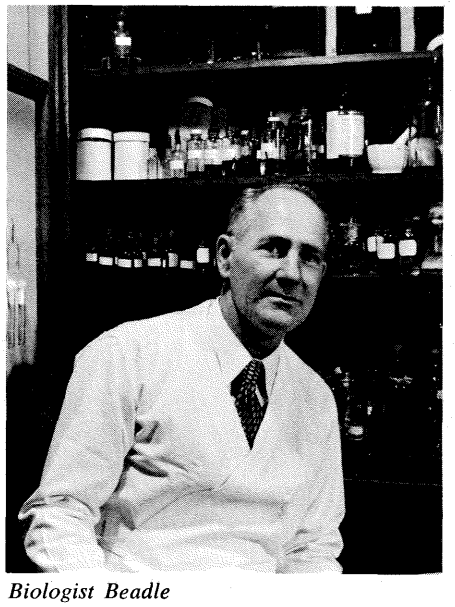
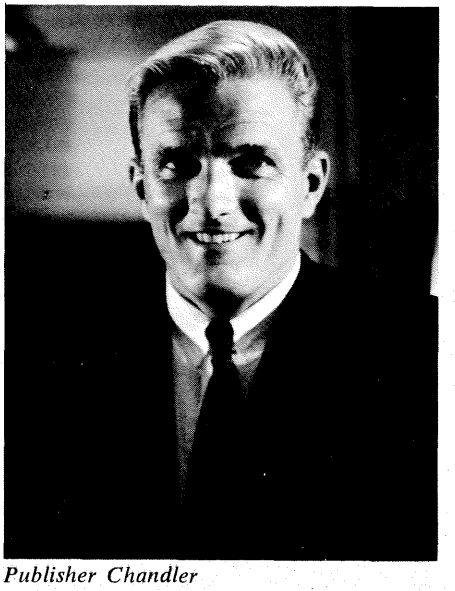
The Month at Caltech



Biologist Beadle

Banker McNamara

Engineer Mettler



Publisher Chandler

Trustee Diversification

Caltech's board of trustees has elected four new members. Following a decision at their November 1 national meeting to increase the size of the board from 40 to 45, the trustees added George W. Beadle, Otis Chandler, Robert S. McNamara, and Ruben F. Mettler, bringing the total current membership to 42. The increase in size of the board will permit a wider variety of interests from all areas of the country.

With his election to the board, George W. Beadle, 66, resumes his connection with the Institute where he was a member of the faculty from 1946 to 1961. In 1958, while he was professor and chairman of the biology division at Caltech, Beadle won the Nobel Prize in physiology and medicine for his research on the role of genes in controlling biochemical reactions in the bread mold *Neurospora*. He became president of the University of Chicago in 1961, a position from which he retired in 1968. Since his retirement he has served as director of the American Medical Association's Institute for Biomedical Research. Beadle is the author of a well-known textbook on genetics, and co-author with his wife, Muriel, of *The Language of Life*, which won the 1967 Edison award for the outstanding science book for youth. He is a member of the National Academy of Sciences and the American Academy of

Arts and Sciences, and has received honorary degrees from 28 universities and colleges in this country and abroad.

Otis Chandler, 41, publisher of the *Los Angeles Times,* is the third member of his family to serve on Caltech's board of trustees. His father, Norman Chandler, is a 28-year member and was recently elected vice chairman of the board; his grandfather, the late Harry Chandler, was a trustee from 1920 until his death in 1944. Otis Chandler received his BA degree from Stanford University in 1950 and then served two years in the Air Force. He joined the Times Mirror Company, the parent firm of the *Los Angeles Times,* in 1953, and became publisher of the newspaper in 1960. He has won journalistic awards from the Universities of Missouri and Southern California and an honorary doctor of laws from Colby College.

