



# The Inaugural Address

by Thomas E. Everhart

*Caltech:  
People  
and an  
Institution  
in Pursuit  
of Excellence*

**Robed in the academic garb of Cambridge University, where he earned his doctorate in engineering, Thomas Everhart pauses in the procession to his presidential inauguration ceremony on April 12.**

I accept the honor and the responsibility of the presidency of the California Institute of Technology with both enthusiasm and humility. I am enthusiastic about this institution, what it has accomplished, and what it can accomplish in the future. I am humbled by my profound respect for the quality of my predecessors and what they have achieved. I am grateful to the Board of Trustees and to the Faculty Advisory Committee for this opportunity to serve Caltech, and to the Board, faculty, students, and staff for the warm welcome my wife, Doris, and I have received here.

I am also grateful to many former associates and friends who have come to share this occasion with us, and to delegates from sister institutions who honor us with their presence. I ask your help as I assume these duties, for I have learned that no one succeeds in life without a great deal of help from others. I have been fortunate to work with some superlative people throughout my career—teachers and fellow students in school, college, and graduate school; colleagues at Hughes, Ampex, and Westinghouse Research Labs; faculty colleagues, students and staff at Berkeley, Cornell, Illinois, and now Caltech; and colleagues from foreign universities, professional societies, and advisory committees. And a special word of thanks to my former graduate students, whose hard work, intelligence, and inspiration have often pushed me to the limit. Many of you have come to share this day with us, and I thank you for the help you have given me over the years. My family has been wonderfully supportive as well, and I am glad so many of them can be with us today.

Universities are among the most important of social institutions. Some have said that universities are such storehouses of knowledge because the freshmen bring so much with them when they come, and take so little away when they leave. I read not long ago that there are 62 social institutions in the western world that have been in continuous operation since 1530, and 58 of them are universities. In 1530, the purpose of universities was to preserve and interpret knowledge through the scholarship of those who professed to know—the professors—and to communicate that knowledge to the coming generations—the students. Since 1530, both the nature and the mission of universities have changed. In fact, over a century ago, Thomas Huxley commented that “The medieval university looked backwards; it professed to be a storehouse of old knowledge . . . . The modern university looks forward, and is a factory of new knowledge.”

But notice that even Harvard, our oldest U.S. university, founded in 1636, misses being in this select group of 58 continuously operating universities by more than a hundred years! Indeed, the higher education system in this country, which in recent times has been the envy of much of the world, is relatively young. Some of the most distinguished institutions have been in existence for only about a century. Many of our large state institutions owe their existence to the Morrill Land Grant Act of 1862, including three institutions that I have served. These institutions have provided educations to much larger numbers of students than could be accommodated in



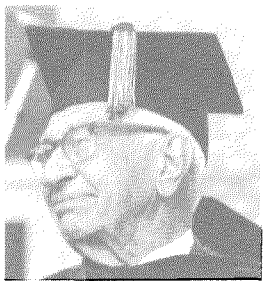
the private colleges and universities of the country, and some of them have become very distinguished in their own right. The private universities, on the other hand, have had more freedom to experiment and to innovate, be it the house system for undergraduate living at Harvard, the "great books" curriculum at St. Johns, the stimulation of and collaboration with industry that led to Stanford's Industrial Park, early computerization of the campus, as at Dartmouth, or the focus on a few important subjects, which has been the hallmark of Caltech.

From President Rhodes of Cornell, I learned how important the traditions and heritage of an institution can be to its march toward further accomplishment. The heritage of the past is the foundation upon which we build the achievements of the present and our vision of the future. Let us consider our heritage here at this institution. Picture if you can this vast area of Los Angeles, devoid of houses, freeways, and other aspects of inhabitation by mankind. This was the scene in 1771 that greeted the Spanish founders of Mission San Gabriel, which still exists a short distance from this spot. One hundred twenty years later, as the population of settlers was increasing, Amos G. Throop founded a school of arts and crafts in Pasadena. Since its early days, under a variety of names, it has enjoyed the support of local citizens, and distinguished members of the community have served on its Board of Trustees. The vision of some of these early Board members, and especially that of George Ellery Hale, an astronomer and first director of the Mount Wilson Observatory, was

the inspiration for the modern Caltech. "We must not forget," he wrote, "that the greatest engineer is not the man who is trained merely to understand machines and apply formulas, but is the man who, while knowing these things, has not failed to develop his breadth of view and the highest qualities of his imagination."

