

Millikan, William B. Munro, and Lee DuBridge, is not for what the Institute has done financially or industrially for Pasadena, but for what it has done for the nation, for society, for all mankind in the realm where values are not measured by the standards of the clearing house and market place, but by the enlargement of man's knowledge, his penetration into hitherto unexplored mysteries of the universe, his command of forces that seem to lie within the borders of the Infinite.

How can we evaluate or adequately recognize contributions of such magnitude, contributions that the whole

world and all mankind will profit from not for a year or a decade, but, in some instances, at least, for as many generations as man shall live?

Of all Pasadena's many assets, the greatest and probably the most enduring is the California Institute of Technology. It is a city set upon a hill. "Neither do men light a candle and put it under a bushel but on a candle stick," said the great Teacher, "and it giveth light unto all that are in the house." For my purposes this evening I should like to shorten that last sentence so that it simply reads, "and it giveth light unto all."

## THE FACTS ABOUT CALTECH

by L. A. DuBRIDGE

THE TWO PREVIOUS SPEAKERS have told you about how Caltech has developed from an obscure manual training high school to one of the great scientific centers of the country. It is a fascinating—an almost unbelievable story. It is a story about which those of you who have been very close to Caltech through the years have been well aware. Sometimes you have been even painfully aware of it. A big and hustling neighbor with a big and sometimes noisy family is bound to attract attention. And people are bound to wonder what this neighbor is up to—and whether he is really as important as he thinks he is.

Tonight I would like to ask you for a few moments to forget you are Caltech's neighbors. Let's pretend you are a stranger to the community—as I was a stranger just five years ago. Suppose you had never before heard of Caltech but were curious to find out about it. Suppose you came to me and said, "Look, I don't want any of your sales talk. I want the real facts about Caltech. What is Caltech's place in the field of education? What has Caltech done for the community and what has it done for the country?"

All right, let us look at a few facts. First, what is Caltech's place in the educational world?

First I take from my shelf the yearbook of the Association of American Universities. This is an organization of 37 of America's leading universities, each individually selected after a careful examination of the quality of its educational and research program, the quality of its faculty, the adequacy of its physical facilities. The membership list includes all the big name universities—Harvard, Yale, Princeton, Columbia, Cornell, Michigan, California, Stanford and the rest. Caltech has been a member of the A.A.U. for many years. Caltech is the only member whose student body numbers

less than 4000 students. We have hardly more than 1000.

Why is Caltech classed as a *university* at all?

That is an interesting point, too. A Commission of the A.A.U., of which Wally Sterling and I are both members, has been making a statistical study of all the institutions of higher education in the United States—some 1700 of them. It was found necessary for various purposes to attempt a classification of these institutions—and in view of their very diverse nature this proved to be quite a task. But they finally ended up with the following classes: junior colleges, liberal arts colleges (like Occidental and Whittier), complex liberal arts colleges (like the Claremont group and a few others), separate professional schools (schools of medicine, of law, of theology, etc.) and universities. When all the schools had been sorted out into these classes there were two left over; M.I.T. and Caltech. They did not fit the class of separate professional schools which typically offer one degree for a fairly specific curriculum of study. On the other hand, most universities have a whole collection of schools and colleges—law, medicine, engineering, agriculture, journalism, liberal arts and so on. But there is one distinguishing feature of a university—a substantial program of graduate work and research. Caltech and M.I.T. certainly have these—so they were classed as universities.

So the educational world then recognizes Caltech as an important center of graduate work and research. What other evidence is there in this direction?

The next volume I take off my shelf is the membership list of the National Academy of Sciences. This organization was chartered by the U. S. Government under President Lincoln to advise the government on scientific matters. The Academy elects its own membership and restricts it to only 450 men and women in the

whole country who have reached eminent positions of leadership in some field of science or engineering. Since there are at least 45,000 professional scientists in the country who might be eligible for election, you can readily see that only one scientist in 100 is a member of the Academy. There are about 300 scientists and engineers employed on the Caltech faculty. If the national average held, we should expect three of these men to be members of the Academy. The actual count is not three—but twenty-seven—nine times the national average. And, incidentally, one of the greatest figures in the history of the Academy during the past forty years, one who played a commanding role in guiding its critical role before, during and after World War I was Robert A. Millikan. And his close companion during those years in Academy affairs was that other great Pasadenaan—George Ellery Hale.