Robert S. McNamara, 53, former Secretary of Defense and currently president of the World Bank, was graduated from the University of California at Berkeley in 1937. In 1939 he received his MBA from the Harvard Graduate School of Business Administration and served as an assistant professor there from 1940 to 1943. During World War II he worked for the U.S. War Department in Britain, setting up a statistical control system over the flow of materiel, money, and personnel. He also served with the U.S. Air Force in India, China, and the Pacific and was awarded the Legion of Merit and promoted to lieutenant colonel before his discharge in 1946. For 14 years after the war McNamara served as an executive of the Ford Motor Company; he was made president in 1960. In 1961 he became defense secretary under President Kennedy, a position in which he worked closely with Caltech's president, Harold Brown, who was Secretary of the Air Force from 1965 to 1969. Since April 1968 McNamara has been president of the World Bank and also of the International Finance Corporation and the International Development Association.

Ruben F. Mettler, 45, assistant president and executive vice president of TRW Inc., and chairman of President Nixon's task force on science policy, is a Caltech graduate. He received his BS degree from the Institute in 1944, his MS in 1947, and his PhD in electrical and aeronautical engineering in 1949. Mettler began his career as associate director of the guided missile research division and Thor program director for the Ramo-Wooldridge Corporation (a precursor of TRW). From 1962 to 1968 he served as president of the TRW Systems Group, where he directed space programs for the Vela, Pioneer, and Orbiting Geophysical Observatories satellites. Under his leadership the TRW group also developed the lunar module descent engine for the Apollo program, contributed ideas for modernizing the Minuteman ballistics missile program, and helped with the Navy's program for integrating its antisubmarine defense. Mettler has received many honors for his engineering work: In 1955 the Junior Chamber of Commerce listed him as one of America's ten outstanding young men; in 1964 he received the "engineer of the year" award from the Engineering Societies of Southern California; and in 1966 he was given Caltech's Alumni Distinguished Service Award.

Treatise on the Thesis

It is one of the unenviable duties of the dean of graduate studies at Caltech to read every graduate thesis every year. In 1969 there were about 125 of them—upwards of 20,000 pages—with most of them submitted close to the deadline for getting degrees in June.

But now it is fall, and the spring reading marathon is so far away that Dean H. F. Bohnenblust can speak of it almost affectionately, as he did at an outdoor dinner welcoming new graduate students on October 3 in Winnett Plaza:

There is something that is really very characteristic about the theses in geology. They are terribly long, and in a certain sense this is very satisfying. It is rather discouraging to come into my office in the morning, and there in my "in" basket is a huge stack of theses which I am supposed to read. Well, each thesis appears in duplicate, so whenever I get a nice fat geology thesis, I read it through, and I have suddenly a big second one disappearing. That is gratifying. In addition, I must say one thing: Among all the theses that I have seen at Caltech, it is the geology theses which I enjoy the most. They are descriptive, and they are interesting, and I can understand most of them.

Biology and chemistry are two fields which are an excellent example of interdisciplinary work. They work in many respects in common; in fact, they do more than that. They list the same course in the catalog under different titles; biology such-and-such, and chemistry such-and-such, and it is the same course. That has a tremendous advantage. The student need only take one course. One year he lists it under biology, and the next one he lists it under chemistry. It is very useful. Chemistry theses, of course, are full of hexagons. That I have observed. They also involve teamwork, and when I sign the final approval of a chemistry thesis, I am rather uneasy. I am never sure whether I am giving an additional degree to a member of the staff, or, worse than that, maybe I am awarding the degree to the wrong student.

As far as mathematics is concerned, they have the shortest theses. Every thesis is read by an official reader, because we try to make sure that every so often there will be a sentence that has a noun and a verb. The readers like the mathematics theses because there is no sentence with a noun or with a verb; it is all hidden in a symbol and an equality sign. A mathematics thesis starts very simply with one assumption; then you look at the last page and there is the conclusion. In between you find a sequence of self-evident lemmas.

Physics theses are frankly the ones I like the least. What is more, they remind me of the nightmare of the contract bridge player. He held four aces, four kings, four queens, and one jack, and after very scientific bidding he finally reached a contract of seven no trump. Lo and behold, the man on his left led with a green card he had never seen before. Well, when you read a thesis in physics, somehow they always come up with a new particle that you have never seen before.

