

CALTECH NEWS

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SPECIAL EDITION

On June 7, 1967, President Lee A. DuBridge alerted the annual meeting of the Caltech Alumni Association to some important activities being planned for the next few years. Because these actions will affect both the short- and long-term operations of the Institute, his remarks are reprinted in this special edition of Caltech News as a way to get the information to the people who were not at the meeting. The next regular issue of the News will be published in October.

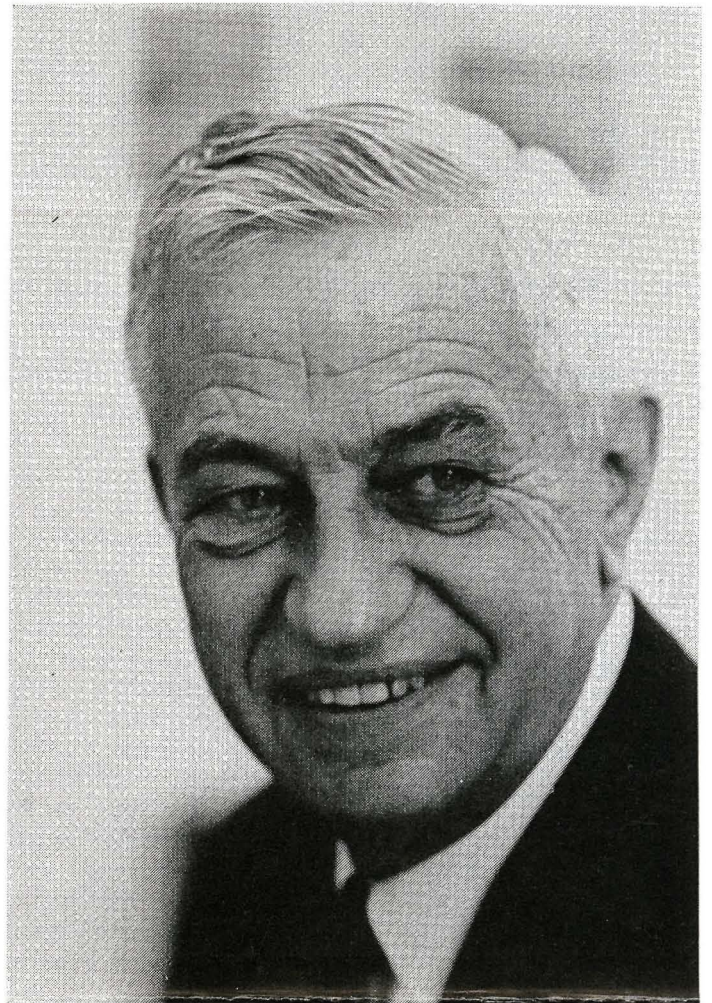


Photo by Leigh Wiener

“Caltech’s Future”

*A Preview for Alumni of
Important Developments
Scheduled for the Institute*

by Lee A. DuBridge

I welcome this opportunity to talk to the Caltech alumni on this occasion, and I wish to talk rather seriously. I am somewhat sobered when I reflect on the fact that more than half of you who are here tonight, and more than half of all alumni, received your degrees since 1946. More than half of you, in other words, received your degrees from me personally—unless, of course, you skipped commencement. All that proves is how young most of you are and how old I am. Yet it’s pretty terrifying to think that so many people spent several critical years of their lives at an institution over which I presided. Just think how much better it would have been for all of you if only, somehow or other, I could have found ways to make this a better institution. Not that the president really has too much to say about changing an institution! Yet here and there he can give a push in the right direction. Or, here and there, he can

prevent mistakes from happening. For all the mistakes of commission or omission which I have made in these 21 years, I now apologize; I hope we can be better in the future. In just three years now I will be passing on the reins of my office to my successor. I hope you will all be as kind to him as you have been to me.

I arrived here in the fall of 1946—stepping into the shoes of a great man whom I had admired and known personally for nearly 25 years before. I already knew a great deal about Caltech, but beginning in 1946 I quickly learned a lot more. As I got reacquainted with my old friends on the faculty and came to know the others, I realized that by some magic Dr. Millikan had assembled here a pretty precious group of people and had found a way for stimulating them to work happily and productively together.

“There are two basic things I think we must keep, aside from solvency: namely, our relatively small size and our ideals of exceptionally high quality. To maintain both of these requires courage, judgment, and an exceptional capacity for selectivity.”

That, I said, is what we must continue: having a precious group of faculty and students who work happily and productively together. That, of course, is just what a great university is all about.

