

CALTECH NEWS

PUBLISHED FOR ALUMNI OF THE CALIFORNIA INSTITUTE OF TECHNOLOGY

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MEMORABILIA. Trustee Chairman Arnold Beckman and President Lee DuBridge take a last look at some artifacts of Robert Millikan's life (his spectacles are in Dr. Beckman's left hand) at the official dedication of the library on December 9. Objects are now preserved in a sealed box—filled with inert gas—in the cavity behind the cornerstone.

Trustees 'Look With Favor' On the Admission of Women Undergraduates--Perhaps By Fall of 1970

Caltech is steadily heading toward admission of women undergraduates. On November 7, 1967, the faculty went on record as approving the admission of women as soon as possible. On January 8, 1968, the Caltech board of trustees kept things moving by telling the Administration to prepare a detailed report for the board's consideration on how the new policy would be implemented. That report, and the board's decision, could be in as early as this summer.

On January 9 the trustee buildings and grounds committee agreed in principle with a way to solve the housing problem: Make one of the four proposed new graduate houses into a combined graduate and undergraduate-women's residence. The biggest step toward undergraduate coeducation will come when someone donates money (more than \$600,000) which can be used for the women's residence.

The four graduate houses are part of Caltech's \$85.4 million campaign, now in full swing. The change in plans will, of course, reduce the number of rooms available to male graduate students. But they are not expected to complain too much if their displacement means more women on campus.

When might Caltech actually have the women undergraduates on campus? Barring any major setbacks, the trustees will probably be presented with plans that could get them here as early as the fall of 1970.

No one—except perhaps a few over-eager students—expects the addition of a limited number of women undergraduates to completely solve the "problems" attributable to Caltech's all-male under-

graduate makeup. President DuBridge agrees with President Robert Goheen of Princeton, who said: "There are no problems here that coeducation would cure."

Actually, the overwhelming support for the plan seems to stem from the difficulty of defending the premise that women ought to be excluded. Nonetheless, to most people it's a beginning, and they look with enthusiasm (and some apprehension) at the prospects of "lady Technicians."

Alumni Doing Their Part By Topping \$1,000,000 In Four Months' Solicitation

As of mid-January, Caltech alumni were more than halfway to meeting their development campaign goal of \$2 million. In four months of campaign solicitation they have raised as much as it took them three years to raise in the previous campaign.

Nearly 600 alumni volunteers are now working with the 85 area chairmen. Only 10 percent of the 10,000 total alumni have contributed to the campaign, so the biggest solicitation push is yet to come. By the end of the previous campaign, 52.5 percent of the alumni had contributed; Alumni Campaign Chairman Rube Mettler says he is determined to get 100 percent participation this time.

The \$1 million already raised doesn't represent the whole alumni effort—only the gifts of less than \$100,000. With the major gifts included, Caltech alumni are credited with an impressive \$5.7 million to the still-young fund drive.

Caltech Reminds Its Neighbors of Its Intentions: A Solid Campus Bloc From California to Del Mar

Property owners surrounding an expanding university can, under adverse conditions, be among the harshest critics of higher education. As part of its program of community relations, Caltech recently took a formal step to keep its neighbors informed about its plans and how those plans may affect them. On December 5 President Lee A. DuBridge appeared before the directors of the city of Pasadena to outline the "territorial implications" of the Science for Mankind development campaign.

He reminded the board that he had appeared before it ten years ago and told it then that Caltech would eventually occupy the land consisting of Tournament Park and that between California and Del Mar, and Hill and Wilson. For the present those boundaries are still accurate, except for two parking lots (one already built) located on the west side of Wilson. Expansion at some later time would probably have to use other land, probably between Wilson and Catalina (west of the present campus boundary) and south of California between Tournament Park and Hill.

Much of the property needed for immediate expansion is already owned by the Institute; the rest is in the process of being acquired. All the property owners in the affected areas have been notified that the Institute wants to buy their land and expects to pay the fair appraised value. When those purchases are completed, the campus will consist of about 105 acres. (The original plot donated early in the century by Arthur Fleming was 22 acres.)

Caltech will shortly make a formal request to the city for the closing of San Pasqual between Wilson and Hill, Michigan between San Pasqual and Lura (eventually closed all the way to Del Mar), and Chester and Holliston to Del Mar. The Michigan closure is particularly important because the Beckman Laboratory of Behavioral Biology will be built where the street is now.

Members of the board asked if it was feasible to arrange a tunnel along San Pasqual instead of closure, but Dr. DuBridge suggested that the costs involved—to both Caltech and the city—would be too great to be seriously considered. He also said that the use of pedestrian over-crossings or tunnels had been considered and discarded because they are generally ineffective as long as people can dash across the street.

Another question concerned the projected use of more land—including some that is now part of city streets—for parking lots. One member wanted to know if parking structures could be built.

Dr. DuBridge admitted that he too was dismayed by the "sea of cars" that will result, but pointed out that the costs for structures are prohibitive now. The price, including land acquisition, for surface parking is estimated at about \$1,700 per car. In an above-ground structure it would be \$3,500, and below ground it would be as high as \$4,000. Parking structures, said Dr. DuBridge, were not something he was optimistic about going to the public to raise money for.

Dr. DuBridge anticipated the issue of whether it was in Pasadena's interests to have more land removed from the property tax rolls. (Caltech, as an educational institution, does not pay property taxes.) He said that the Institute has estimated that the annual taxes accruing to the city on all properties between San Pasqual and Del Mar and Wilson and Hill if they were occupied by private residences would be about \$13,500.

"However," he said, "recall that Caltech pays to the municipal power and light department an electric power bill every year of \$324,000; about \$44,000 of this goes to the city general funds. Another comparison would be that our utility bill is about 20 times what it would be if there were single residences in that area. So while you have lost \$13,500, you have gained \$44,000 at the present. And our utility bill will go up as we add facilities and as we recondition existing buildings.

"I should call to your attention that another benefit to the city is the Caltech payroll, including JPL, which now runs at \$68 million a year. This supports a Caltech community, including their families, of more than 20,000 people. Many of them live and pay taxes in Pasadena, feed millions of dollars into local business enterprises, and pay very large sums in city sales taxes. Caltech also pays city sales taxes on much of the material and supplies that it buys. I think I can say, Mr. Mayor, quite modestly, that Caltech more than pays its way in this city."

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31st ANNUAL
ALUMNI SEMINAR
SATURDAY, MAY 4
Save This Date

ALUMNI FORUM

Editor:

On page 5 of the September 1967 issue of *Caltech News* appears the following paragraph:

Chemical engineering, faced with small numbers of students in many of the courses it offers, has also decided to consolidate some of its offerings. As a result, undergraduates will get more exposure to thermodynamics, and undergraduates and graduates will do more work in transport phenomena; two separate courses in industrial chemistry and stage operations are now combined as optimal design of chemical systems.

First of all, it contains several statements that are either not quite true or could only be interpreted in a way that would give the wrong impression. For example, it is not true that our graduate students will do more work in transport phenomena, nor is it necessarily true that our undergraduates will get more exposure to thermodynamics. It is true that we have dropped courses in industrial chemistry and stage operations, and that the new curriculum does indeed offer a course in optimal design of chemical systems. It is an oversimplification, however, to say that the former two have been combined into the latter.

Perhaps the preceding comments are mere details and of little significance except to the chemical engineering faculty and students; however, the opening statement, "Chemical engineering, faced with small numbers of students in many of the courses it offers, has also decided to consolidate some of its offerings," is quite misleading. If it were true, it would represent nothing but expediency, and that is not the case. It is certainly true that the enrollment in our chemical engineering classes has been dropping in recent years, and indeed the chemical engineering faculty has been concerned about this matter. It has been our position all along, nevertheless, that we either offer a chemical engineering option, or we do not. There has certainly been no serious

consideration that we lapse into offering part of a program because we have a small number of students.

The changes in curriculum were made for positive reasons and were put into effect only after six months of deliberation by subcommittees of the chemical engineering faculty and by the entire group. We think we have come up with something quite imaginative and probably unique in undergraduate chemical engineering education. Our new program continues, in the Caltech spirit, to put strong emphasis on exposure of the student to the fundamental disciplines of physics, mathematics, and chemistry. As is the case with most engineering departments around the country, however, we have been groping for some time for a way to convey meaningfully some concepts of engineering to our students.

Last academic year Professor Corcoran, somewhat as an experiment, changed the nature of his sophomore course, ChE 50, *Applications of Chemistry*, and focused for the entire quarter on one topic. The students considered the construction and operation of an artificial kidney machine, with all of the chemical, physical, and engineering aspects, along with economic and sociological problems.

This course was very successful and gave us considerable impetus to carry over this concept into our new course, ChE 110, *Optimal Design of Chemical Systems*. This course will be offered for the full three quarters. It will be required of our seniors in the chemical engineering option and is available for first-year graduate students. The course material will perhaps change from time to time, but when we set the course up, we had in mind treating by case methods such topics as artificial body organs, life support systems for satellites, environmental engineering problems, efficient and economic design of chemical processes, and other interesting problems drawn from anywhere in science, technology, and society where there is an obvious need for good applications of the principles of chemistry, engineering judgment, and the simultaneous consideration of social and economic factors. The professor in charge will be assisted when necessary by other members of the chemical engineering faculty and by outside authorities from other schools and/or industry.