Finally, this leaves engineering. Now,

this is really much too complex an organization to speak about. It is the biggest division and it contains many specialties. Frankly, I think that some of them are completely indistinguishable from each other, such as applied mechanics and mechanical engineering. Thank God, Dean Lurie, who is associate dean, is reading the theses in engineering now. But before he helped me, I remember at least one difficult case: You know, a thesis begins with a title; then after a while comes a page where the student dedicates his thesis to somebody he really cares for. I found that page filled with mathematical symbols; no explanation. Well, I spent a whole night trying to figure out what he was trying to say. All I can tell you is that after a long search I finally discovered that he was speaking about the cross product of two vectors and was dividing the cross product by the first vector and by the second vector, and that left the X. So when I analyzed the symbols, slowly the sentence came out and the dedication was to Maxine, his wife. Of course, I could not let that go by, so I spent another night of work explaining to him how I had deciphered what he meant to say in his dedication. A few years later he came back to me and said, "You know, that really convinced me that somebody had read my thesis."

I would like to conclude with one remark wherein I am really quite serious. I have concentrated on theses in speaking about the different options, and, for all of you who are going to go on for the PhD degree, naturally the thesis work will be the important part of your program. Somehow you are registered as "graduate students." I do not quite like the name student—it implies to some extent that you came here as an outsider, as an individual, and that you will be with us a certain time and leave as an individual. I would like to emphasize very much that the research that you will be doing here while you are on the campus is not only your own research, but it is part, and a vitally important part, of the research effort of the university as a whole. For this reason, I would much prefer not to look at you as just students, and I hope that you will not feel that you are just students, but that you are members of our research staff.

Honorary Degree

Harrison Brown, professor of geochemistry and of science and government, received the honorary degree of Doctor of Science from the University of Cambridge on November 1 on the occasion of the 150th anniversary of the Cambridge Philosophical Society. Brown, who also serves as foreign secretary of the National Academy of Sciences, received this tribute at the Cambridge ceremony:

> Young Americans, in order to be able to afford college education, cannot rely like our young men on grants from public funds. Often they must to a large extent make their way by their own gifts and sweat. Even so this man, being an expert pianist, scraped together the means of embarking on his studies by performing in nightclubs, whether solo or as leader of his own jazz band or producing songs of which he had himself composed both the words and the music. Hence no doubt the confidence, hence the keen and enterprising spirit, with which he initiated his bold plan of collecting all the springs of scientific knowledge into one reservoir, so that anyone who wishes to be informed of the best attestation for any measurement could have somewhere from which he might most conveniently derive it. But he could never have acquired the authority necessary for so great an undertaking if he had not himself been a consummate scientist. For this is the man who determined the age of the earth by much more certain proofs, through scrutinizing the lead found in isolation in iron and in stone meteorites. He has also propounded a probable theory of the origin of the planets.
>
> Nor as a researcher into atomic nuclei does he think that the dangers that can result from such studies are no responsibility of his. Indeed it was at his instigation that the Federal Government of the United States set up its Arms Control and Disarmament Agency. And he has also been anxiously exercised about that other great worry of farsighted men, the fear that the nations may perish rather through excess of population. For what-

Consummate scientist and jazzman Brown

ever concerns man he takes to be his concern.

This graceful tribute is actually a translation of the original which, befitting the occasion, was delivered in Latin. Scholars who have not had recent occasion to use the Latin for "nightclubs" and "jazz band" may be interested in the original wording of the third sentence of the tribute:

> Velut hic olim, ut erat scitus clavichordii, in noctuvigilorum tabernis sive solus sonans, sive dux symphoniacis quasi Corybantiis aera geminantibus consonans, sive cantica promens quorum ipse et verba et numeros composuerat, facultates ad studia capessenda corrasit.

