black, as of the election in April. Significantly, Johnson added, these black men represent a new "independency" of the black community, not a form of white tokenism. He expects similar developments to take place soon in other multi-racial communities.

The police department is also trying to do some significant things, he explained. Jobs will be broken down into more diverse categories, with the harder jobs being performed by the more experienced officers, and the routine assignments (like traffic) being handled by utility police. There is also a growing corps of community liaison officers to deal with special problems involving minority population.

Another police innovation is the formation of a committee made up of four city councilmen who can hear grievances against the police if the police department itself doesn't satisfy a complaining citizen. But, Johnson said, only two cases have come to the committee in the last two years. "The mere existence of the committee tends to minimize the number of cases."

Another important Berkeley innovation, he continued, has been the "courageous position on integration of the schools." As of this year all schools, high school to elementary, have been integrated by bussing. At the start of the program, he said, there were fears of white flight from Berkeley. There was flight, but whites, not blacks, replaced the whites who left. The population has been stable for four years at 40 percent black, 50 percent white, and 10 percent oriental.

Perhaps the most obvious Berkeley barometer has been the University. Johnson reminded his audience that most people measure the beginning of serious campus disturbances from the Free Speech Movement at Berkeley in 1964. In each succeeding year, he pointed out, there have been further major disturbances, which are subsequently mirrored at other schools all over the country.

The pattern at Berkeley, he said, consists of a vast predominance of non-students, taking advantage of the open campus, fomenting causes. For any cause, he claims, there are only 100 to 200 people involved; their intent is to attract the support of another 1,000 to 2,000 people. The students who may flock to the causes are, he said, mostly freshmen and sophomores. Johnson referred to the non-student activists as "street people," part of a "bohemian culture in the shadow of the university." Johnson, who is proud of Berkeley's response to racial problems, took care to point out several times that the bulk of the street people, including those in the Third World Liberation Front, are white.

Johnson spoke at length about the "People's Park," a temporarily vacant piece of university land that had been occupied by activists, and which finally led (the week following Johnson's talk), to Berkeley's most recent violence. The school had cleared the land several months ago, intending to put some playing fields with a park-like atmosphere there. Johnson claimed that "A man named Scherr, who puts out a depraved paper called the *Berkeley Barb*," was leading the movement to put a park there. He predicted that "people's parks," private land claimed by activists for public use, will be the next national trend. Johnson, who ripped with relish into the activists promoting the movement in Berkeley, was also critical of the university administration for declining to assert its property rights during the weeks that the land was being taken over.

On the problem of urban crises, Johnson said the major cause was that "propertyless millions of people feel no sense of identity with 'life, liberty, and property,' the fundamentals of the founding fathers. We must reactivate those fundamentals."

Johnson insisted that "Every man, if he has the initiative, should have the opportunity to own his own home." And, like the pioneers, he said, he should build the home himself. "I have designed a home ownership concept, called Pioneer Homes, that calls for four independent garden homes on the same 50- by 135-foot lot."

A pilot project, which can be inspected, has been completed in Berkeley. Johnson's plan would be for the poor man to create his own down payment equity by building the house on evenings and Saturdays. □

Post-Vietnam Economy

Continued from page 5

nam. However, the surtax is currently producing $10 billion in revenue, and returning that money to the consumers (who would spend 90 percent of it), would go a good distance to create new jobs for those people now in Vietnam jobs. The amount left unassigned may amount to no more than about $5 or $6 billion, says Noll, and there are already plenty of claims for it. It could be used for domestic programs that have been bypassed because of war expenses; it could be used for transferring federal tax revenue to the states; or it could be used for individual tax relief. The choice, Noll again emphasized, is political. From an economic standpoint, all would have the same general effect, because all would add to total spending and thereby create new jobs to replace old ones. But it is also possible, he said, that we could withhold the money from circulation in an attempt to "buy" price stability quickly in this current period of inflation. The cost of this policy is more unemployment, much as we had after Korea. □

Music: No More Moon-June Lyrics

Continued from page 6

to 'do his own thing.' A desire for freedom among Americans is certainly nothing new. What is different in the songs of the sixties is the conviction that this freedom should be used by the individual in an extensive exploration of his own internal world." The way the songs advocate is mind-expansion ("How happy life would be / If all mankind / Would take the time to journey to the center of the mind.").

Not an easy trip, reminds Rosenstone, but youth has found a shortcut with marijuana and LSD, which they carefully distinguish from the "hard" drugs like heroin. Many young people, he says, see their drugs as an ultimate solution to their own and the world's problems.