It is too early in the present year to give any assessment of the success of our course, but even at the present time we think it represents an exciting innovation, and it is certainly selling it short to convey the impression that it is merely the expedient consolidation of two previously existing courses.

Should you be interested, I think you would find members of the chemical engineering faculty eager and willing to provide you with information and the facts

about our pedagogical changes and about the recent exciting developments in the growth of a young, productive faculty with a great breadth of modern research problems.

Chemical Engineering Staff

Editor:

I received my copy of *Caltech News* today and read the article on Gordon Weir [*If Alumnus Gordon Weir Is Carrying An Umbrella You Might As Well Call Off Your Garden Party*] with interest.

In 1940 I was the regional control officer of the 1st Weather Region U.S. Air Corps. In July or August of 1940 I received orders to immediately obtain 15 recruits for the graduate course in meteorology at Caltech.

I shortly discovered that practically every qualified potential cadet in southern California had taken off for parts unknown for the summer season.

On a visit to Caltech I heard a rumor that there was a recent graduate believed to be still in the Old Dorm behind Throop Hall. Proceeding there posthaste, I corralled one in the shower and induced him to sign up as a Flying Cadet—non-flying—Meteorological. He was probably influenced by the fact that I had access to his clothes blocked.

Could this have been Gordon Weir?

Ivan L. Farman, '26, MS '39
Bradenton, Florida

PS: Since I enlisted all of this first class and there were not more than two or three from Caltech, the probability is high.

Editor:

As one of the women graduate students at Caltech, I was very interested to read the article about us [June 1967 *Caltech News*]. There are several comments I would like to make.

First, as did the girl who wrote an angry letter to Caltech, I do consider the admissions policy of the school to have been discriminatory. I strongly disagree with Dr. Lurie that "the past cryptic catalog wording never deterred women from applying." It certainly deterred me! The only reason I bothered to apply was that the head of my department (who got his PhD from Caltech) insisted.

I also resent his statement: "A woman who is confident of her ability isn't going to let a line in a catalog deter her." From discussions with many other students, I would say that very often we were anything but confident in our ability when we first started studying here—both male and female students. So it sounds to me as though Dr. Lurie was saying, "Girls must satisfy all of the same requirements of background, etc., as boys, and must in addition (unlike boys) satisfy a personality requirement." This looks strangely like discrimination to me.

Nothing in the rest of the article quite got to me as strongly, since I am not as yet involved in the problems of job hunting. I know that, as a graduate student here, any feeling of prejudice I have had has come from my own oversensitivity and from unfamiliarity on the part of other (male) students. (Girls have a unique view of Caltech, based on many odd and fascinating incidents, that could take quite a while to describe.) Actually, I have found discrimination in universities (at this one in particular) to be somewhat less than epsilon—although I would not generalize to ones I am not personally familiar with.

But a paying job is something else again. It was amusing to note that of all the girls interviewed, only one (Janet Jones) seemed to have had the experience of looking for one. The other girls more or less kept protesting, "Oh, it *can't* be like that!" "Why should it be like that?" while she was reiterating, "But it *is* like that!" and even got quite angry at them. I am very curious to know what the others—especially Mary Baker—will think in a few years when they are talking about something they have actually experienced rather than talking in a vacuum, as it were. From that point of view, the whole interview seemed not very productive.

The only experience I can recall of clear discrimination (besides the fact that Princeton does not admit women) was in an interview with some professors from Canada who came down to speak to Canadian students here about job opportunities back home. One of them told me not to let anyone pay me less because I was a woman—Canada needed mathematicians badly enough that I could insist on fair treatment. And even at that, I have not had a chance to put this to the test. So I feel definitely unqualified to judge the general situation.

I would be very interested now in reading interviews of alumni of both sexes—especially recent PhD's—to see if they have any suggestions to us about what to watch out for. The article was very good (as is the rest of the paper) but didn't go far enough.

Rena Schwartz
BSc, 1965, McGill University
(honours math)

Editor:

I wish to caution you not to dismiss "walking on water" as passé [*Walking on Water is Passé, So YMCA Imports Seminarists to Build Bridges to Land of Science, Caltech News*, June 1967]. Down here in Brunei, every day or two a "creature" rises from the grass without visible means of support and after crossing the beach takes off slightly above the surface of the South China Sea. I don't know how Jesus did it, but one thing seems certain—"walking on the water" is here to stay!

Robert C. Kendall, '33
c/o Brunei Shell Pet. Co. Ltd.
Seria, Brunei, Borneo

Alumni: \$3,424,935 in '67

The fiscal year 1967 was Caltech's most successful since 1960 in terms of voluntary (non-contractual) private gifts received. Of the \$12.4 million total, more than \$4.6 million were in the form of bequests, and nearly \$3.5 million (more than a quarter of the total) came from Caltech alumni. The table below, which shows both sources and destinations of all private gifts received in that period, is from a compilation made for a survey conducted by the Council for Financial Aid to Higher Education and by the American Alumni Council.

Private Support: 1967

| | Unrestricted | Student Aid | Division Support (Engineering, Biology, etc.) | Other | TOTAL SUPPORT FOR CURRENT OPERATIONS | Endowment (Unrestricted) | Endowment (Restricted) | Facilities, Equipment | Life Income Trusts | TOTAL SUPPORT FOR CAPITAL PURPOSES | TOTAL SUPPORT FOR ALL PURPOSES |
|---|--------------|-------------|---|--------|--------------------------------------|--------------------------|------------------------|-----------------------|--------------------|------------------------------------|--------------------------------|
| Corporations, business concerns | 1,076,426 | 268,358 | 246,151 | — | 1,590,935 | 2,800 | 100,000 | 320,195 | — | 422,995 | 2,013,930 |
| Alumni | 2,175 | 2,462 | 225 | 58,302 | 63,164 | 50 | 2,376 | 3,283,855 | 75,490 | 3,361,771 | 3,424,935 |
| Other individuals | 424,827 | 18,925 | 51,365 | — | 495,117 | 4,146,974 | 62,701 | 361,390 | 369,430 | 4,940,495 | 5,435,612 |
| Foundations | 25,500 | 125,982 | 1,101,932 | 15,000 | 1,268,414 | — | 3,000 | — | — | 3,000 | 1,271,414 |
| Societies and organizations (Associates and other groups) | 158,243 | 25,285 | 77,949 | 6,070 | 267,547 | — | 7,761 | — | — | 7,761 | 275,308 |
| | 1,687,171 | 441,012 | 1,477,622 | 79,372 | 3,685,177 | 4,149,824 | 175,838 | 3,965,440 | 444,920 | 8,736,022 | 12,421,199 |

Anthropologist Thayer Scudder Is On A Crusade To Get Support For Social and Behavioral Sciences



Thayer Scudder

Thayer Scudder, who calls himself Caltech's "anthropological mascot," came upon the Caltech humanities division in 1964 like a broken dam; to all indications the torrent of activity shows no signs of abating. He came to the Institute largely through the urging of Edwin Munger, Caltech's professor of geography and—until Scudder came—sole resident specialist on Africa.

Anthropology has been an overwhelming success at Caltech. About 35 students sign up for Scudder's course each quarter, and he claims that at least one student graduating from Caltech each year now considers going into anthropology. He says it has a unique appeal to young people.

"Traditionally, sociology and psychology have been concerned mainly with western society. This is one reason they may not appeal so much to some young people—because they think the fields are primarily concerned with *our* society and are therefore culture-bound.

"Anthropology is concerned with all cultures; and now we're trying to see 'cultural universals.' You can evaluate certain aspects of cultures—for example, their ability to meet the legitimate needs and aspirations of their members and the extent to which they allow other cultures to coexist with them."

Scudder considers those Caltech students who "wander out of science" to be prime prospects for anthropology, but only if they remain interested in science. He cautions his sophomores or juniors that, if they are interested in anthropology, they should first take broad courses in other social and behavioral sciences while continuing their studies in math.

"One thing I try to stress to all of these guys is that, whether we like it or not, we're members of highly complex societies that are based on science and technology. The effective thinker of tomorrow will be a person who understands the bases of his present society. This means that bright Caltech students with good backgrounds in the physical sciences, math, and the social sciences can make a disproportionate addition to the world. This is one of the great services Caltech can perform."

Scudder is delighted to be at Caltech but at times views the expansion in social sciences at Caltech with mixed feelings.

"I'm here because there isn't a large department. Students *do* take up a large

amount of time, and most graduate students in anthropology aren't intellectually useful until they've done their field work. They can't think wisely about a society until they've studied one. By then they're not much use to the faculty because they're busy writing their theses to get out.

"This attitude may be selfish to some extent, but a person has to look at his service to self, society, and world in his own way. Caltech gives me a chance to operate on an international level, which I feel is very important."

At Caltech he has a low teaching load (there are only two anthropology courses offered: *Race, Language, and Culture*; and *The Anthropology of Development*), although he lends a hand in seminars dealing with developing countries. His specific anthropological concern is the Kariba Dam area of central Africa. He and his colleague, Professor Elizabeth Colson at Berkeley, have been studying 50,000 members of the Tonga tribe there since 1956. In 1957-58 these people were relocated because of the building of the dam, and Professors Scudder and Colson have been studying what happens to such societies (whose members make up a substantial proportion of the world's population) when they are altered rapidly by a major governmental project such as the Kariba Dam and ensuing lake—one of the largest man-made bodies of water in the world.