Armin Deutsch

Armin J. Deutsch, staff member of the Mt. Wilson and Palomar Observatories, died on November 11 of a heart ailment and complications. He was 51.

Deutsch discovered that giant red stars generate great stellar winds which carry matter through space. His research included study of the composition and rotation of stars, star clusters, cool stars with unusual chromospheric activities, and a group of magnetic stars called peculiar A stars.

Born in Chicago, Deutsch graduated from the University of Arizona and got his PhD from the University of Chicago. He was an assistant astronomer at Perkins Observatory in Delaware, Ohio, in 1946-47; an instructor at Harvard Observatory from 1947 to 1950; and since 1951 had been a staff member of the Mt. Wilson and Palomar Observatories and the Carnegie Institution of Washington.

Arms Limitation Delegate

Harold Brown is one of six members of the delegation appointed by President Nixon to participate in strategic arms limitation talks between the United States and the Soviet Union. Accompanied by his wife, Colene, Brown flew to Helsinki on November 11 for the first talks, which are expected to take about three weeks.

This first session will determine topics, ground rules, and a meeting place for future discussions. Brown was a member of the U.S. team that helped negotiate a nuclear test ban during discussions which began at Geneva in 1958-59.

DuBridge Professorship

The Associates of the California Institute of Technology have launched a fund-raising project to establish and endow a Lee A. DuBridge professorship in honor of the Institute's former president, who is now President Nixon's special assistant for science and technology. The Associates are a group of public-spirited citizens (now numbering about 400), interested in the advancement of learning, who were incorporated in 1926 as a non-profit organization "for the purpose of promoting the interests of the California Institute of Technology."

While they hope that the professorship may be rotated among the various fields of scholarship at Caltech, the Associates would like their first candidate to be someone whose interests are "in an area of biological sciences in which an understanding of behavior is important or in an area of science or technology which is closely associated with Dr. DuBridge's career or interests."

Award

Cornelius Pings, professor of chemical engineering, won the $1,000 Professional Progress Award for 1969 from the American Institute of Chemical Engineers. The award recognizes his work in "theoretical and experimental developments in the fundamental behavior of fluids, particularly in the critical region."

Graffiti

Simple declarative statement painted on the construction fence surrounding the site of Baxter Hall of the Humanities and Social Sciences:

GOD GRADES PASS/FAIL

Who's In Charge Here?

Paul Saltman '49, PhD '53, biochemist and provost since 1967 at Revelle College of the University of California at San Diego, continues to report back to Caltech on his trials and tribulations as an academic administrator.

In June 1968, E&S carried his "Provost, Proteins, Protest, Pot: Higher Education in America Today." Herewith, some highlights from his most recent informal report, made at a dinner meeting of the Friends of the Caltech YMCA:

Can you imagine my coming to Caltech in 1945 and stepping into Robert Millikan's office and saying, "God damn it, Bobby, here are 15 non-negotiable demands. Now shape up!"

I grew up in a very liberal, permissive household, learning how to letter signs and carry placards and the like, so it *never* occurred to me that some student —some freshman—might walk in and give *me* 15 non-negotiable demands. But it happened.

I am concerned with universities today, and I would like to try to describe a kind of environmental problem which involves three sub-species—administration, faculty, and students—that operate within this ecological niche called a university, which is also dependent on other sub-species like governors and trustees and indignant citizens and blacks and chicanos and industrial-military complexes.

First there are administrators—a strange lot. What do we have with respect to governance of universities? Grayson Kirk at Columbia? Two hundred and fourteen years without a single faculty meeting? Pusey at Harvard? When the going gets tough, call the cops; don't talk to your faculty? S. I. Hayakawa with a tam o'shanter and the frayed ends of a loudspeaker cord? Who's in charge here? Who becomes the dean? Who becomes the provost?