It would have been easy in 1946 to say, “We have a great place here—let’s keep it just like it is.” There may be some members of the class of ’46 or earlier classes who wish that we had done just that. It might indeed have been a great temptation in 1946 just to sit on our *status quo*—except for one thing: There wasn’t too much of a *status quo* to sit on! The war was just over, and the Caltech of the war and prewar years really wasn’t there any more. A college doesn’t convert itself to a war research laboratory and military training school for five years and still stay just the same.

So, in 1946, the Caltech of prewar years was only partly reassembling itself. Many, but not all, of the great teachers had stayed here or were coming back. It is true that the spirit of the place in 1946 had returned to what it had been in the prewar years. But clearly—whoever was the president—a new era had to begin, for times had changed. There were new ideas and new technologies to be explored—a new generation of students to teach. Under Dr. Millikan, Caltech had never remained static. He would not have kept it static in the future.

I shall not dwell on what has happened in the past 20 years—not only at Caltech, but in all American higher education. You already know the story. Much of what has happened has been exciting. Some has been difficult and disturbing. By much

good luck, and by virtue of a tremendous amount of hard work on the part of the faculty and the trustees, Caltech has remained distinguished and even relatively solvent. Either achievement is difficult; taken together, they often seemed next to impossible.

But the past is past. The next question is: Where do we go from here?

This is a question with which every university must continually struggle. Yet, even as we look to the future, the past is always with us. The traditions which have been built up here in the past 75 years will not die overnight. And, we can all be proud to say, we don’t want them to die. We have examined and reexamined them many times in recent years, and on the whole we have found them good. And surely no one wants to kill success, of which we have surely had our share.

But times are still changing; the world is changing. What was good for 1920 may not fit the picture today; what is good today may not fit tomorrow. What do we keep, and how do we change?

There are two basic things I think we must keep, aside from solvency: namely, our relatively small size and our ideals of exceptionally high quality. To maintain both of these requires courage, judgment, and an exceptional capacity for *selectivity*. We must select our faculty and students with the greatest care. And we must select with great discrimination our areas of principal effort.

We *are* a university, since a university, by common definition today, is an institution with a strong program of graduate study and research. But being a university does not mean we are *universal*. We don’t do everything. We do a few things supremely well. We are a unique kind of university.

What things do we do?

There, of course, lies the problem. There are many things to be done. There are many things that are worth doing. The modern world is full of important and urgent problems. The world is full of wonderful opportunities to learn new things, to educate students in new ways, to be of great service to the community and to the nation.

How do we decide what to do—keeping in mind that whatever we choose to do we must do superbly well?

A thousand questions present themselves to us; a thousand problems, which the world faces, knock at our doors. You can name any number: smog, water,

transportation, urban living, human suffering, a better educational system, equal rights for all citizens, a better government, peace among nations, good will and understanding among all people—the list is endless. These are all problems which are proper for universities as a whole to study. Which do *we* choose?

First, we recall from past history that the most effective way to solve a problem is not always to tackle it directly. In fact, the great success and value of the university in our society is not that it attacks the great problems of our time. The task of the university is to seek knowledge and to educate students. The new knowledge and the trained and talented minds will solve problems—if they have a solution.

Our task at Caltech is not so much to select great problems to solve, but to select those areas of knowledge which seem to be *relevant* to the world of today and to which we can productively address ourselves and effectively introduce our students.

In this connection, the question is sometimes raised: Should we continue to be an “institute of technology”—a university oriented about science? Are not other areas of endeavor more important in the world of today?

Well, aside from the fact that to junk 75 years of history and gallop off in a wholly new direction would clearly be disastrous, I happen to believe, as I am sure you do, that science and technology are *more* and not *less* relevant to the world’s problems today than ever before. Not that there are not other critical fields of endeavor, too. But the sorriest parts of the world and of our own country are not the parts where there is too much technology, but too little. The most difficult problems we face in improving the lot of human beings do not arise because we know too much, but too little. Whether we talk about smog or cancer or transportation or population or food, or most any other human concern, we find lack of knowledge and lack of knowing how to use knowledge in science and technology. We lack knowledge in other fields, too, of course—but technology is still an important hope for the future.

Hence we must study it. And since technology rests on science, we must

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study it. And since we have proved in recent years that Caltech knows how to study science and technology effectively, it is rather nice to realize that we don't have to do an about face in 1967. I have several speeches on the cultural, social, economic, and other values of science and engineering—and also on the purely aesthetic and spiritually exciting values. I don't have to give them tonight. I trust I have made my point. There are plenty of reasons for us to remain Caltech.

"We shall continue our studies and teaching in the basic sciences: in mathematics, physics, chemistry, biology, geology, astronomy. These are fundamental fields of knowledge, they are intellectually exciting, they have enormous practical applications and potentialities."