Arthur Amos Noyes, professor of chemistry and formerly acting president of M.I.T., came here part time in 1913 and full time in 1919. He, together with George Ellery Hale and others, persuaded Robert Andrews Millikan to come after World War I, first on a part-time basis and, after 1921, full time. Hale, Noyes, and Millikan were really the founding fathers of the modern California Institute of Technology, as this institution has been called since 1920. The distinguished anthropologist Margaret Mead has said: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has." These three citizens, Hale, Noyes, and Millikan, backed by the Board of Trustees and other friends of the Institute, started a climb toward excellence that Caltech has pursued ever since.

Millikan served as administrative head of the Institute from 1921 until 1945. When he came, 1 PhD student had graduated from the Institute in its entire history. As few as 5 and as many as 30 bachelors students were graduating each year. And, masters students ranged from 1 to 3 annually. In his first decade, 937 students received bachelor of science degrees, 127 received master of science degrees, and 123 received PhDs. In his last decade, the number

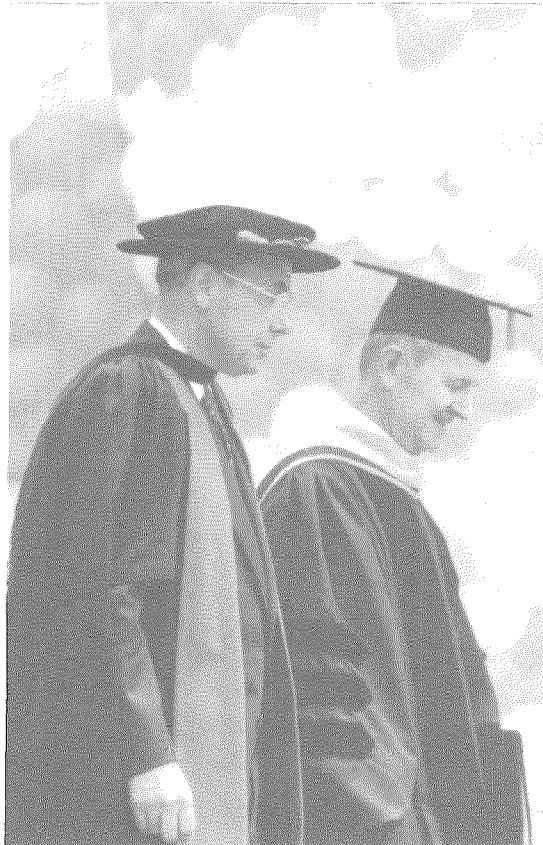
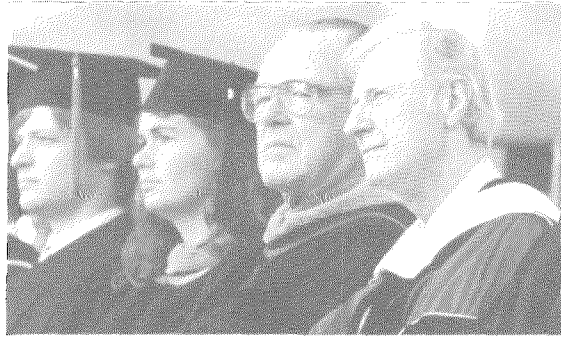


**Lee A. DuBridge, Caltech's president from 1946 to 1968, listens to his third successor.**



Among those who extended an official welcome to the new president were (from left) Sam Weaver, president of the Associated Students of Caltech; Lynn Hildemann, chairman of the Graduate Student Council; the Hon. John C. Crowley, mayor of Pasadena; and Frank H. T. Rhodes, president of Cornell University, who spoke on behalf of academic institutions and learned societies.

Below: Everhart and Ruben F. Mettler, chairman of the Board of Trustees, leave the podium against a festive backdrop.



*We should remember that a few thoughtful, committed citizens can still change the world.*

of students who received bachelor degrees had grown slightly (to 998), the number who had received master's had grown over three and a half times (to 461) and the number who had received doctorates had more than doubled (to 263). Let me put this in better perspective, for this was a time of rapid growth in graduate higher education in the United States. In Dr. Millikan's first decade, Caltech graduated about 1.6 percent of all doctorates in the country in the fields in which it taught. In 1941, the last year before statistics were disrupted by World War II, Caltech graduated 1.7 percent of all doctorates in these same fields of science and engineering. Since that time, under three successive presidents, and in a time of continued growth in graduate education, Caltech has continued to graduate over 1 percent of all the PhDs in the United States, aggregated over those fields of science and engineering in which it participates. Like all Caltech graduates, these graduates have become known for their quality.