At a time when we are living with a very rough and ragged interface in the interaction of technology and science, how much have our institutions, with the great minds of science and technology,

Provost and negotiator Saltman

interacted with the men of the social sciences and the humanities to take some positive, dynamic step in the form of education today? Are we still living with the Morrill Act of a hundred years ago, worrying about land grant colleges and what we are going to do in the classical sense about agriculture in the United States? Who is looking toward the leadership of the university in the dynamics of the city in America today? Columbia? Berkeley? Caltech? UCSD?

I am very disturbed that over the years we have failed to recognize the problems of dynamic leadership in universities and colleges, that we always made the dean out of the guy who didn't publish quite enough to get his promotion, whose wife was very active in Faculty Wives, and who has two lovely kids. How many of them have really been involved in studies of problems of adolescent behavior and the concerns of a modern student in a modern society? Very, very few.

If you're going to pay a guy to be an administrator, he damn well better be in the game all the time as an administrator, 100 percent. And when you're paying him to lead, he'd better be out in front, and he'd better not be some kind of pacifier, trying to cool it. Because they've got more cans of gas than we have water.

If the students have reasonable claims, you work on them; if they're unreasonable, you call them on it. And you don't move capriciously and fast; you move slowly and evenly and steadily. You keep all of your moves completely wide open on top, and you go out on the plaza and you tell them what's happening and you involve the whole student body.

And you better not be shocked when you get half through and some kid steps up and calls you a "fascist pig," because he's sure as hell going to do it. You better have some answer for him in terms of, "Well, what are you doing about making this a better place, and are you involved?"

By and large, the academic administrator is a person who has not by his own personal concern with research been a great researcher, nor by his concern with teaching been a great teacher. He has become somehow or other more and more involved with the problem of management—and I use that term pejoratively.

Faculties in universities are an interesting group. There was a time (Oh, it was a sweet time) you would fill out your form for the NIH and you'd say, "Well, how much do I want this year? $150,000—$250,000—they've got a lot of money. And if not, then there's the NSF and the AEC." And, oh, the greenery just flowed.

There was a time—and it was a good time because science did prosper and the journals filled to overflowing with interesting articles—that a professor became a free entrepreneur, beholden to no one. He moved nomadically with his grants and with his tents from place to place in the desert of academe, seeking the best kind of real estate that he could get his hands on and the minimum teaching loads and the maximum chance to do his own thing. I emphasize that, because now the students want to do their own thing too—and it's very funny how the professors are uptight about that.

The fact of the matter is that the professor's main concern was to his peers. He was playing the federation meeting. How were *you* doing? Were you playing the men's room or the main stage? Where were you when your slides were shown? And on which airplane to Washington were you? And on what councils of government did you sit? And for whom did you consult so that you could have a couple of extra bucks to go off and do a little extra skiing or surfing or what you will? You were not beholden to students. And that's too bad, because I think that's what the universities are all about: teaching and learning. When the professors shirk their duty in this, we're in real trouble.

Then there are students—the bushy-haired, the weirdos, the wild ones, the bare feet up against the lectern while you're trying to teach. You're trying to show some sort of consideration—or magnanimity—and the SDS is out flying the North Vietnamese flag on the plaza and the Marines are marching in from one side and the citizens of La Jolla from the other, and the professors are going "Oh, my God. What'll we do?" And the governor is saying, "Get that flag down."

I really have figured it all out. The students of America are giving everybody the old Italian high-sign. You can laugh

at it—but it's very tough to do, and it's getting tougher. Because the gesture is increasing in violence, and it is giving me great fear.

Great fear because I see within the context of the university today a very unfortunate circumstance taking over—the sense of self-righteousness of students, lauded by some of their faculty. I don't believe in this Children's Crusade. Yes, there are problems in the society. No, the students don't have all the answers. Because if they did, what the hell am I doing being a provost and a professor? Do you want to turn it over and walk away? The answer is no; and they don't want you to either. But they do want leadership and guidance.

And they are very, very bright. And they are very concerned. And what are we doing in a university for them? Seeing if we can load them down with more calculus and thermodynamics?

