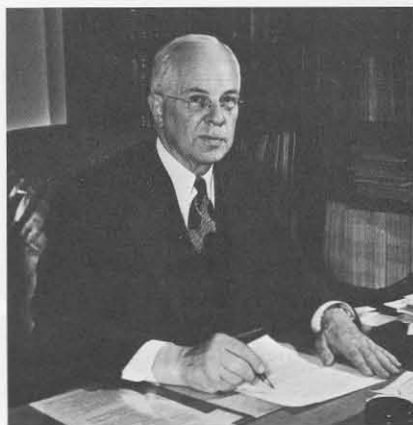


Robert L. Daugherty

1885 - 1978



Robert L. Daugherty's association with Caltech extended over 74 years—beginning in 1904 when he enrolled as a student in Throop Polytechnic Institute, and including 37 years as professor of mechanical engineering and 22 years as professor emeritus. He died on August 20, 1978, just 19 days short of his 93rd birthday.

He was born on September 14, 1885, in Indianapolis, Indiana, and later his family moved to Pasadena where he attended, and graduated from, Pasadena High School. He received an AB degree from Stanford University in 1909 and served as instructor during the academic year 1909-10. He was then appointed to the staff of Cornell University, where he served for five years. In 1916 he became professor of hydraulic engineering at Rensselaer Polytechnic Institute and in 1919 joined the Caltech faculty (still Throop Polytechnic Institute at that time) as professor of mechanical and hydraulic engineering.

In these 47 years of teaching Professor Daugherty inspired several generations of engineers both in his classes and through his writing. He was the author of 29 technical papers and 3 books. His very successful textbook *Hydraulics* was first printed in 1916 and, in an updated form, is still in print. Many thousands of students have found this book an excellent introduction to the subject, and

Professor Daugherty explained its success by pointing out that when he arrived at Cornell University, he was assigned to teach five sections of hydraulics. After two years of this intensive teaching he knew every question a student could ask about hydraulics, and he wrote his book so as to answer all of those questions.

Professor Daugherty was a man of great energy and hard work, and this was evident throughout his career. He went to Cornell with the rank of instructor, expecting to work for an advanced degree. However, during his first year, he was promoted to assistant professor, which made him ineligible to receive an advanced degree from Cornell. As a special favor, Stanford University permitted him to register as a graduate student for two years and waived the residence requirement. He reported to Stanford upon his research and submitted a thesis for which he was awarded the ME degree. His thesis was published by the McGraw-Hill Book Company in 1913 under the title *Hydraulic Turbines*, and this established him as a leading expert in the field. His second book, *Centrifugal Pumps*, was published in 1915. Publication of *Hydraulics* in 1916 meant that within seven years of graduating from college Daugherty had published 3 books and 8 technical papers.

In his long association with Caltech,

Professor Daugherty accumulated a vast fund of anecdotes that he enjoyed recounting. One of these stories dealt with the inauguration of the Athenaeum. When the building was completed in 1930, a formal inaugural banquet was held. Professor Daugherty showed up at the affair in his tuxedo and was met by an agitated Dr. Millikan, who said, "It is too cold for the ladies in their formal dresses, and no one knows how to start the furnace. Can you do something about it?" So Professor Daugherty went down in the basement and tried to figure out how the furnace could be started. By the time he succeeded, adjusted the temperatures, and returned upstairs, the food had been served and the banquet completed—so his participation in the inauguration of the Athenaeum consisted of serving as a full-dress stoker in the basement.

Professor Daugherty took his teaching very seriously and much enjoyed his contacts with the students. William Holladay, '24, tells how Professor Daugherty handled his class following a tonsillectomy. Daugherty never willingly missed a class, so even though he was unable to speak after his operation, he came to class, stood at the blackboard, and had the students ask him questions. Then he wrote the answers on the board.

In addition to his academic life he pursued an active professional career, serving as consultant on many important engineering projects, most of which involved in some way pumps or turbines. In the 1930's, together with his colleagues Theodore von Kármán and Robert Knapp, he served as consultant on the design of the precedent-setting water pumps for the Colorado River Aqueduct. At that time, this was the largest pumping project in the world, and it has since played an important role in the development of southern California. Later he served as consultant on the design of the 65,000 hp pumps for the Grand Coulee Dam and Irrigation Project

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on the Columbia River, which in the 1940's became the biggest pumping project in the world.