Initially the dam brought a successful fishing economy into being, raising living standards for many of the Tonga who had been farming on a rather simple basis. However, when Dr. Scudder returned to the region last summer, he found the fishing situation gasping for breath. The species deflected into the lake from the Zambezi River may not have adapted to lake conditions, or their predators may have flourished too well under the new conditions.

In the Kariba project an anthropologist can, in a relatively short time, see what happens to a culture that begins to make a fast transition from simplicity to the complexities of a modern technological world.

In 1963 there were 2,000 Tonga fishermen on the north bank of the new lake, supporting approximately 10,000 people with their labors. Today there are less than 500 fishermen. When fishing production started receding, many of the sharper fishermen took the money they had saved and got out. Some set up stores, others went to cash-cropping cotton, and a number moved to nearby cities. Many financed the further education of younger relatives.

Now I sort of commute to Africa once or twice a year

Until that time the Kariba basin was predominantly rural; members went to cities temporarily to make money, then returned. Now, with a significant minority moving to the city to stay (but still keeping in contact with their rural villages) and with the opening of two major coal mines and of new schools, the basin is being incorporated within a much wider and more diversified society.

Scudder finds that now the Tongas' expectations are rising. The first high school came into the area in 1964, and Profes-

sors Scudder and Colson are following the progress of its graduates to see what happens to the first locally educated elite. What proportion enters university? What kinds of jobs do they go into? Do they move to cities or come back to help develop their own district?

There are studies to be done, too, on whom they marry. Do they marry only educated girls? Only from their own area? Or do they marry women from all over Zambia? As the Tonga are pulled into an industrialized society, there are countless other problems along the way.

Unlike the Caltech students who may "wander into anthropology," Thayer Scudder was headed in that direction for a long time. At an age when many of his contemporaries still wanted to be firemen, he wanted to be a naturalist. His father, a professor of English at Swarthmore, was an amateur naturalist, and summers in the Berkshires brought the boy into the company of family friends with the same interest.

He embarked on a program in biology at Harvard but by his sophomore year decided he wanted to work more with people. By the time he took his degree, his studies emphasized biology and archeology. As president of the Harvard mountaineering club he headed an Alaskan expedition the summer of his graduation. He had taken his honors at Harvard in anthropology, and at first the Arctic seemed a good way to combine mountains, biological ecology, and people.

International development agencies are inclined to take a technocratic as opposed to a 'peoples' approach to development

However, it was not only no place for a family (he married his wife, Molly, at the end of his sophomore year), but it didn't have the development potential he was looking for.

"In Africa you've got 200 million people," he says, "so if you're interested in development, why pick an area which, from a human settlement point of view, isn't particularly important?"

With his geographical interest finally pinpointed in Africa, he turned around and went to the Yale Divinity School for a year.

"It struck me as an excellent base for having the freedom to do the kind of interdisciplinary studies I then needed. I was interested in how people looked at their environment, at themselves, and at society. At Yale half of my courses were in the field of comparative religion. But I also took courses in the graduate school where I was able to study under one of the leading African geographers. I wanted to spend this time playing around in history, philosophy, and geography."

The next year he went back to Harvard and by 1956 was ready to do his first field work in Africa. After he had his PhD, he and his wife and two small daughters spent a year on a postdoctoral fellowship in England. A year in Egypt followed, then back to Northern Rhodesia (now Zambia), where he continued his studies of the Kariba Dam relocation project.

"Now I sort of commute to Africa, once or twice a year, for as short a period as two weeks or as long as four months."

In two or three years he plans to go back, with his family, for another full year.

One of his long-range goals is to convince people in authority that there are such things as "people experts."

"In Africa I used to have arguments with the former colonial administrator of the district. I'd say, 'Look, if you've got a geological problem, you bring in a geologist; if you've got a medical problem, you bring in a doctor. But if you have a problem that deals with the people of your district, you consider yourself the expert.' You see, all people consider themselves experts on people."

A technical solution's not worth a damn if the farmer won't accept it

"It doesn't occur to most people, including our congressmen, that the social and behavioral sciences have an important role to play if we are to create a more satisfying world in which to live. There is not sufficient support of them at any level."

He considers that his most worthwhile effort at the moment is to try to get the experts in international development to realize that the strictly technological approach to development is just not good enough.

"To my knowledge, I was the first anthropologist to work for the World Bank—that was in 1964—and I kept wondering at the time if I'd be the first and last. Though fortunately I wasn't, the battle has hardly started since, I believe, the Bank and other international development agencies still are inclined to take a technocratic as opposed to a 'peoples' approach to development.

"But a technical solution's not worth a damn unless, for example, you can get the farmer to accept it. If he doesn't accept it—and from his viewpoint he may have good reasons—he's blamed for being irrational.

"To get popular understanding and involvement you've got to understand the peoples' point of view, their problems, aspirations—then marry your solution to this to get an over-all answer."

Scudder concluded by saying that, after you do this, you have to realize that each new solution will eventually give rise to new problems. And they should be attacked from the same interdisciplinary point of view.

"So this is my major community service: to do everything I can to get all the behavioral and social sciences brought into the development process as legitimate team members. It's a slow battle."

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Caltech and the New Freshman: What Brought Them Together, and How Do They Hit It Off?

"I'm usually able to identify a student's class and even his semester fairly well. [At Caltech] I've constantly been off by several years and always with a systematic error in the same direction. Whenever I think someone is a senior, he's a freshman . . ."

—Abraham Kaplan, professor of philosophy at the University of Michigan, Caltech YMCA Leader of America, Spring 1967.

Perhaps Dr. Kaplan's difficulty in making identifications was a result of his visiting campus during third term—after those freshmen already had the better part of a year under their belts. It is not known precisely when, of course, this accelerated transition to "senior" takes place. Nonetheless, assuming that they are indeed "freshmen" at some point, *Caltech News* rounded up nine of them a mere three and a half weeks after their arrival to solicit some initial reactions to their Caltech experience. Results of that quest appear here.

What led you to want to become a scientist or engineer?

Ian Kling, Hackettstown, New Jersey: I don't consider myself a scientist or anything else yet; I'm not even sure I want to be one. Right now I do best in science, and I have the impression that very much of liberal arts is very liberal and doesn't have enough backbone. You learn the most through the scientific process, and a good background will help in whatever happens. Learning a lot of wishy-washy liberal or conservative thinking and none of the facts behind it won't help much.

Don Smith, Annandale, Virginia: A scientific education would be of far more value to me than a liberal arts education, because I'm not sure what I want to do yet, and I don't think I will be for a couple of years. But if I decide that I want to go into law or economics or something like that, a scientific education could easily traverse the gap between the two. If I pursued a liberal arts education, I couldn't go to science as easily.

Barry Fitzgerald, Palatine, Illinois: Science and technology are the fields of the future, the things that are moving out. They're new, big, important.

Bruce Horn, Coos Bay, Oregon: I liked science all through high school because it was exact. Unlike English, in math and science you have an exact answer.

Gary Koenig, Hyattsville, Maryland: I'm in engineering and science because I've found that I have a natural aptitude for it. And I do so terribly in the humanities that I really didn't have a choice of what field I wanted to get into. But I also think the thing I like best is that science

is exact. It isn't something that changes from year to year. Usually, when you discover a truth in mathematics, it's truth—all the time, not just in certain instances.

Ron Lipinski, Hinsdale, Illinois: I've always wanted to understand why things worked. Like in history, I didn't want to only find out that Columbus discovered America; I wanted to discover *why* he did. In physics and science, they work basically at that: why something works. So I figure that science is much more interesting than any other job I could go into.

Robert Fisher, Fort Lauderdale, Florida: I suppose a lot of it is habitual; I've always been brought up in a scientific atmosphere, and science has always been among my best subjects. I've always appreciated its precision and exactness, the fact that it was a workable subject, yet still exciting.

Why did you choose Caltech instead of another school?

Lipinski: Well, the prime magazine, of course, is *Scientific American*, and most of the articles I read always had some reference to Caltech or MIT. I found out later that MIT was concerned more with specific application and engineering, while Caltech was concerned more with theoretical science and the understanding, which appeal to me more. And then, of course, the publicity it got for the space agency too.

Koenig: My brother is a senior in physics at the University of Maryland. From what I hear from him and his friends, Caltech is almost a legend around the East Coast. When people refer to *the* physics school, they usually refer to Caltech. I figured that if those people recommended it, it was probably a pretty darn good school.

Horn: I chose Caltech over MIT because it's smaller; that makes quite a difference.

Fitzgerald: I came out here in my junior year. In Chicago nobody ever heard of Caltech. You mention it, and people would say, "What's that?" And my guidance counselors in high school said, "Don't waste your time in applying because you'll never get in." But my trip out here impressed me.

Smith: I chose Caltech over MIT because I visited both campuses, and I thought that the atmosphere at Caltech was more friendly. I suppose it has to do with relative sizes. MIT just didn't impress me nearly as much as did Caltech. I met Joe Rhodes [Caltech student body president] last spring, and he really impressed me. I also met the student body president at MIT, and there is no comparison between the two.

