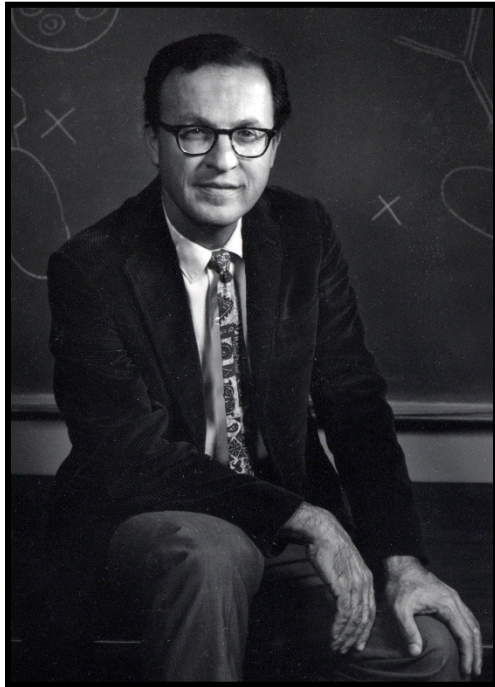


# DONALD GLASER

CALTECH  
AND BEYOND



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THE CALTECH ARCHIVES

## The Papers of Donald A. Glaser

The Caltech Archives is pleased to announce receivership of the papers of Nobel Prize winner Donald Glaser. The papers, which include Glaser's work on his award-winning invention of the bubble chamber—which allowed scientists to study subatomic particles—have been processed and are being digitized, and once completed will be made available for instructional and research purposes.

Donald A. Glaser, PhD '50, was one of the most innovative and progressive scientists of the 20<sup>th</sup> century. From his invention of the bubble chamber to his pioneering role in molecular biology and his leading contributions to visual neuroscience, Glaser has advanced many of our most important frontiers of scientific discovery and technological progress.

### Credits:

#### *Caltech Archives:*

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## CALTECH FACULTY IN THIS EXHIBIT

### Richard Chace Tolman (1881 - 1948)

Tolman, who accepted a position at Caltech—and where he would remain for the rest of his academic career—served as professor of physical chemistry and mathematical physics, as well as held the position of dean of the graduate school. Early in his career, Tolman became interested in relativity theory. And his scientific work between the two world wars included statistical mechanics, relativistic thermodynamics and cosmology.

During WW II, Tolman had major responsibilities in the joint efforts of science, industry and the military, serving as vice chairman of the National Defense Research Committee (NDRC), as General Leslie Groves' scientific advisor on the Manhattan Project, and immediately after the war as chief technical advisor to the US delegation to the UN Atomic Energy Commission.

### Robert Andrews Millikan (1868 - 1953)

Millikan, best known as an experimental physicist and for his famous oil drop method, which enabled Millikan to establish the long accepted value for  $e$ —the elementary unit of electrical charge—pioneered investigations into the photoelectric effect and gave important support to the quantum theory of light. For these achievements he was awarded the 1923 Nobel Prize in physics. His prime role here was to guide the growth and development of the California Institute of Technology for twenty-five years (1921 - 1945); and together with his two close associates, the chemist Arthur A. Noyes and the astronomer George Ellery Hale who shared the same vision, made Caltech and Pasadena an important intellectual and scientific center.

With the advent of war in Europe in 1939, Millikan believed that the United States could not, and perhaps should not, avoid involvement. Under his prodding, Caltech geared itself to wartime pursuits. The aircraft industry of Southern California relied heavily upon Caltech for research and development of a broad range of critically-needed devices. A program to develop and manufacture armed rockets was begun, leading to the creation of the Jet Propulsion Laboratory (JPL). In 1945, at the end of the war, Millikan officially retired but continued to be active in the affairs of Caltech as well as to pursue his scientific and civic interests.

### Carl David Anderson (1905 - 1991)

In 1923, Anderson entered Caltech as a freshman, intent on studying electrical engineering, until he took a course with Ira Bowen and changed his major to physics. He would stay on at Caltech to do graduate work under Robert Millikan, receiving his PhD in 1930, as well as an additional postdoctoral year to conduct experimental research on cosmic rays, also under Millikan's supervision. Anderson's work with cosmic rays led to his discovery in 1932 of the "positive electron," later named the positron. For this work, Anderson would be awarded the 1936 Nobel Prize in physics, at the age of only 31. In 1933 Anderson accepted a faculty position at Caltech, and spent the rest of his academic and research career here, until he retired in 1976.

During WW II, Anderson was closely associated with Caltech's rocket research and development, led by Charles Lauritsen, working on problems associated with the launching of rockets from airplanes. In the postwar period Anderson returned to his cosmic ray work.

### William Ralph Smythe (1893 - 1988)

Smythe, who completed his PhD in 1921 under Nobel Laureate Albert A. Michelson at the University of Chicago, became a professor at Caltech in 1923, where he remained until his retirement in 1964. Notoriously famous for his electricity and magnetism course at Caltech, Smythe taught at least six Nobel Prize winners—Charles Townes, Donald Glaser, William Shockley, Edwin McMillan, Carl Anderson, and James Rainwater. In the field of research, Smythe was the originator of a method of separating isotopes in quantity, electromagnetically.

### Max Delbrück (1906 - 1981)

In 1937, Delbrück arrived at Caltech on a Rockefeller Foundation grant as a research fellow in biology, after having received his doctorate in theoretical physics from Göttingen in 1930, going to Copenhagen to study with Niels Bohr in 1931-1932—who greatly influenced Delbrück's interest in biology—and eventually moving to Berlin for five years to work as an assistant to Lise Meitner in chemistry. Besides the need to leave Nazi Germany, Caltech became attractive for its *Drosophila* genetics work. During the 1940s, Delbrück collaborated with Alfred Hershey and Salvador Luna, doing research in cell physiology and the genetic structure of bacteriophages—the viruses of bacteria. This work would lead to all three sharing the 1969 Nobel Prize for Physiology or Medicine. He returned to Caltech in 1947 as a professor of biology, retiring in 1977.

### Murray Gell-Mann (b. 1929)

After receiving his bachelor's in 1948 from Yale, his PhD from MIT in 1951, spending a year at Princeton's Institute for Advanced Study under J. Robert Oppenheimer—where he began to work on elementary particle theory, and then joining the University of Chicago's faculty, Gell-Mann finally arrived at Caltech in 1955, accepting a faculty position in theoretical physics, and remaining here until 1993.

At Caltech Gell-Mann continued to explore the symmetry properties of elementary particles. In 1963 he put forward the hypothesis that the fundamental constituents of the strongly interacting particles are quarks and gluons—names given by Gell-Mann—for which Gell-Mann would be awarded the 1969 Nobel Prize for his contributions and discoveries concerning the classification of elementary particles and their interactions.

### Richard Phillip Feynman (1918 - 1988)

Feynman, famous for his development of quantum electrodynamics, or QED, a theory describing the interaction of particles and atoms in radiation fields, was awarded the 1965 Nobel Prize in physics, for work he had done while at Cornell, 1945-1951, as well as his earlier investigations while at Princeton, where he received his PhD in 1942. During WW II, he worked at Los Alamos on the atomic bomb project.

In 1951, Feynman accepted a faculty position at Caltech, a position he held until his death. While at Caltech, Feynman continued his work on theoretical physics, making important contributions to the study of liquid helium, particle physics, and later quantum chromodynamics. In the early 1960s, Feynman taught a freshmen introductory course, which eventually led to the publication of *The Feynman Lectures on Physics*.