Such, says Rosenstone, is the picture of the modern world as seen through popular music. "Whether one agrees wholly, partly, or not at all with such a picture of the U.S., the fact is that it is pictured on records that sell millions of copies to teenagers."

Records have to some extent taken the place of more traditional sources of information and guidance for youth. In place of parents and schools, which he says may be hindered by a cultural lag, music and underground newspapers "telegraph important messages to young people and help to define and codify the mores and standards of their own subculture." So, he says, the lyrics of the music serve a functional role in the world of youth. "Without reading Paul Goodman, David Riesman, C. Wright Mills, or Mary McCarthy, they know that life is a 'rat race,' that Americans are a 'lonely crowd,' that 'white collar' lives contain much frustration, that the war in Vietnam is far from just."

The second musical element, he says, is the search for personal experience, and an implicit criticism of what youth sees as the materialism that destroys spiritualism. Such criticism, he reminded the audience, can only be made by affluent people. If they are really utopians, he added, they may have at least "caught something of the desire for freedom that all men feel.

"If the youth can in their own search help us redefine ourselves as spiritual as well as physical and material beings, then they have given us much that we should thank them for." Rosenstone admits that youth indulges in excesses, but says that he "would not wish them to be tempered and calm and mature in all things—as it does to all generations, maturity will come in time."

He suggests condemning youth less and listening to them more. "They have reaffirmed what much of America has forgotten—that gadgets and contraptions and property and, yes, profits, are and should be less important than people. If we can learn this lesson from them, then we shall be in a position of thanking them for helping to give us back what we seem to have lost—both our individual and collective soul." □

Control Smog? Limit the Inputs

Continued from page 6

move toward doing something about it.

There are two approaches to controlling the formation of smog when bad conditions are predicted. Seinfeld called them feed-forward and feedback control.

"In a feedback system you look at what has happened and react. But in the feed-forward system, your model predicts what will happen under certain conditions, and you act before they happen.

"There are many possible solutions, and the technology is largely in hand, but we don't seem to have the political ability to take these steps," he said. "That's where we need a lot of work, in the area of social and economic evaluation of alternatives. These are the decisions nobody wants to make."

Seinfeld displayed color pictures showing the Los Angeles Basin blanketed in thick smog. Explaining the conditions that lead to smog, he said:

"Los Angeles, like other cities located on southwest coasts, has just the right conditions to keep smog bottled up. The main problem comes from the temperature inversion, which keeps the fumes from automobiles and other smog sources from escaping. Wind velocities are usually not high enough to disperse the pollutants, either."

A key ingredient in Los Angeles' air pollution is sunlight, which spurs reactions involving oxides of nitrogen and hydrocarbons. The agents formed in these complex reactions are the irritants that damage plant life and cause discomfort.

Sienfeld said a chemical engineering group at Caltech is working to perfect a simplified model of southern California's atmospheric smog reactor, but that it is a complicated problem involving both meteorology and chemistry.

"Of course we can't control the temperature, solar radiation, and other meterological inputs for the reactor," he added, "so we must concentrate on the chemistry. If we can find a way to control what goes in, perhaps we can have something to do with what comes out." □

New Tectonics Theory

Continued from page 5

material rises and solidifies as it nears the surface.

As new crust forms along the rises, the sea floor spreads (at between one and ten centimeters per year), causing the massive continent-size blocks to push against each other like paving stones. At the block interfaces are seismic zones, mountain-building, and deep ocean trenches where old crustal material is returning to the mantle. These block boundaries are frequently offset by faults, such as California's San Andreas—a long transform fault that offsets the East Pacific rise. Other, less visible offsetting faults can be mapped from the record of earthquakes along them.

Much of the new theory has come from data about magnetic properties of deep-sea rocks, said Anderson. As new crustal material solidifies along the rises, magnetic materials in it align themselves with the earth's magnetic field. Because the earth's magnetic polarity periodically reverses (making the North Pole the South Pole), a series of magnetic "stripes" can be detected in rocks of varying ages laid out along the ocean floor. These stripes can be dated and so correlated all over the globe. By matching up stripes of similar age, geologists have been able to reconstruct the positions of the continents at past times. The reconstructions indicate that millions of years ago there were one or, perhaps, two "precontinents," with the Americas, Africa, Europe, and Greenland making up the major one. □

ANNUAL ALUMNI DINNER

Wednesday, June 11, 1969

Rodger Young Auditorium

Los Angeles

Cocktails 6:00 p.m.