Josh Foreman, Scottsdale, Arizona: Caltech has a tremendous reputation where I come from. Quite a lot of people go to Caltech from there. My teachers said, "You're good in science and math—you ought to go to Caltech." I wanted to go someplace where I would be treated as a person, not a number.

Craig McCluskey, Los Angeles: I came to Caltech because it's small—a lot smaller than my high school was. I had been quite impressed with Caltech when I came here a couple of years ago for the Easter vacation lecture series.

Fisher: It seemed like a friendly school, one where we would bump into the important people who could help us.



Fitzgerald: My guidance counselors said, "Don't waste your time applying, because you'll never get in."



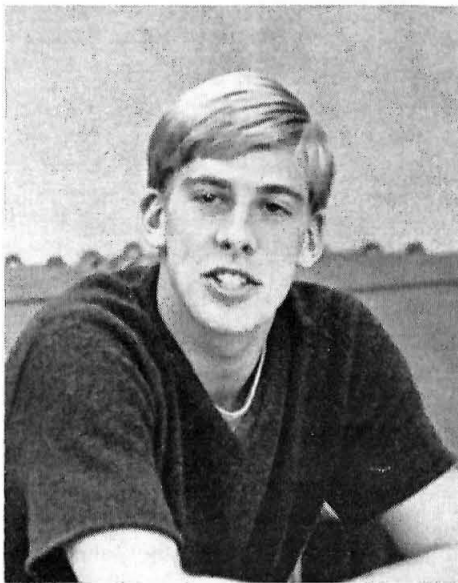
Smith: It might be good to have grades second and third terms, and pass-fail just in the first term.

Now that you're here, is there anything that surprises you?

Kling: I was surprised at how much it seems like a liberal arts campus. The people here don't talk about science but are just as worried about politics and other things as many people at other campuses. The students are worried, and I think that's good. The people here are more well rounded than I had expected.

Smith: My only fear in coming here was that either I couldn't keep up with the pace of the academic life or that there would be just too many people doing nothing but studying. I found that this wasn't true. There are other people like me, who don't study all the time and who take part in other activities. I was afraid that not enough of the people would be well rounded. I think that this is essential to development of any human being, and I found it here.

Fisher: I was surprised by the quality of the other students. This concentration of intellect, where I become an average student, is a little shocking.



Koenig: Science is exact. It doesn't change from year to year.

What do you think of the student houses?

Lipinski: They held a surprise for me. I had been other places and heard the food was bad, but I thought anyone could enjoy food anywhere; I was wrong. The food was really a very big disappointment here. It is very bad.

Koenig: I'm in Ricketts, one of the old houses, and I think it's really great. I would say we have more tradition than perhaps any of the other houses. In the student houses, after so-called initiation the first couple of weeks, there is really no segregation between the freshmen and the upperclassmen. It seems that after the first couple of weeks everyone in the house treats the other people as equals. I enjoy my life in the student houses. Of course, the meals leave something to be

desired, but still I think it's great when you can live with a bunch of other guys that are always willing to help you and do things for you.

Smith: You usually create a lot of noise yourself, so you can't go around criticizing other people. There are times when you're going to want to let off some steam. I think you learn to live with it. If you're going to take a test or something, I think you can do better by going off to the library than you can in the house.

Foreman: The noise is a real problem. I take my work over to Millikan.

Fisher: I like the student houses very much, but I can't fight down the feeling that they're dying out. More and more people seem anxious to get away from them. And they're not as friendly a group as I'd been told they were. I'd like to see something done about it. That's why I'm very happy with Dabney House's plans to hold its own sensitivity conference to see if it can reunite some members of the house. I don't want to see the house system deteriorate. It would take a lot out of the school if I had to live in a dorm. Noise is a problem, and I do have to go elsewhere to study.

Are the courses harder, easier, or about what you expected?

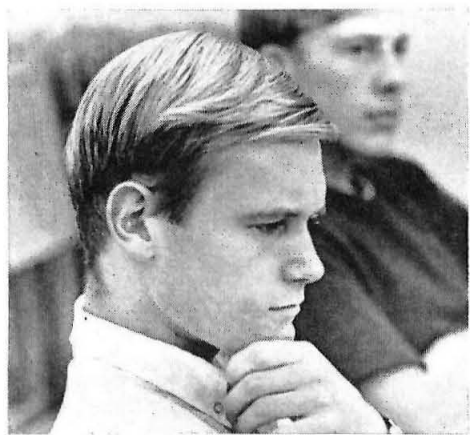
Horn: As much as it's impressed on us—how much we're going to have to work and so on—when we're interviewed, at student camp, and all, you still have to wait until school starts for the shock to really hit you. And you find out that all this gas they've been giving you about the work is true after all.

Lipinski: I find the math is most satisfying; it seems to be the most organized of all the courses. They give you a set of homework problems that are at least feasible in many cases. Physics is next best because, although it's a snow job in many cases, still you have set problems—something you can do and be pulled along by. Chemistry is among the worst, because the labs don't correspond to the lectures, for one thing. I like history because it's really very much liberal—and especially with the YMCA program, with Negro tutors coming here, it really fits in perfectly with our program.

Fisher: The courses are no harder than I'd expected; it's just that I hadn't expected the other kids to be able to handle them so well.

Foreman: The courses are hard, especially physics. I just don't seem to be getting it at all. And math's pretty tough. Chemistry is not quite as hard as I thought it would be. I'm taking European history, which I like a lot; it's a tremendous course.

Ian Kling: I find that English is the easiest course, perhaps because I had a good liberal arts background in high school. And I like physics because it's a



Lipinski: I've always wanted to understand why things worked.

brain teaser. Chemistry lab is very good. The lectures are something else. The math goes so far and the proofs are really deep, and sometimes you begin to wonder if they're snow or not.

Koenig: I think humanities are more interesting than science and math because you learn about people. I'm taking history, and I really enjoy it. The discussions are fabulous, and I like doing research for papers. It's a welcome relief after science and math.

Do you like the pass-fail system for freshman year?

Fisher: I'm in love with it. Pressure is rough enough as it is. I like to think that I can get out and involve myself in other activities that might detract from my academic standing. I would be much more hesitant to do that if I had to worry about A's and B's. In the long run I don't think I'll have learned any less; I just might be a little less familiar with the details.

Smith: During the first term it's an ex-



Kling: I don't consider myself a scientist or anything else yet; I'm not even sure I want to be one.

cellent idea, but I don't know how it's going to be after two or three terms. You might get in a rut and not be able to pull out of it. In high school, competition drove me to do all sorts of things. It might be a good idea to have grades during second and third terms, and just pass-fail in the first term.

Lipinski: If it weren't for pass-fail I would be a lot more tense, because I would be worried about chemistry or something like that pretty badly. Right now I feel that, even if I don't do as well as I might possibly do if I would work all day and all night, I've learned something and I won't be punished for not learning everything. ■

Multi-Letterman Frazzini Wins NCAA \$1,000 Award

Caltech's star defensive end and punter, John A. Frazzini, '68, has been awarded a \$1,000 National Collegiate Athletic Association postgraduate scholarship.

Frazzini, a physics major, started in all Caltech football games in the past four years and has lettered in basketball and baseball. He is also a winner of Caltech's Wheaton Football Trophy and the Caltech Outstanding Athlete Trophy, and was co-captain of the football team.

In 1967 Frazzini's field play earned him a place as defensive end on the SCIAC all-conference first team. He was also the conference's leading punter, with an average of 40.5 yards per kick. ■

Caltech Medievalist Attacks Modern Misconceptions of Anti-Semitism

The roots of the 1900-year growth of anti-Semitism can be traced primarily to early Christian teachings. This view is held by John Benton, Caltech associate professor of history, who discussed this and other aspects of anti-Semitism before the YMCA Athenaeum luncheon forum November 22.

The specialist in medieval history reminded his audience that only two years ago the Vatican council officially absolved the Jews of guilt in the death of Christ.

In tracing the causes of anti-Semitism, past and present, he dismissed as scientifically untenable the once commonly held theory that Jews have qualities making them inherently unacceptable to Gentiles. Some people, he said, offer as proof the fact that the Jews were attacked by the Romans even before Christianity. However, these attacks came about because the Romans found the Jews' monotheism unacceptable and because the Jews had a national culture that brought them into military conflict with the Romans.

After the establishment of Christianity the Roman distaste for monotheism was displaced by Christian aversion to the Jews because they would not accept the doctrine of the coming of the true Messiah.

Although this brought on them certain legislative penalties before the time of the Crusades, they were saved from forcible mass conversion or wholesale destruction because of the early Christian concept that a last remnant of Jews would be converted at the second coming of Christ. Most Christians believed they should not interfere with the divine machinery.

However, this did not stop destruction of Jews and their property on a casual basis as Christianity gained force and militancy.

Dr. Benton said that another widely held belief has been that, after the Jews



John Benton

dispersed from Palestine, their separatism set them apart from their Christian neighbors and proved there was something "different" about them.