But still not entirely just the Caltech of the past—for the past goes by fast in this fast changing world. We still must steer a course into the future.

Some choices for the future are easy. We shall continue our studies and teaching in the basic sciences: in mathematics, physics, chemistry, biology, geology, astronomy. These are fundamental fields of knowledge, they are intellectually exciting, they have enormous practical implications and potentialities—and all these sciences are teeming with new developments, new ideas, new discoveries, new opportunities. The studies we are pursuing in these areas do not much resemble what was going on in these sciences 40 years ago. And there have been great changes in the past 10 years. There will be great and unforeseeable changes in the coming years. If we maintain a faculty composed of highly imaginative and energetic people, we can be confident that we will move into new frontier areas as rapidly as opportunities arise. It is easy to name many subject matter areas now active on the campus which were all but unknown a few years ago: planetary science, molecular genetics, plasma physics, space science, behavioral biology, biological systems engineering, information science, quantum engineering, stellar nucleogenesis, quasars, strange particles—and so on.

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We cannot plan, we cannot foresee just what new topics will be on our agenda 10 years hence. We can only be alert, on our toes, flexible, able, and anxious to move into new fields as new opportunities arise.

In the engineering fields our task is a little different: The range of choice is broader, the opportunities more varied, the problems more complex.

Yet, even here, a well defined Caltech tradition seems worth continuing: We shall continue to stress those areas of engineering which are frontier areas, areas which are just emerging from the laboratories of science, areas where new technologies are in the making. Aeronautical engineering was not initiated at Caltech because it was a well established and "safe" area into which to move. Quite the contrary. It was new, it was risky; its future, though full of promise, was still unclear. A new approach was called for—an approach of new understanding based on mathematics and physics and careful basic experimentation. I do not need to remind you how this approach has paid off. Pioneering advances in basic aerodynamics, in structures and in fluid mechanics, new knowledge in the supersonic field, prime breakthroughs in jet propulsion—all have emerged from the Caltech laboratories.

Electrical engineering, too, has gone through a continuing series of transformations—from transformers and switchgear and motors, to high voltage technology, to vacuum-tube electronics, to solid-state electronics—to lasers, masers, plasma, computers, and information science. In many of these latter fields the future is wide open and exciting in its implications.

And so it is with other fields—the changes of the past and the excitement of the present provide the momentum and the opportunities for the future.

But let me pass on to another field—that of the humanities and social sciences. In the early days I think it is fair to say that we taught these subjects as fringe benefits to undergraduates—offered in order to help round them out, make them more articulate in speech and in writing, introduce them to the great ideas of the world's best thinkers, and help them be better citizens.

These are fine and currently valid objectives. But we now move a step ahead. These subjects are now *more* than a fringe benefit; they lie at the core of the professional training of the scientist or engineer. They become ever more important as the point of view of science and engineering veers from technology for its own sake to technology in the service of man. For

what is it that serves the needs of man? What are the great ideals toward which men strive? What is the place of beauty, of goodness, of high ideals in the life of men? What social, governmental, and economic institutions have been built to facilitate man's relations to his fellowman? How do these institutions work? Do they always work as well in an underdeveloped nation as in one with a highly developed technology and industry? What role do science and technology play in advancing the welfare of men? Can we use our scientific and engineering knowledge more effectively in seeking solutions to the world's problems? To the problems of men seeking a better life?

We believe that Caltech is in a key position to address itself more actively to some of these questions, both in our teaching and in our research.

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It is not difficult to see how we capitalize on present sources of strength and where we need new resources.

Consider what we now are doing to help us understand better the nature of man and the problems of his society:

- We are exploring the history of ideas—including the history of the impact of science and technology.

- We are exploring more deeply the basic nature of the human being—and of other related living creatures—to understand the physical-chemical processes involved in genetics, in disease, in the actions of the nervous system and the brain. We seek, in short, to understand the *science* of human behavior.

- We are studying—and are expanding our studies—about the relations between science and technology on the one hand, and the government, economics, the emergence of developing countries on the other.

- We have moved actively into the area of environmental health engineering—examining problems of water supply and pollution, waste disposal, the productivity and the resources of the oceans.

- We are building new techniques and new ideas in the use of data processing techniques and information theory to facilitate advances in science and engineering and applied mathematics, in studying chemical and biological systems, in helping to know better how to obtain, store, and use information more effectively in

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all fields of knowledge, and in many areas of human endeavor.

● In every field of science and engineering we are using interdisciplinary collaboration to focus attention on new areas of interest.

● We are offering to undergraduates the opportunity of majoring in humanities or social science—*after* a solid first two years of mathematics and science. We are trying harder to help our students achieve better educational opportunities, and a better start on finding a meaningful life.