Dinner 7:00 p.m.

Speaker: Glenn S. Dumke, Chancellor, California State Colleges

Reunions: Classes of 1914-19-24-29-34-39-44-49-54-59-64

PERSONALS

1923
HAROLD S. ENDICOTT, retired consulting engineer for the General Electric Company, has been selected to receive the 1969 Arnold H. Scott Award, presented for "outstanding achievement in the science of electrical insulation technology" by the American Society for Testing and Materials. Endicott, who retired from G.E. in 1966, joined the company in 1924 as an assistant engineer. Much of his work has centered on dialectric measurements and development of test methods.

1926
VICTOR F. HANSON, director of the division of physics research in the engineering department of the DuPont Company, has retired after 35 years with the company. Hanson pioneered many of DuPont's research activities in the fields of instrumentation and atomic energy, and he was the first director of the radiation physics laboratory. He lives in Yorklyn, Delaware.

1927
WILLIAM W. AULTMAN is chairman of the board of James M. Montgomery, Consulting Engineers, Inc., an internationally known sanitary engineering firm in Pasadena.

1930
TRUMAN H. KUHN has been awarded the Tasker H. Bliss Medal of the Society of American Military Engineers. The medal is awarded annually for contributions to military engineering education to a professor or instructor at a university with an ROTC unit. Kuhn is vice president for administrative affairs and dean of faculty, Colorado School of Mines, where he has been on the faculty for over 20 years.

1932
PATRICK B. LYONS was recently appointed to membership on the Oklahoma State Board for Vocational and Technical Education, which is composed of the seven members of the State Board of Education and six members appointed by the governor. Lyons is general manager of Western Electric in Oklahoma City.

1936
DAVID HARKER, PhD, is the recipient of the 1969 Jacob F. Schoellkopf Medal, awarded by the Western New York Section of the


Harker '36


Kuhn '30

American Chemical Society. Harker, who is head of the biophysics department of Roswell Park Memorial Institute in Buffalo, N.Y., was cited for his "contributions to the theory and practice of X-ray crystallography and particularly its application to the determination of the structure of complex natural products as exemplified by ribonuclease." Harker also teaches at the State University of New York, the University of Rochester School of Medicine and Dentistry, Niagara University, and the State University College at Buffalo.

1939
WALTER H. MUNK, MS '40, associate director of the Institute of Geophysics and Planetary Physics of the University of California at San Diego, has been awarded the 12th annual California Scientist of the Year Award by the California Museum of Science and Industry.

1942
ROY C. VAN ORDEN, division manager of Albert C. Martin & Associates, has been made a partner of the Los Angeles architectural firm. Van Orden joined Martin & Associates in 1950.

1944
FRED W. MORRIS JR. was recently elected president and a member of the board of directors of Tele-Sciences Corporation. Tele-Sciences is an electronic engineering and management consulting firm headquartered in Washington, D.C. Morris was formerly technical consultant to President Johnson's Task Force on Communications Policy.

1947
RICHARD C. GERKE, MS, consulting engineer, has moved his office from La Jolla to San Diego, Calif.

1948
THORNTON A. WILSON, MS, has been named chief executive officer of the Boeing Company. Wilson, president of the company since 1968, has been with Boeing for 27 years. He was closely associated with the development of the B47 and B52 jet bombers and directed the company's Minuteman intercontinental ballistic missile program.

1949
VIRGIL J. BERRY JR., MS, PhD '51, former director of planning and coordination for Sinclair Oil Corporation, is the new manager of the international finance, control, and planning department in the international division of Atlantic Richfield Company in New York.

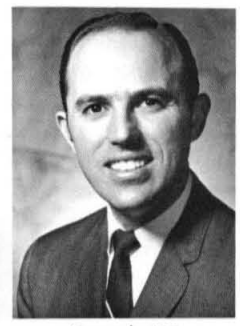
JOHN HEATH JR., Los Angeles regional manager for The American Appraisal Company, has been named director of market planning for the firm, headquartered in Milwaukee. Heath has been with the company since 1957.

MARVIN B. RUDIN, MS '51, president of Analog Integrated Microsystems, Inc., of Sunnyvale, Calif., has announced the formation of a new corporation that will join his firm with Bourns Inc. The new company will design, manufacture, and sell advanced analog monolithic integrated circuits. Rudin is president of the new firm.

1951
HAROLD F. MARTIN was recently made laboratory manager at the IBM Advanced Systems Development Laboratory in Yorktown Heights, N.Y. He has spent the last several years in California.