As a matter of fact, Dr. Benton said, the Jews in medieval Europe—never more than two or three percent of the population—were indistinguishable from their Christian neighbors in every way but religious belief. And it was not until after the Crusades in the 12th century that Christian society insisted that the Jews show their separatism by wearing distinguishing garb. At the same time there

were also laws enacted forcing them off the land and into trade, and thus channeling Jewish wealth into usury.

As the Crusades ignited Christian militancy and created the fervor to march east and liberate Moslem-held holy places, it kindled the feeling that "enemies of the faith" closer to home should also be persecuted.

"This widespread turn toward violence," Dr. Benton said, "set the pattern for the next centuries and culminated in Nazism. Anti-Semitism is not a unique virus in the human spirit. We are plagued by racism in other forms. All of us in the United States have grown up in a society which either tacitly accepts or openly proclaims doctrines of racial superiority and inferiority."

He said he took comfort in the many ways in which America is better and healthier than 12th-century Europe, "but," he added, "too many chilling comparisons can be drawn between conditions during the time of the first Crusade and our own time. We, too, have unassimilated minorities. We have an official doctrine which condemns persecution, but which has a limited effect on the minds and hearts of our people."

He drew a further parallel by stating that this country, too, is engaged in a crusade, a brutalizing foreign war justified by an ideology.

"Like the Crusaders, we are very close to saying: 'Behold! Why should we fight only our enemies in a faraway land when there are those among us who are undermining our society?'"

He concluded by admitting that, as he prepared his discussion, the words of philosopher George Santayana echoed loudly:

"Those who cannot remember the past are condemned to repeat it." ■

James Lorenz of CRLA: The Law Is Limited and Lawyers Are Limited

A young attorney whose organization is winning some impressive legal battles in California admitted to a Caltech YMCA audience on December 6 that those victories have often been hollow. James Lorenz, founder of CRLA (California Rural Legal Assistance), a federally financed group of attorneys and aides representing primarily Mexican-American farm workers, concluded that in the last few years people have come to realize that "the law is limited and lawyers are limited."

He traced the recent history of the civil rights movement as an illustration. The 1963 March on Washington, he said, "showed a belief that laws and legal mechanisms would assist in the improvement of the position of black people. It was a belief in non-violence and integration . . . and certainly involved a belief in the efficacy of law."

"Today," he said, "we no longer have a faith that the political process will work. By and large we don't have the involvement of white youth in that movement. We increasingly have a resort to violence. We don't have effective integration of white and Negro, and we certainly don't believe that this Congress can do much of anything except, perhaps, change things for the worse."

He admits that those who expected great progress had "underestimated a very deep-felt racial antagonism that exists in this country and has always been present." Nevertheless, he says, this failure of the law to provide immediate results led to

the current drive for concentrations of power among minority groups who, a few years ago, had integration as a prime objective.

Solving social problems through the law (in contrast to some other current programs, like welfare and the War on Poverty) often fails because it is not comprehensive. For example, he said, the law could force unions to open up their apprenticeship programs to minority people. But the effect would be limited without political push to somehow create more jobs.

Also, he said, when CRLA had the state's cutbacks in the Medi-Cal program declared illegal by the California Supreme Court, "there were still no indigents who were getting medical services, because the state said: 'Well, this may finally be reversed upon appeal, so we want all you doctors to know that you're giving services during this interim period at your own risk. You may not get paid if it turns out that we win.' And, of course, that had the effect, practically, of cutting off all the services."

Another legal victory and practical failure was CRLA's appeal for better working conditions for women and children in Riverside County. The rulings handed out by the Industrial Welfare Commission were so stringent that the growers decided it was too much trouble to hire women and children. Net result: Instead of better working conditions, there was a loss of income for already poor farm workers' families.

CRLA's operations face the threat of

veto from Governor Reagan, who has objected to its function as a government-financed group that sometimes takes legal action against government. If CRLA continues, Lorenz, a 1964 Harvard Law School graduate, says that a Mexican-American attorney must eventually take over leadership of the group. Race, he contends, underlies most of today's volatile issues, and it appears now that ethnic or racial solidarity may provide the power bases that minority groups must have to get their share of justice. ■

New Alumni Books

The Great Monkey Trial, L. Sprague de Camp, '30. Doubleday & Company, Inc., N. Y., 1967. \$6.95.

Electronics for Biologists, Franklin F. Offner, MS '34. McGraw-Hill, N. Y., 1967. \$6.95.

Nuclear Astrophysics, William A. Fowler, PhD '36. American Philosophical Society, Philadelphia, 1967. \$3.00. Jayne Memorial Lectures.

The Mind of the Dolphin, John C. Lilly, MD, BS '38. Doubleday & Company, Inc., N. Y., 1967. \$5.95.

Methods of Experimental Physics. Vol. 4, Atomic and Electron Physics. Part A, Atomic Sources and Detectors, Vernon W. Hughes, MS '42, and Howard L. Schultz, Eds. Academic Press, N. Y., 1967. \$21.50.

General Chemistry, William A. Nevill, PhD '54. McGraw-Hill, N. Y., 1967. \$8.50.

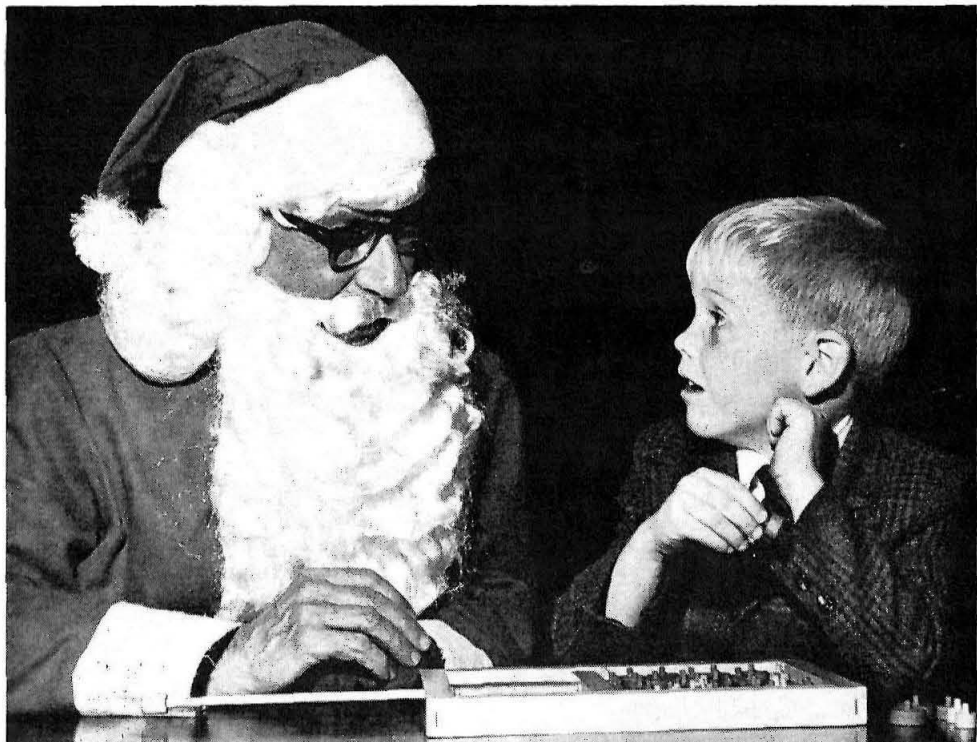
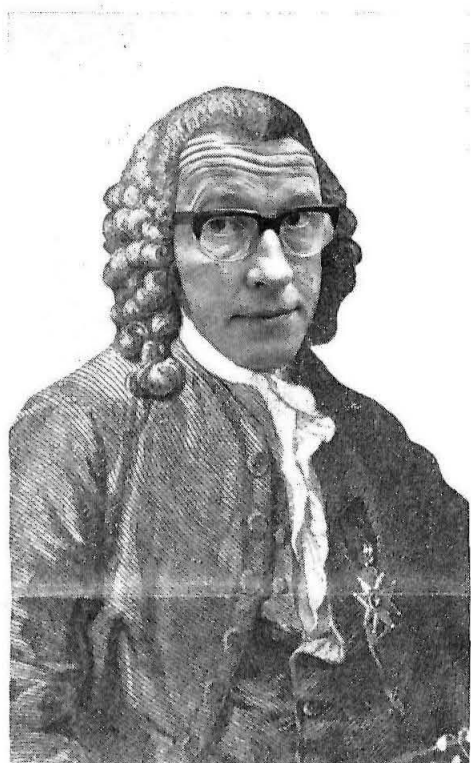


Photo through the courtesy of the Los Angeles Times

A LITTLE BIT OF FUN, real (above) and imagined (left). At this year's annual Athenaeum Christmas party, Santa was none other than Lee A. DuBridge who—after 20 years of fund-raising for Caltech—must have enjoyed the role. Dr. DuBridge, in a more serious mood, answers some accumulated questions from alumni at the right. Meanwhile, to celebrate the prestigious honor bestowed on Caltech's Max Delbrück—election to England's Royal Society—he has been suitably decked out (by way of the photographic darkroom) in a fitting costume for that hoary organization. Dr. Delbrück's observations on the trip he took to Europe in connection with that award are presented below.