### Higher education and the war

I think everyone agrees that never in the history of this nation was the value of the nation's system of higher education more conspicuously exhibited than during World War II. Every institution placed its facilities loyally at the disposal of the government for training officers and technicians and for military research. There is hardly a college professor in the country who was not either in the service, or employed as a specialist by the government or engaged in one of these college and university programs of training or research. And what were the major or most spectacular achievements of American science in the field of new weapons of war? Everyone knows the answer. The atomic bomb, radar, the proximity fuse and the artillery rocket. The proximity fuse came largely out of the Carnegie Institution of Washington—a private research laboratory in Washington, D. C. at which several Caltech professors were engaged in the early stages. The principal university participators in the atomic energy program were the University of Chicago and the University of California. Radar came out of M.I.T.—and rockets from Caltech.

To whom does the Defense Department now turn as the present cold war gets warmer and as the needs of the military for scientific help get more critical? Again it turns to all universities and especially to those who rendered such conspicuous service before. Again it turns—with confidence and with expectations which are almost frightening—to Caltech. And again Caltech is prepared—far better prepared because of its recent experience than it was ten years ago—to render what assistance it can, in education and in research to contribute to the present and future welfare and security of this country.

And Caltech's services go far beyond what it does on its own campus. For sixty years—and more especially during the past thirty years—Caltech has been bringing to its campus each fall as freshmen some of the finest and most talented young men that could be found among the country's high school graduates. And after four years they have gone out to take their places in the

world of science or engineering or industry or government service. And each year hundreds of graduates of this and other colleges all over the country come here for graduate-training and earn master's or engineer's or doctor's degrees. And so in every major government defense laboratory, in almost every major industrial laboratory, in scores of colleges and universities, Caltech alumni are advancing the fronts of science and engineering and are putting their knowledge to work to advance the welfare of mankind everywhere and to advance the science of their nation.

And as Caltech serves the nation it also serves its own community. Each airplane that comes out of a Southern California factory and flies from Los Angeles to all points on the globe is a better airplane because of knowledge of aerodynamics and aircraft design and structure which came out of Caltech laboratories. When you turn on your water faucet and draw a plentiful supply of pure water you can thank in part a group of Caltech engineers who helped lay out the Metropolitan Water District system and who helped design more efficient pumps to bring water from the Colorado River. When you pay your electric light bill remember that it would have been at least a little bit larger but for the work of the Caltech million-volt laboratory which helped make possible and economical the transmission of electric power over great distances. And some fine day a few years hence when you sniff the fine air of Southern California and find that smog is no longer the ugly irritant it once was, give a little prayer of thanks to a couple of Caltech professors whose ingenious work uncovered the chemical nature of the specific ingredients of smog which made it so unpleasant and so damaging to plants and animals and men.

### Second to none

Yes, Caltech has come a long way since the day sixty years ago when Father Throop established in what was then a little town of 5,000 inhabitants a little school of mechanical arts. It has come a long way since that day in 1910 when President Scherer, in dedicating the new campus on California Street, said bravely to the entire student body of 40 students that Throop Polytechnic Institute was then embarked on a program aimed to make it a college of science second to none in the country. Brave words, indeed. And there must have been many who smiled and shook their heads at this boastful bit of academic fantasy. But it was not fantasy but prophecy. For already in 1910 President Scherer had enlisted the vigorous and farsighted interest of George Hale and those who knew George Hale knew he was a man who made his visions come true.

Caltech owes much to George Hale. It owes much to many another citizen of Pasadena and Southern California. It owes much to this entire community, for it is your institution. You, the citizens of this area, created it. You, the citizens of this area, support it. It will go on to greater achievements in exact proportion to your continued confidence and support.