How was this accomplished? What were the guiding principles that led to the Caltech of today? Shortly after he came to Caltech, at the acceptance ceremony for the Norman Bridge Laboratory of Physics, which he directed, Dr. Millikan stated the ideal of the California Institute of Technology. It was: "... an ideal not very common in American educational institutions, an ideal not of large growth in numbers, nor of the extension of the field of study over a large range of subjects, but rather the ideal of doing work of superlative quality in the chosen and relatively limited field of the Institute's



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activities—the cultivation of the mathematical and physical sciences and their applications.” He went on to insist that “there is tremendous need in the United States for some schools which are designed to furnish exceptional opportunities and to give exceptional training to exceptional men.” This was to be accomplished by providing the students access to an unexcelled staff. “Four-fifths of all teaching is the teaching of example. Creative men arise spontaneously in an atmosphere in which creative men exist and in general nowhere else.” (Note his emphasis on appropriate role models here, a need still present today.) Finally, he urged “. . . the cultivation of science together with the cultivation of a belief in the reality of moral and spiritual values.” His hope was to create “. . . at the California Institute of Technology, not only . . . men with the highest technical skill, but . . . men of the finest character and of the broadest citizenship.” Today I would amend that only by emphatically stating “men and women” where Dr. Millikan used the word “men.”

The curriculum was expanded from engineering, chemistry, and physics to include geology, and economics, history, and literature (in 1925) and biology (in 1928). Although the Institute has grown somewhat over the succeeding decades, and the fields of study and research have advanced to keep up with, or indeed, have often led the popular subject matter of the times, the structure that Dr. Millikan and his colleagues established has persisted.

In 1946, Dr. Lee DuBridge became the second chief executive officer of the California

Institute of Technology, and its first president. Like Millikan, he assumed office shortly after a great world war, a war that had had an impact on him. He vowed to follow the lead of his predecessor and enhance the faculty and the facilities that were needed to do the work of the Institute. He was tremendously successful. The number of faculty more than doubled, the number of buildings and the budget more than tripled, and the endowment grew by more than a factor of five. In his last decade at the Institute, while the number of bachelor degrees granted had remained constant, the number of PhDs granted was up three times from the last decade of his predecessor. Dr. DuBridge is the senior statesman of the California Institute of Technology. It is a real honor for me to have him with us today.

In the past two decades, two other presidents, Dr. Harold Brown and Dr. Marvin Goldberger, have presided over this institution; and it has continued to excel under their leadership. Modest growth has occurred, particularly among post-doctoral students. But, quality—not numbers—has been the key to our continued success.

Some reasons for that quality have become apparent to me through informal meetings with students. Undergraduates like the small size and the sense of community at Caltech, where they can know all their fellow students and many of the professors. They like the honor code, and the fact that they are treated as if they are important individuals. They appreciate knowledgeable professors who are leaders in their fields, and they are enthusiastic about the oppor-

**The new president embraces his daughter, the Rev. Janet Everhart, who gave the invocation and benediction.**



tunity to do research, for example, through the Summer Undergraduate Research Fellowships (SURF) program.

Graduate students appreciate the excellence of their faculty mentors, their fellow students, and the superior facilities. They also appreciate the sense of community—and the new graduate student housing which allows a majority to live within walking distance of the campus.

Both groups find Caltech to be an intense place, where they are learning a great deal, both through their education and through their experiences here. They seem intrinsically able to understand the difference between education and experience, as stated by that great natural philosopher, Pete Seeger, who said: "Education is what you get when you read the fine print. Experience is what you get when you don't."

And so today, when more scientists and engineers are discovering new knowledge and creating new technology faster than ever before, and when size is often equated with greatness, what should be our future role at the California Institute of Technology? Besides continuing to stand for quality, we should continue to focus on a few important areas, and should aspire to be second to none in these areas. If we are to stay small and vital as science and technology change, we may need to phase out certain topics as we carefully choose which new and more important ones to emphasize. As an institution, we shall need to reassess our priorities. In doing so, we should keep the following points clearly in mind.

●First, we should remember that a few thoughtful, committed citizens can still change

the world. We have a good supply of such people among our faculty, students, and staff, and we can make a *difference*—a *big difference*.