Alumni Association membership brings:

- *Engineering and Science* magazine
- Triennial Alumni Directory
- Athenaeum membership privilege

The Berlin Wall: An Economic Boon For East Germany

Communist East Germany's surprising economic progress has been boosted by the notorious Berlin Wall, "which stopped the brain drain and forced people to accommodate themselves," says a Caltech scientist who recently visited his native Germany. Max Delbrück, professor of biology, recently returned from Europe after receiving high honors and voiced these opinions:

"As compared with four years ago when I was last in East Germany, the economic progress was very impressive. Now everything functions reasonably well, and you can buy consumer goods—some at reasonable, others at very high, prices. Their standard of living is considered the highest among Eastern Bloc countries.

"Many people believe this is the effect of the Wall. People had to stay, and they proceeded to put their house in order.

"Political pressure, however, is as strong as ever and is felt with special bitterness by the young people. Both young and old are absolutely neurotic with a prison complex—they can't get out."

Delbrück, known for his pioneering work with viruses in the study of genetics, added: "If the Wall were taken down today, there most certainly would be a stampede of people leaving—but I believe 95 percent of them would come back.

"This is because, for one thing, employment is exceedingly high in East Germany and general services are probably better there than in the West."

Concerning the status of science in East Germany, Delbrück said, "I would say their best institutes are interesting enough for our young postdoctoral students to go there for a year or two if suitable arrangements can be made, and I would like to urge both sides to make such arrangements."

Delbrück attended a meeting in East Germany of Leopoldina (the German Academy of Natural Scientists), in the city of Halle, where he was a recipient of the Gregor Mendel Medal. Other medals went to scientists from West Germany, East Germany, and Russia.

"Like the English Royal Society," he explained, "the academy is independent. It is all-German and is one of the few bodies still functioning that includes members from East and West Germany. Up to the time of the Wall they alternated meetings in East and West, but now the academy always meets in the East.

"For the eastern scientists this is the occasion of the year where they meet their western colleagues. The fact that the Leopoldina functions effectively is largely because of the skill, energy, and courage of the academy president, Kurt Mothes."

Delbrück visits Germany every fall to lecture at the University of Cologne, where he organized and for two years directed an institute for genetics. He usually spends about a month there. He also visited London this year, where he was inducted into the Royal Society as a foreign member.

Alumni Queries #3: What ARE the Problems? How Can We Comment? What Research Is Being Done?

Does the Institute really have problems? We rarely, if ever, hear of them—only the money requirements.

Of course, every college and university has problems, such as:

- (a) Continued reevaluation, readjustment, and improvement of the curriculum.
- (b) Continued examination and improvement of the student advisory system.
- (c) Improved methods of selecting freshmen and graduate students.
- (d) Meeting the valid needs of students relating to student house affairs, athletics, extracurricular activities, and financing of student organizations (ASCIT, Caltech Y, etc.).
- (e) Expanding our facilities to provide more space for libraries, athletics, dormitories, classrooms, laboratories, etc.
- (f) Keeping and recruiting first-class faculty members.
- (g) Parking problems.

There are plenty of others.

Many alumni would like to express their views regarding Institute policy and practices. How can these views be communicated? And will they be heard?

Alumni are invited to express their views about Institute policy and practice in any way they choose. They can write letters to the president or to other Institute officials. They can write letters of comment to *Engineering and Science* or *Caltech News*. They can form informal groups or committees to meet with the

president and/or other Institute officials. They can discuss Institute affairs in the meetings of the board of directors of the Alumni Association and communicate their views formally to the president or others. They can make their views known to members of the board of trustees, particularly the alumni members (Beckman, Ramo, Vesper, and Carlson).

However, alumni should remember that many things have changed at Caltech, and in the world, in recent years, and we hope they will seek information as to why certain policies now in force are different from what they used to be, or why they have or have not changed in certain directions. We hope the alumni will seek information as well as express their views. They can be assured that information will be furnished as promptly and extensively as possible, and their views will surely be heard.

I received a PhD from Caltech, preceded by a BS from another institution. Despite a deep loyalty to my undergraduate school, the greatest intellectual experience of my life was my study at Caltech. How can I keep abreast of developments in my division at Caltech?

Nearly every division at Caltech publishes annual reports of its research activities. These can be obtained by any alumnus on request to the appropriate division chairman. Copies of the annual *President's Report* also give much information, and these have been sent to alumni for several years.

—Lee A. DuBridge
Caltech president

Brown Takes a Scientific Plunge Into the World of Fiction

A missed plane connection to Nigeria back in 1965 has resulted in the publication of a book in 1968. Harrison Brown, Caltech professor of geochemistry and of science and government, stranded for a few hours in New York, looked up some old friends, M. B. and Chloe Zerwick. At one point in the visit Mrs. Zerwick gave Harrison Brown a long, thoughtful look.

"You know," she said, "I have an idea for a novel. What would happen if the world suddenly got a message from outer space? What effect do you suppose it would have?"

At that moment Harrison Brown and Chloe Zerwick became literary collaborators. The result, *The Cassiopeia Affair*, published by Doubleday, hit the bookstores January 26 of this year.

"The idea touched on a lot of things I had been worrying about in my own work," Dr. Brown says of his first novel. "So, on the flight to Nigeria the next day, I started playing around with a plot structure."

For his story he chose the star Cassiopeia as the source of the signals that are decoded by one of the earth's great radio astronomers. In reality, Cassiopeia is one of the strongest sources of radio emissions.

He started fantasizing what the message might say and how it would be decoded. He began constructing a series of plausible domestic and international developments. These initial plot doodlings were the springboard into a year and a half of collaboration by correspondence.

"I wrote my part mainly on planes, and Chloe did hers mostly in New York. Mine was accomplished during four trips to South America, fifteen to Europe, two to Africa, and one to Asia."

Aside from the strictly science- and government-oriented sequences, which Dr. Brown took on, the two of them divided the story into sections, interchanged them, and rewrote each other's on occasion. They actually saw each other only twice during the year and a half of writing.

Dr. Brown is the author of several previous books. Mrs. Zerwick has had considerable editorial experience, and is now with a New York foundation dealing in problems of world law.

Will Caltech and/or some of its scientists be recognizable in the novel?

Dr. Brown agrees that there will probably be many who will think they recognize certain people, although most of the characters are amalgamations of several scientists of Brown's wide acquaintance.

The locale is on the Atlantic seaboard, but Dr. Brown naturally drew largely from the work going on at Caltech in the planetary sciences.

The hero and the villain are both Hungarian-born scientists, which Dr. Brown suspects will have a lot of people insisting that "one's got to be Edward Teller and the other Leo Szilard." He maintains, though, that any resemblance stops with the nationality.

The main character is a fairly old, quite remarkable scientist with amazingly broad interests which include politics. His interests in the human condition are also strong, or else he has an unexpected streak of naiveté, since he has an attractive wife in her twenties and a ditto male assistant in the same age bracket.

In a sense the book is a tragedy. The basic theme, according to its Caltech co-author, is that mankind blew its big chance.

Association Consistently Brings Off Successful Scientific Feat of Turning Bucks Into Alumni

Seventeen undergraduates have had their burdens eased, courtesy of the Caltech Alumni Association, since the Alumni Scholarships were established in 1954. Ten have graduated with its assistance, and only three awardees didn't hang on for the full span, either because of transferring or because grades slid to the nervous side.

Alumni scholarships had a rather rocky beginning. In the 1920's the Alumni Association established a scholarship program, electing to choose the recipients itself. This didn't work as well in practice as it looked in theory. Subsequently a scholarship fund was continued on a plan of subscription notes from alumni. But, human nature being what it is, the notes had a way of falling by the wayside.

In 1946 the Association board of directors decided to solicit funds from the alumni for a badly needed Institute gymnasium. However, during the ensuing campaign Scott Brown, a member of the Caltech Associates, died and left funds to the Institute with which the present Scott Brown Gymnasium was erected. The money the alumni had raised toward a gym was given to the Institute for locker rooms and the Alumni Swimming Pool.

In 1953, with the physical education complex assured, the Association started a campaign to solicit funds for four four-year undergraduate scholarships. The solicitation went on until 1957. At that time

enough had been raised for an endowment fund to cover the purpose.

The first scholarship holder to graduate was Eugene Cordes, '58, now an assistant professor of chemistry at Indiana University. In '59 came physicist James Havey, who is now in the Air Force, stationed at Edwards AFB in California.

Subsequent graduates were:

1960: Joseph Cauley, who also received his master's degree at Caltech in physics. He has become one of the mysterious "address unknowns" in the alumni files.

1961: Robert Poe, now a graduate student in physics at the University of California, San Diego.

1962: Alan Zame, an honor graduate in mathematics. He received his PhD at Berkeley and is an assistant professor at the University of Miami.

1963: Karvel Thornber, graduated as the top engineering student in his class. He received his PhD in electrical engineering at Caltech in 1966 and is now a research associate at the Stanford Electronics Laboratory. In 1967 he married Nora Josephson, the second woman to receive a PhD in physics at Caltech.

1964: Donald W. Davies, a physics graduate student at Berkeley.

1965: Tom Pucik, working toward a PhD in aeronautics at Caltech.

1966: Ed Perry, also still at Caltech, doing graduate work in engineering.