This problem came to me most clearly when I found out that they had hung the second provost in effigy, and then in reality, on the basis of dorm visitation rules—a great educational problem. The fact of the matter is that nobody was asking students how they wanted to live in a residence hall.

And you begin to worry as a biologist when you know that a woman becomes a woman physiologically between 13 and 15 years old in our society, but we're still treating them like adolescents when they come into a university at 18 and 19. And yet we have never asked the students to participate in the governance of their own lives within a university. We have never asked students how they felt about what they were learning in a university. We have never asked students to help in the decision-making process of higher education.

Whenever we brought this point up to our faculty, they would say, "Well, what the hell do *they* know?" And when the students would be given a chance to say what was relevant or irrelevant, they would say, "Well, you know, man, like it's gotta be relevant."

"Like what has to be relevant?"

"Like, you know, man, make it relevant —like, you know, black and white—like, you know, sensitivity—like, come on, like—"

It's hard to listen to or understand that kind of communication. I finally figured out what the problem was. They had never been asked to really state the problems and their solutions, neither in high school nor in junior high school nor any place.

Let me end with an upbeat, Pangloss, comment, because I feel that things aren't going downhill forever. I'll tell you what's going to happen this year. Saltman predicts that what happened at Stanford last spring is the model of what is going to happen at UC this year. There is going to be such a hue and cry for the stopping of military research on university campuses that the students—and probably the faculty—will bring Berkeley to a screeching halt until it disperses all of its holdings in Livermore and Los Alamos.

Students at Caltech—it may take them a little longer—are going to be investigating every grant that any faculty member ever had and any consulting that he does for any agency of the federal government or private industry that has in any way, shape, or form a relationship to the military-industrial complex—whatever that may be. That's going to be the real low point. That's when the real barricades are going to have to be built.

We have failed to move smartly, failed to give leadership in universities, and failed to be out on that cutting edge in terms of our concern and involvement with the total world scene. The universities have not taken that kind of initiative and sparkle that they should have had long ago in trying to make changes in a world that we are so sensitive to.

I think we're going to live through the year, and I think we're going to live through Ronald Reagan and the violence that he does to us and the violence that the regents do to us and the violence that the *San Diego Union* does to us and all kinds of ways and shapes and forms of violence, be they in the form of the environment which surrounds us or the violence that is within.

But I think that it's time to be making some very positive kinds of changes. Two years ago when I came down to San Diego, I was appalled by the three-cornered game that was being played, with administrators in one corner, faculty in another, and students in another. We tried to put together the governance for the college that involved every level—the faculty, the students, and the administration—with every kind of problem: curriculum, buildings, life in the residence halls, course structure, grading, effectiveness of teachers. And it was very curious. You know who resisted first? It's hard to believe, but it was the students. They didn't want any part of it.

"Hey, man, you're corrupting us. You're over 30, you're a fink, you're a fascist, you're an animal, you're part of the military-industrial complex, you took federal money, you're a whore. I don't trust you."

It's taken us just about a year and a half, and the students have finally agreed to come along. But when I presented bylaws that had been worked out for the college governments to a faculty meeting, guess who all of a sudden is very uptight? The faculty, bless their hearts.

Cried a physics professor, "You mean to say I'm going to have students on a judicial committee judging *my* actions on a campus?"

I said, "That's right."

"Who are they to judge me?"

And they talk about community in a college? The faculty is very nervous, you see; we have black militants on the campus now, and they stomp into academic senate meetings and scare the hell out of every faculty member there, and the faculty runs, crying "I'm guilty, I'm guilty. What do you want?" And when they get in the confines of a meeting where they can vote privately, I am very nervous that they are going to manifest their masculinity in the quietude of a ballot box, but not out front on the plaza where it counts.

The time has come for universities to live in 1969, not in the days of the Morrill Act, and not in the good old days just after the war when we were all getting the big grants from Washington. We have to be much more concerned with how we can interact in a society of students and teachers in which we become the models for the society that we wish to build. If we sit around waiting for somebody else to write the folksong or to build the barricade, it will be too late. We must be the model. Now.