●Second, we should remember Hale's reference to breadth of knowledge as well as depth, and the importance of imagination. New discoveries are liable to be made by people who know more than the details of a single field; and to augment our imaginations, we have tools of unprecedented power with which to do our calculations, make our measurements, and visualize our results.

●Third, we must remember that we shall need support to accomplish our goals. We need to continually remind society that our work and our accomplishments are important to the future of our region and of our nation. Caltech has always returned good value for resources entrusted to us, and we must continue to do so.

●Fourth, we live in times of unprecedented change, and we should be ready to seek out the new and important challenges that have long-lasting implications, and meet them head-on.

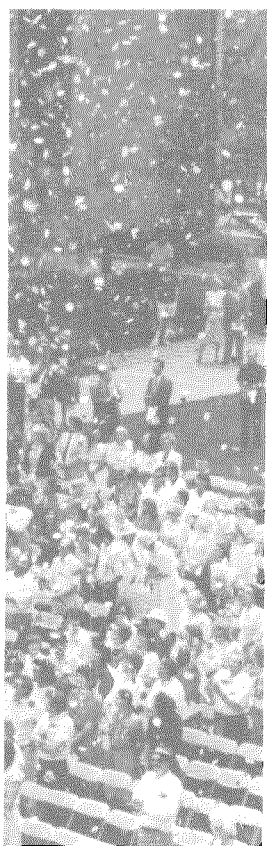
●Fifth, we shall continue to excel only if we attract to our midst the most imaginative, innovative, intelligent and industrious faculty and students, and continue to provide them with the facilities and stimulation to excel.

●Sixth, we need to remember that people think both quantitatively and subjectively. Our students need to be taught both methods. We use primarily quantitative reasoning in mathematics, science, and engineering, although intuition and imagination play an important role. But in dealing with people, with their senses and emotions, subjective reasoning is very important. It may be possible to quantify the smell of a rose, the art of Van Gogh, or a symphony by Beethoven, but most of us don't really care about that sort of quantification. We *do* care about the impact a rose, a painting, or a symphony has on our senses—and the emotional lift they give us. People, individually and collectively, are important to each of us as we go through life, and we need to understand how to interact, and how our predecessors have interacted in earlier times. Hence, lessons from the humanities and social sciences are essential to our development. That is why previous presidents have stressed the importance of the humanities, the arts, and the social sciences to our students, and that is why I reaffirm that importance today.

●Finally, we need to constantly remember that people and knowledge are our two most important products. The students who entrust their futures to us for undergraduate study or for graduate education deserve the best that we can



**Members of the new president's family occupying front-row seats for the ceremony included his wife, Doris (third from left), son John, daughter Nancy (second from right), and niece Amy Harrison (right). Also seated with the family party were Shirley Gray (left), Mabel Beckman (second from left), and Tammy Schmit (center). On the opposite page Everhart and Trustee Arnold O. Beckman stand during the proceedings.**



provide. They carry away new knowledge, understanding, and maturity when they leave us. Likewise, the contributions to knowledge that we learn through research and scholarship and that we communicate to others through conferences, papers, and books become part of the ever-growing foundation of human knowledge. Through these people and through this knowledge we build upon and, we hope, improve upon the heritage and culture which we have received.

Last November, I read a book about astronomy at Caltech entitled *First Light*. Although it was about science, it dealt more with people, the scientists who thought and taught astronomy, who built equipment to find out what and where the myriad stars we see on a clear night really are. I was delighted to learn recently that this book has won the 1988 American Institute of Physics award for the best book about physics for the layman. I was so taken by *First Light* that I wrote a letter of appreciation to the author, Richard Preston, whom I had never met. In the delightful letter he wrote me in reply, one paragraph seemed to catch the spirit of Caltech. Keep in mind that this was written by someone who had been educated elsewhere, and who had observed Caltech only as a subject for his book.

"Caltech is a unique place with a style all its own, like nothing else on earth—a small institution made up of real people, with all their complexities, and yet Caltech has had, and still has, the daring to build telescopes and instruments that leap beyond anything anybody has ever tried before, using private money, private initiative. In some sense, my book is a story of the best

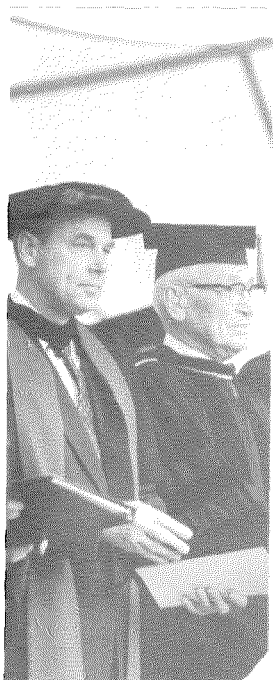
and most ambitious things that human beings can accomplish."