Current Alumni Scholars: Larry Shirley, Steven Banks, David Shirley, and James Richards.

1967: Mark Satterthwaite, an honor graduate who took his BS degree in economics, is continuing in the subject at the University of Wisconsin. He was one of the first Caltech undergraduates to beat the drums for coeducation on campus and headed a student investigative committee on the possibilities.

The present senior and junior scholarship holders are Dave and Larry Shirley—no relation. However, both are math majors and have a similar pattern of student body activities. Larry also claims a mother named Shirley Shirley.

Following his June graduation, Dave expects to go directly to graduate school for a PhD in applied mathematics. Larry is stressing the humanities and carries a

double major in mathematics and history. He wants to go into the Peace Corps before continuing in graduate school in the field of science and government.

The sophomore scholarship holder is biology major Jim Richards of Englewood, Colorado. He likes skiing and climbing, and tutors at Pasadena's Westside Study Center.

The freshman of the undergraduate quartet is Steven Banks, one of the youngest members of his class. His parents are teachers in the Columbus, Ohio, public schools, and Steven is a product of the University School at Ohio State University. He was one of the state's outstanding high school students in math and science.

Coming Caltech Events

- Feb. 19, 8:30 p.m., Beckman Auditorium.**
Monday Evening Lecture Series.
"The Moon." Albert R. Hibbs, senior staff scientist, Jet Propulsion Laboratory. Free.
- Feb. 20, 8:30 p.m., Beckman Auditorium.**
Silent Movie Series.
Douglas Fairbanks in
"The Thief of Bagdad."
- Feb. 24, 8:30 p.m., Culbertson Auditorium.**
Caltech Drama Club Play.
"The Male Animal."
- Feb. 25, 8:15 p.m., Dabney Lounge.**
Los Angeles Brass Quintet. Free.
- Feb. 26, 8:30 p.m., Beckman Auditorium.**
Monday Evening Lecture Series.
"Cool Plasmas Aglow." Frederick H. Shair, Caltech assistant professor of chemical engineering. Free.
- Feb. 29, 8:30 p.m., Beckman Auditorium.**
Illustrated lecture by
Dr. Alan Solomon, "Contemporary Art—American Revolution." Co-sponsorship by Caltech and Pasadena Art Museum. Free.
- March 2, 8:30 p.m., Beckman Auditorium.**
Interhouse Sing. Free.
- March 3, 8:15 p.m., Dabney Lounge.**
Coppin Ensemble. Free.
- March 5, 8:30 p.m., Beckman Auditorium.**
Silent Movie Series.
Richard Barthelmess in
"Tol'able David."
- March 7, 8:30 p.m., Beckman Auditorium.**
Lecture by Marian Anderson.
"The Artist's Responsibility to Society."
- March 24, 3:30 p.m., Beckman Auditorium.**
Coleman Concert.
- March 26, 8:30 p.m., Beckman Auditorium.**
Silent Movie Series.
Lon Chaney in
"The Phantom of the Opera."
- March 31, 8:30 p.m., Beckman Auditorium.**
State Repertory Theatre Concert
Readings. "The Young Visitors" and
"Through the Looking Glass."

PERSONALS

1918

WILLIAM B. NULSEN died suddenly on July 6, 1967, just one week after retiring with emeritus standing as professor of electrical engineering at the University of New Hampshire in Durham. Nulsen was a professional engineer and often an industry consultant. He was also a senior member of the Institute of Electrical and Electronic Engineers and a member of the American Society of Engineering Education and the New Hampshire Academy of Science. He is survived by his wife, Dorothy, and two daughters.

1926

ARNOLD S. LUTES, Ex, a former engineer and real estate salesman in Sunnyvale, Calif., died on May 22, 1967. He was with Westinghouse for more than seven years, serving in various engineering capacities before his retirement, after which he was associated with Hubbell & Co., realtors. Lutes is survived by his wife, Inez, and a son and grandson.

1927

JOHN F. AKERS died October 10, 1967. He had been with the Goodyear Tire and Rubber Company in Los Angeles 23 years at the time of his retirement in August 1966. Since then he had pursued his many and varied outside interests. He spent many hours among the unusual plants he had gathered over the years and was active in the Los Angeles Cactus and Succulent Society. Akers was also founder of the Southwest Meteorologists. He is survived by his wife, Dorothy.

1928

BORIS PODOLSKY, PhD, died November 28, 1966. He was professor of physics at Xavier University in Cincinnati, Ohio, at the time of his death.

1931

JOHN EMILE GIRARD, rate engineer with

the Los Angeles Department of Water and Power, died April 4, 1967. Girard was a lieutenant in the U. S. Navy during World War II, serving as an engineering officer, but returned to the department of water and power in 1945. He is survived by his wife, Lorraine, and 11 children.

1932

GRANT D. VENERABLE writes to announce his marriage on May 18, 1967, to Mrs. Naomi Tahron Pryor in Los Angeles.

1933

JACK N. SPARLING has been elected chairman of the board of Quinton Engineers, Ltd., a planning, architecture, and engineering firm in Los Angeles. He has been vice president and chief engineer since 1947.

1934

ERNEST R. HOWARD, MS '35, has just completed 10 years with Texas Instruments in Attleboro, Mass. While there he helped develop a new use for thermostat metal—inside a color TV tube.

WALTER H. JORDAN, PhD, assistant director at the Oak Ridge National Laboratory, is also teaching on a part-time basis at the University of Tennessee.

NICK T. UGRIN, vice president and director of industrial relations for Union Oil Company of California, has been named to the San Marino, Calif., library board.

1935

CHARLES M. BLAIR, PhD, formerly vice chancellor at Washington University, St. Louis, Mo., is now vice president, technical division, of the Magna Corporation in Santa Fe Springs, Calif.

WILLIAM W. JENNY, MS, staff assistant in missile and space systems division reliability at Douglas Aircraft Co., Inc., Los Angeles, died in November 1967.

1937

DANIEL LAUDER GERLOUGH is professor of transportation engineering at the University of Minnesota's Institute of Technology in Minneapolis.

DEAN NICHOLS, MD, is now a consulting radiologist in Phoenix, Ariz. He has traveled extensively in the United States in the past year attending postgraduate courses in radiology. Nichols resigned from Bregman, Nichols & Associates, Ltd., last year.

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PLACEMENT ASSISTANCE TO CALTECH ALUMNI

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Name

Degree (s) Year (s)

Address

PERSONALS

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1943

THOMAS A. GAFFNEY, MS, is an instructor in math at the City College of San Francisco.

1944

ROBERT G. HALLWACHS, MS, has been appointed dean of the newly formed division of humanities and social studies at the Drexel Institute of Technology in Philadelphia. He is the former provost and dean of faculty of Wells College, Aurora, N. Y. Dr. Hallwachs is currently doing an extensive study of Robert Burton's book *The Anatomy of Melancholy*.

1945

CHARLES R. CUTLER is a lawyer in Washington, D.C., with a rapidly growing interest in his most recent hobby—a 24-foot sailboat that he races summer and winter on Chesapeake Bay.

DONALD B. DUNCAN, PhD '51, has been appointed a vice president of Litton Industries. He will also continue as president and general manager of the guidance and control systems division at Woodland Hills, Calif. Duncan has responsibility for activities in the fields of inertial navigation systems for military and commercial applications, avionics weapon control systems, and ground support equipment.

DONALD C. SNYDER, a commander in the Civil Engineering Corps of the U.S. Navy, is the new chief of the engineering and standardization division at the Defense Construction Supply Center in Columbus, Ohio.

1946

DONALD FURST, MS '48, is currently head of the gas turbine development department of Airesearch Manufacturing Co. in Phoenix, Ariz. He is working on several interesting projects, including new auxiliary gas turbines for the Lockheed C-5A and the Boeing 747 aircraft.

EBERHARDT RECHTIN, PhD '50, has been appointed director of the Advanced Research Projects Agency of the Department of Defense in Washington, D. C. Formerly assistant director for tracking and data acquisition at Caltech's Jet Propulsion Laboratory, he will now be responsible for planning, initiating, and directing specific research and development programs for the department.

ROBERT C. WISE, an attorney, is a member of the Pennsylvania Legislature and lives in Williamsport, Pa.

1947

SPENCER R. BAEN, MS, PhD '50, a colonel in the U.S. Army, is project manager for the SHILLELAGH Missile System at Redstone Arsenal, Ala. This system constitutes a large part of the main armament for three army combat vehicles.

RAYMOND A. BROWN, MS, PhD '49, is a biologist at the Oak Ridge National Laboratory at Oak Ridge, Tenn.

RAYMOND M. CLOCK, MS, formerly a colonel in the U.S. Army, is now a PhD candidate attending the University of Florida in Gainesville. He expects to get his doctorate in 1968.

JACK E. FROELICH, MS '48, PhD '50, and his son Mark, aged 9, drowned November 25 while duck hunting on a lake in Carey, Idaho. Dr. Froehlich, previously executive vice president and chief executive officer at Space-General in El Monte, Calif., had been president of National Engineering Science Company of Pasadena since January 1967. He was chief of the guided missile engineering division at Caltech's Jet Propulsion Laboratory until 1959, when he left for Space-General. Froehlich is survived by his wife and another son, John.