1952
WILLIAM RIHN has been promoted to manager of engineering for Earth Sciences Company, Pasadena. The firm supplies analytical services and instruments for determining the response of structures during earthquakes and other disturbances. Rihn was project manager for the lunar seismometer manufactured by Earth Sciences that will be set up on the moon by Apollo astronauts.


McCloskey '67


Bounds '66

1957
MARTIN C. TANGORA, instructor of mathematics at the University of Chicago, will spend the academic year 1969-70 as a temporary lecturer at the University of Manchester, England.

1959
DONALD M. WIBERG, MS '60, PhD '65, assistant professor of engineering at UCLA, is spending a sabbatical year at the DFVLR (West German NASA) Institute for Guidance and Control in Oberpfaffenhofen, near Munich.

1961
JAMES M. KALLIS, MS, has received his PhD in aeronautics and astronautics from Stanford University, and is now a senior engineer/scientist at the McDonnell Douglas Corporation in Santa Monica, Calif.

1966
WILLIAM G. BOUNDS, MS, has joined Dalmo Victor, a Textron division in Belmont, Calif., as a marketing specialist in electronic warfare systems. He was previously senior engineer in Sylvania's Radar ECM Department in Mountain View, Calif.

1967
GARY M. JOHNSON, MS, a lieutenant in the U.S. Air Force, has been assigned to duty at Wright-Patterson AFB, Ohio. Formerly at the Space and Missile Systems Organization at Norton AFB, Calif., Johnson is now a research scientist assigned to the Office of Aerospace Research.

DAVID J. McCLOSKEY, PhD, has been promoted to supervisor of the defense technology studies division in the systems analysis department at Sandia Laboratories, Albuquerque. McCloskey joined Sandia in 1966 and has worked in the optical effects in solids division and the weapons effects research organization.

J. HUSTON McCULLOCH has joined the staff of the President's Commission on an All-Volunteer Armed Force. He received an AM in economics from the University of Chicago in March and plans, he says, to continue there for a PhD "after the draft is abolished."

OBITUARIES

1925
HENRY R. FREEMAN, Ex, died April 21 in Los Angeles. A partner and CPA with Miller & Co. of Los Angeles for many years, he is survived by his wife.

1929
HUBERT M. O'HAVER, retired sales manager for the Southern California Gas Co., died recently in Los Angeles. He had retired in January of this year.

1947
RAMON TERMINEL SALIDO died in late 1967 in Mexico City, where he was living at the time.

1954
CHIN-KUANG JACK CHOW, an engineer at the RCA Laboratories in Princeton, N.J., died in March. He had been with RCA since 1963, and had been with Hughes Aircraft from 1955 to 1963.

1964
WILLIAM G. SMITH, MS '65, died following an automobile accident in New Jersey in May.

Computer's "Rapidly Extensible Language"

Continued from page 6

said. "It understands most English constructions, including verbs, tenses, and subordinate clauses.

"Thus it can answer a great variety of questions, although it is not expected to answer questions starting with 'Do you believe?' or 'What is your opinion of?'

"If, however, the computer is asked a question it does not have the ability to answer, it certainly isn't embarrassed to say so. It can be provided with the new information immediately and will remember it for future use. This ability to extend its capabilities is an important part of the system."

In one session of the seminars, Thompson was nearing the end of his talk—just before the lunch break—and asked the computer a question about the families. The reply:

"Fred, it's 1200 hours. Are you through?"

Thompson had previously assured his audience the computer was doing the answering, that "there's no man in another room looking up the answers." This reply, received on the typewriter, did in fact come from a man in the Computing Center, asking Thompson if he was through so the machine could be turned over to student use. □

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 .....
.....

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 MAY
ENGINEERING AND SCIENCE
MAGAZINE

►*Aims and Goals of the Institute: A Faculty Committee Looks to the Future*, by C. J. Pings. Results of a two-year study by members of the Caltech faculty.
►*A Night on Palomar Mountain*, by Jesse L. Greenstein.
►*Ice Fog*, by Carl S. Benson. A Caltech alumnus—and a fugitive from Los Angeles smog—finds a unique type of air pollution in Alaska.
►*Retiring This Year*. T. Foster Strong. Paul Bowerman. Horace Gilbert.
►*Astronomer in Czechoslovakia*, by Robert Howard. A staff member of the Mount Wilson and Palomar Observatories reports on his six months at the Ondrejov Observatory near Prague—just before the political upheaval and invasion of that country.