Today, we hear concerns about economic competitiveness. We are still recovering from the Challenger disaster. Our grade schools and high schools are not as competitive as we would like. We cannot find the will to balance our national budget. There are serious conflicts in several places in the world. In times like these, there need to be a few places that look ahead and still dare to do the most ambitious things that human beings can accomplish. Caltech still has that ambition and that daring.

With the generous support of the Keck Foundation, we presume to build the world's largest optical telescope. With our colleagues from the University of California, who will provide the operating funds for the first quarter century for the Keck telescope, we shall be looking farther into space and with higher resolution than ever before.

We broke ground yesterday for the Beckman Institute, which will be the largest building to be constructed on the Caltech campus. It will bring together some of our most distinguished chemists and biologists for research that increasingly depends on the expertise from both disciplines. Just as Dr. Beckman has made many key contributions to our society through his inventions, I predict that future key advances in science will be made in the Beckman Institute. Caltech is grateful for the support of all our benefactors, who, like the Beckmans, have shared our dream of a better tomorrow through vitality and excellence in science and technology today.

*We have returned good measure to society, both in the results of our research and in the young people who have gone forth with an excellent education to make their mark upon the world.*



And this dream continues. In a new option, computation and neural systems, faculty from several divisions are building neural networks using integrated circuit technology to create artificial eyes and ears, for example. Others are studying more deeply how neural systems work in order to improve how future generations of computers may work. This active comparison of biological systems, created by evolution over millions of years, with artificial systems, which humans are creating in weeks and months, promises important new insight into both.

Our physicists are developing new theories that may help explain the fundamentals of matter and what happened in the first few microseconds of the "big bang" which we believe took place at the start of our universe. Our biologists are developing new instruments that make it possible to sequence genes, and to know the genetic and regulatory codes that make humans distinct from other species and one person distinct from another. Developmental biologists are also seeking to discover how complex entities like human babies develop from the information stored in a single cell. Our chemists are synthesizing new organic compounds, and measuring the dynamics of chemical reactions at unprecedented speeds. Our geologists are studying the interior of the earth, as well as chemical reactions important in outer space. Our engineers are developing new computers, new robots, new methods of simulation and visualization, as well as new understanding of the principles on which the machines of our civilization rely. We live in the most exciting age in the history of

mankind, and we in research, we in academia, we at Caltech, are at the center of the action.

Caltech has striven for excellence in research and teaching since its name was changed to the California Institute of Technology in 1920. It has been blessed with an extraordinary Board of Trustees. Excellent faculty, students, and staff, have been chosen to work here, and have elected to do so. The opportunities for research and education here are outstanding, and the members of the Caltech community have worked hard to take advantage of those opportunities. In a society often worried about how to use its leisure time, the people of Caltech have remained work oriented and accomplishment driven. The society around us has been most supportive. Alumni, Associates, friends, foundations, corporations, and government have all provided resources which have been essential in helping us reach our goals. And we have returned good measure to society both in the results of our research and in the young people who have gone forth with an excellent education to make their mark upon the world.

We have made explicit contributions to the nation through the Jet Propulsion Laboratory, most recently in space exploration, one of the most exciting endeavors of our age. The aerospace industry of this region has benefited from our activities, as have many other industries. From the depths of the earth, which moves in frightening ways sometimes, to the depths of outer space as seen through our telescopes, we have tried to understand and to elucidate the forces of nature. We have also used our knowledge, understanding, and ingenuity to try to harness these forces of nature to serve all mankind.

Richard Preston ended his letter to me by telling how generous the people he had met had been, and how they trusted him "to tell the story right." His final sentence reads: "What kept me striving was my respect for Caltech itself: Caltech *deserved* the very best work that I could offer as a writer." After my seven plus months here, those words are very meaningful to me. What will keep me striving in the months and years ahead will be my respect for the example set by my predecessors, the traditions established over time by the remarkable men and women who have helped Caltech become what it is today, and the sense that there is even more that needs to be accomplished for our society in southern California, for this great nation of ours, and for the world at large. Caltech deserves the very best that I can offer as a president, and with your help, I shall try to be worthy of the task. □