BERNARD W. MARSCHNER, MS, AE '48, PhD '54, has been named vice president for university affairs at Colorado State University, Fort Collins. He moves from his former position as professor and head of the mechanical engineering department.

1948

JAMES C. ELMS is director of the NASA Electronics Research Center in Cambridge, Mass. Formerly vice president and general manager of the space and information systems division of Raytheon Company in Sudbury, Mass., he was also deputy director of NASA's Manned Spacecraft Center in Houston, Texas, from 1963 to 1964.

HOWARD W. GREEN retired from the U.S. Air Force as a lieutenant colonel in December 1967, after 20 years of active duty. He and his wife, Martha, and three children now live in San Bernardino, Calif.

JACK W. KEUFFEL, PhD, and his wife, Betty, are living in Salt Lake City, Utah, raising and showing Arabian horses and running a cosmic ray laboratory.

JAMES W. WALTERS, MS, a colonel in the U.S. Army, is deputy project manager of the NIKE-X anti-ballistic missile project at Redstone Arsenal, Ala. His oldest child graduated from Virginia Polytechnic Institute in Blacksburg in 1965; the other two are still in college.

FRED M. WELLS, MS, is director of product development in the paper products division of the Procter & Gamble Co. in Cincinnati.

DAVID WILFORD, MS '51, has joined General Dynamics' electronics division in San Diego, Calif., as chief engineer, data systems laboratory. He spent the previous six years with General Electric on the east coast, working in missile test and commercial data processing.

1949

EUGENE C. MOORING died July 30, 1967. He was chief of the nonmetallics section, Saturn Prod. Des. Br., Douglas Aircraft, Huntington Beach, Calif.

1950

CECIL W. DRINKWARD is moving to Portland, Ore., to become vice president and general manager for Hoffman Construction Company. His fourth child, William Laurence, was born in September.

1951

CARL A. HIRSCH, MD, is conducting research on the regulation of protein synthesis in mammalian cells in the department of medicine at Harvard Medical School and at his laboratory at Beth Israel Hospital in Boston. Prior to 1964, when he began his research, Hirsch held a postdoctoral fellowship and instructorship in the department of bacteriology at Harvard Medical School.

1952

JERRY GREY, PhD, a former professor of aerospace and mechanical sciences at Princeton University, has become president of his own company, Greyrad Corporation, Princeton, N.J. He is also serving as vice president of the American Institute of Aeronautics and Astronautics.

DAVID L. HANNA has been elected a vice president in the New York office of Booz, Allen and Hamilton Inc., management consultants. He is currently on assignment in Lahore, Pakistan.

BRUNO HARRIS is spending the academic year 1967-68 at Princeton University and at the Institute for Advanced Study while on leave from his permanent position as professor of mathematics at Brown University in Providence, R. I.

DALE C. KRAUSE, associate professor of oceanography at the University of Rhode Island in Kingston, is currently in Moscow for a three-month visit at the Institute of Oceanology of the U.S.S.R. Academy of Sciences. He is working through the scientific exchange program of the National Academy of

Sciences and the U.S.S.R. Academy of Sciences. Krause spent last August and September south of Iceland studying the Mid-Atlantic Rift and last October between New Zealand and Chile on the ship *Oceanographer*, studying bathymetry and sea floor slopes.

1953

BRUCE N. AMES, PhD, has resigned from the National Institutes of Health in Bethesda, Md., to accept a position at the University of California, Berkeley, as professor of biochemistry.

GEORGE R. DUBES, PhD, is a section head in viral genetics at the Eppley Cancer Institute, University of Nebraska College of Medicine, Omaha. He and his wife, Margaret, have two sons, George Richard, Jr., and David.

THOMAS F. TALBOT, MS, is associate professor of engineering at the University of Alabama in Birmingham.

1954

BERDINE H. ROGERS, MS, is a geologist with the general atomics division of General Dynamics, San Diego, Calif.

1955

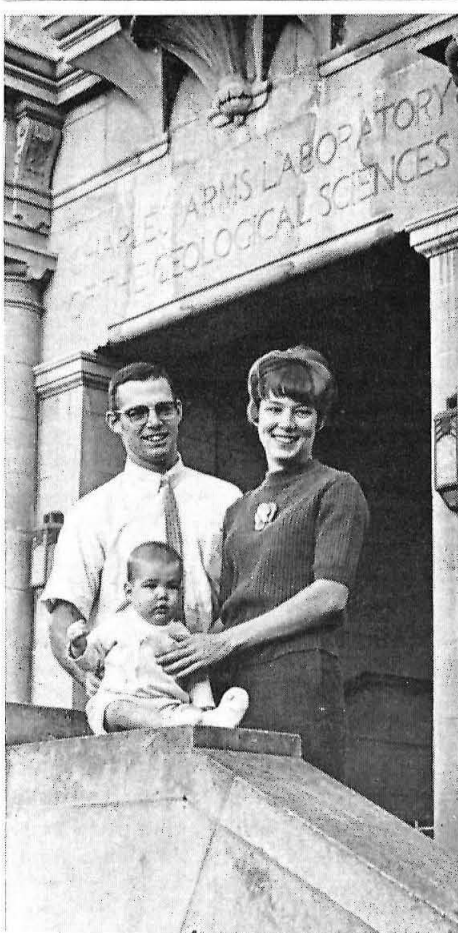
WILLIAM T. MOORE, MS, a lieutenant colonel in the U.S. Army, recently completed a course at the U.S. Army War College, Carlisle Barracks, Pa. He is now assigned to the deputy chief of staff, personnel, Department of the Army, Washington, D.C.

MILES A. NESMAN is a member of the technical staff at The Aerospace Corporation in El Segundo, Calif.

FRANK D. SALISBURY, PhD, became professor and head of plant science in the college of agriculture at Utah State University in Logan in June 1966. He spent the previous 11 years as plant physiologist at Colorado State University in Fort Collins. Salisbury has coauthored a plant physiology textbook which should be released some time this year.

1956

WILLIAM M. CHAPPLE, MS '57, PhD '64, is assistant professor in the department of geological sciences at Brown University in Providence, R.I. The Chapples now have three daughters, Nancy, Beth, and Karen.



BABE IN ARMS. Robert Kieffer (center) has a heritage of considerable distinction. Both parents are Caltech alumni (Hugh, '61, and Sue, MS '67); and both are currently working at Caltech for PhD's in planetary science.

JAMES G. GIRARD, an engineer for Standard Oil Company of California, is presently assistant manager of the refinery in Puerto Barrios, Guatemala.

GILBERT W. KIRBY JR., MS, a lieutenant colonel in the U.S. Army, recently completed a course at the Army War College at Carlisle Barracks, Pa., and was appointed professor and deputy head of the department of earth, space, and graphic sciences at West Point in September. He is now a full-time student at Columbia University working on his doctorate.

MERWIN SIBULKIN, AE, is professor of engineering at Brown University in Providence, R.I.

1957

THEODORE C. JOHNSON has been elected vice president in charge of sales and field operations for Digital Equipment Corporation, Maynard, Mass. He joined Digital as a sales engineer in 1958, and since 1965 has been general sales manager in charge of the company's worldwide sales and service organization.

ROBERT M. McKEON, MS, who earned his doctorate in history from the Sorbonne in Paris, has just been appointed assistant professor of history at Tufts University, Medford, Mass. He was formerly a National Science Foundation postdoctoral fellow and an instructor at Princeton University in New Jersey. McKeon married a French girl and now has two children.

MITRI G. KHAMIS, MS, is senior mechanical engineer with the California & Hawaiian Sugar Refinery at Crockett, Calif.

1959

WALTER A. JOHNSON, MS '60, and his wife, Linda, announce the birth of their first child, Wendy Meroe, on July 31, 1967. Johnson is a senior staff engineer at Systems Technology, Inc., in Hawthorne, Calif., where he has been since 1960.

GEORGE W. LOGEMANN is associate director of the information sciences division at Rockland State Hospital in Orangeburg, N.Y. He was formerly in the mathematics department at New York University.

GUY A. THOMPSON JR., PhD, is associate professor of botany at the University of Texas in Austin.

RICHARD D. WOOD, AE, is a research scientist in the mission analysis division of the NASA Ames Research Center at Moffett Field, Calif.

1960

NORMAN S. FARHA, MS, is a sales representative with F & E Wholesale Grocery Inc. in Wichita, Kansas.

LESTER L. HIRST writes that he is now in the Physik Department der Technischen Hochschule München, in Munich, Germany.

1962

WENDELL Y. G. ING has been appointed to the staff of the Arcon Corporation, an independent research organization in Wakefield, Mass. He will be working on special assignments for the corporation but will also continue his work on the design and development of a land fallout prediction system for the Department of Defense, a project he was working on as a staff member of Technical Operations, Inc., in Burlington, Mass.

1966

Correction: DAVID H. CLOSE was incorrectly listed in the November *Caltech News* under the year 1962. He in fact received his BS in 1966. The remainder of the news item is correct.

PETER H. WIRTZ, MS, and SYLVIE F. POTIGNY, MS, were recently married and are living in Munich, Germany. He is a physicist with the Max Planck Institut für Plasmaphysik, and she is a process engineer for Linde Ag in Höllriegelskreuth.