As to our students, you may be interested in a statement made recently by a campus visitor, Professor Abraham Kaplan of the University of Michigan, in a taped interview with our Professor John Weir. Dr. Kaplan—a philosophy professor who has visited and lectured at some 100 college campuses in recent years—said "(The Caltech undergraduates) are the most intellectually mature undergraduates I've ever known . . . Whenever I think one is a senior, he's a freshman; and when I think he is a member of the faculty, he may be just a junior." He went on to say that they are not the "hard-nosed" or "scientific" type usually imagined. They are "tenderhearted," have fanatic desire to develop their human side, are less interested in discussions of the nature of science than in talking about God, morals, art, or beauty. These interests we must encourage too.

I could go on and on. But I want you to see that it is no idle boast or utopian dream when we say that the new thrust of our efforts at Caltech is epitomized in the phrase "Science for Mankind."

I say it is not a utopian dream. And yet every dream is a Utopia if we do not have the resources to back it up.

And here we come to one of the great dilemmas in American higher education. An institution without dreams and without new goals can quickly become an in-

tellectual wasteland—and can then quickly lose its sources of financial support. Yet, an institution which tries to pursue its dreams too rapidly can go broke in the process—unless it can find ways to persuade the public of the importance of underwriting those dreams.

The normal costs of pursuing educational and research activities in a typical private university are rising inexorably at a rate of seven to eight percent per year—even assuming a relatively fixed enrollment. Moving ahead into new fields, doing a still better job, of course, costs more. It costs more to provide new buildings, to modernize existing buildings; more for new endowment, for added operating expenses; more for faculty salaries and for new teaching and research equipment.

The sources of funds for private universities, and public ones, too, are not at the moment rising as rapidly as are the costs. Cutbacks and deficits are in the wind—and not only in the state of California. In most private institutions new and intensified fund-raising efforts are in progress. Goals of 50, 100, and even 200 million dollars for a fund drive are becoming commonplace for the leading private universities.

Caltech is no exception. Unless we can in the next five years secure between 75 and 100 million dollars in private gifts—exclusive of hoped-for federal funding—we cannot move vigorously ahead and cannot maintain our hard-won preeminence.

To achieve this task will require a new order of effort. It will also require a new order of collaboration between all elements of the Caltech community—students, faculty, administration, trustees, alumni, associates, and all old and new friends of Caltech throughout the community and throughout the country.

The basis for the new plans and the new efforts were laid by committees of the faculty and the trustees over two years ago. The preliminary endorsement of these plans came at a trustees' meeting in the fall of 1965. Final approval and implementation came a year later. The extensive organizational plans and procedures required were also firmed up at that time. A special alumni study group was then established. It reviewed our plans and made recommendations for achieving more intimate collaboration between alumni and the Institute. The recommendations are now in process of implementation. Committees of trustees and alumni and associates are now at work on soliciting advance gifts. Some of these have already been announced, including: a gift by Dr. and Mrs. Beckman of

\$2,225,000 to underwrite a new laboratory of behavioral biology; an anonymous gift of \$2,200,000 to complete the financing of a chemical physics building, now under construction; and a gift from trustee Earle Jorgensen to finance a radio astronomy laboratory at our Owens Valley Radio Observatory. There are other gifts and pledges in hand or in process to be announced later.

The public announcement of the launching of a nationwide campaign will be made next fall. A vast amount of groundwork must be achieved, of course, before a full-scale campaign such as this can be mounted. The organizational framework is being guided by our brilliant new vice president for development, Mr. H. Russell Bintzer. Arnold Beckman, as Chairman of the Board, will be in general charge. Si Ramo, another alumnus-trustee, will be national campaign chairman. Other committee chairmen have been named and are at work. Needless to say, it would not be appropriate to announce at this time plans which are still being formulated. It is, however, appropriate that I give to you, as alumni, a preview of what we are going to do.

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You will understand, I am sure, that the success of this campaign is critical to the whole future of Caltech.

It is not the purpose of this effort just to keep Caltech in the *status quo*—though it takes a lot of money just to do that. Nor is it the purpose to launch extravagant new enterprises to take us into the wild blue yonder. That would take at least twice as much as we propose to raise. It is a program to keep moving ahead, to maintain the forward momentum which has been generated in the past 47 years, and especially in the past 15 years. The funds we raise are not to make Caltech bigger, but to make it even finer. They will underwrite our determination to make Caltech a living, a productive, and a preeminent embodiment of our campaign motto—Science for Mankind.

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Editor: Bruce Abell, '62

Associate Editor: Janet Lansburgh

Photographer: James McClanahan