The consulting that gave Daugherty the greatest personal satisfaction was his solution of the ventilation problem on the Moffat Tunnel of the Denver and Rio Grande Railroad. The tunnel was at that time the longest in the world used by steam locomotives. Professor Daugherty was called in when it was found that the ventilation system could not clear the tunnel of smoke and exhaust gases. When he analyzed the situation, he perceived that a train passing through the tunnel could be thought of as a large loose-fitting piston pushing air ahead of it. He could also see that if the ventilation system were to be operated so as to take advantage of the piston effect instead of opposing it, the problem could be solved. This consulting project led to the publication of a paper, "Piston Effect of Trains in Tunnels" (*Trans. Amer. Soc. of Mech. Engr.*, Vol. 64, 1942), and in a discussion of the paper the chief engineer of the railroad stated that not only did the solution provide adequate ventilation but accomplished it at a 35 percent reduction in operating cost.

In 1946, following World War II, the first evidences of southern California smog appeared, and Professor Daugherty immediately became interested in the problem. In 1948 he was appointed chairman of the advisory committee to the hearing board of the Los Angeles County Air Pollution Control District. After his retirement from Caltech in 1956, at the age of 70, he served for 17 years as a full-time member of this board, and it was largely due to his good advice that the problem of industrial contribution to the smog was solved in an efficient and cooperative way.

On the occasion of his 90th birthday party, which was celebrated at the Athenaeum in 1975, he mentioned in the course of the conversation that he had not yet requested his annuity

payments to begin—after all, the salary he received for serving on the hearing board was greater than the salary he had had as professor at Caltech and he did not need the money. What the Teachers Insurance and Annuity Association made of an annuitant who had not yet started collecting pension payments at the age of 90 can be imagined.

In recognition of his many professional achievements he was made a Fellow of the American Society of Mechanical Engineers. He always took great satisfaction in his membership in professional societies, particularly ASME, the American Society for Engineering Education, Society of Sigma Xi, and Society of Tau Beta Pi.

Another side of Professor Daugherty's career involved the development of the city of Pasadena. He served on the city's Board of Directors from 1927 to 1931, and he was Mayor from 1929 to 1931. These were particularly difficult years for city governments and were especially difficult for Pasadena. The new City Hall had been constructed on Garfield Avenue, and the new Central Library building had been constructed at the north end of that street. To complete the project an auditorium building was to be built at the south end. Although it was in the midst of the depression years, Professor Daugherty worked out a successful financing plan, and the resulting Pasadena Civic Auditorium became the nucleus for many future developments in the downtown area. He received a number of citations for his contributions to the city of Pasadena; the most recent was presented in the spring of 1978 by the Pasadena Beautiful Foundation.

One of the stories Professor Daugherty told about some of his duties as mayor had to do with a throw-away newspaper that started up in Pasadena during his term of office. This paper tended to publish the more libelous news items, and Professor Daugherty noticed that though many of those

dealing with the city government were erroneous, they were nevertheless generating unhappiness among the citizenry. So he went to the newspaper office to discuss the problem. The editor explained that all the news items were typed up on slips of paper and put on a spindle on his desk; when he needed filler for the paper, he took the items off the spindle. He then claimed that he did not have time to check these items for accuracy or truthfulness. Said Daugherty, "If you don't object, I will check them for you." From then on, every Monday morning, Professor Daugherty stopped in at the editor's office, went through the slips on the spindle, and threw those that he did not approve of in the wastebasket. He considered this a great contribution to harmonious city government.

Professor Daugherty married Marguerite Rayner in 1932. Together over the years they maintained a special interest in Caltech students and other members of the Caltech community. They were hosts at many parties, and they attended almost all Caltech functions. On Alumni Day each year he was always the first on hand to greet those who came to campus—not only those he had known during his tenure as a faculty member, but also younger alumni—on behalf of Caltech, the Alumni Association, and the Gnome Club. He was at the 1978 Alumni Day on May 13, attending the seminars and, at the end of the day, joining the 1953 class reunion in Millikan Board Room.

His friends all agree that Robert Daugherty was an unusual man. He was a "gentleman of the old school," an exceptional writer of textbooks, an innovative and productive engineer, an unusually effective leader in our community, and an inspiration to many generations of students. Few institutions have had the good fortune to claim the allegiance and active support of such a man over a span of so many years. □