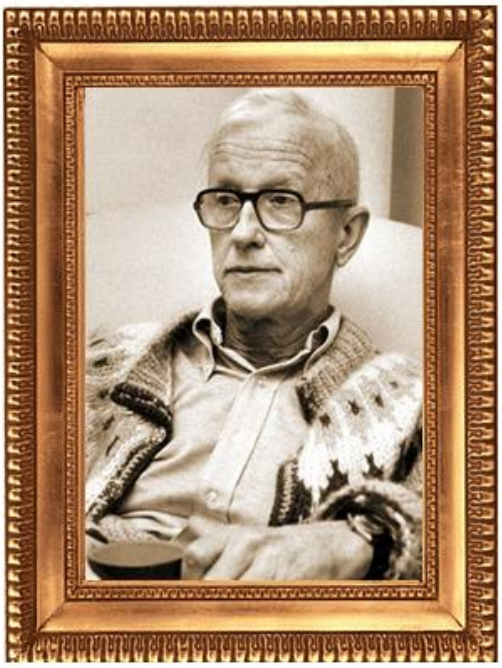
Max Delbrück

(Rocío Palacios-Ferrer)



Source: Wikipedia

Personal and Family Background

Max Delbrück was born in Berlin, Germany, on 4 September 1906. The son of historian Hans Delbrück and Lina Thiersch, granddaughter of the renowned chemist Justus von Liebig. Max was the youngest of seven children, his early years were shaped by hardship following the First World War.

Academic Formation and Scientific Influences

Delbrück's interest in science began in childhood with astronomy and deepened under the mentorship of Karl Friedrich Bonhoeffer, eight years his senior, who became both his lifelong mentor and friend. This relationship played a decisive role in awakening his scientific vocation.

He studied astrophysics, then theoretical physics at the University of Göttingen, a leading center for quantum mechanics at the time. After completing his doctorate in 1930, he travelled through England, Denmark and Switzerland, where he met Wolfgang Pauli and Niels Bohr. Bohr's belief that the principles of quantum mechanics could be applied to biology inspired the interdisciplinary approach that would later define Delbrück's scientific career.

Development of Molecular Biology

In 1932, Delbrück joined the *Kaiser Wilhelm Institut* in Berlin as an assistant to Lise Meitner, the discoverer of nuclear fission. During this period, he participated in informal meetings of a small group of physicists and biologists, which led to the publication of papers on mutagenesis and evolutionary biology. These works had a lasting impact on the emerging field of molecular biology.

In 1937, he emigrated to the United States on a Rockefeller Foundation fellowship, joining the California Institute of Technology (Caltech), where genetics of *Drosophila melanogaster* was under active study. There, he collaborated with E. L. Ellis on bacteriophage research.

The Luria–Delbrück Experiment and Its Impact on Genetics
At the end of his fellowship in 1939, as the Second World War began, Delbrück accepted a position in the Department of Physics at Vanderbilt University in Nashville, Tennessee. There he met Salvador Edward Luria, one of the founding figures of modern virology. Together, they formed one of the most innovative research partnerships in evolutionary biology.

Their celebrated "Luria-Delbrück experiment", also known as the "fluctuation test", published in 1943, provided one of the most compelling demonstrations of Darwinian evolution at the microbial level. They showed that mutations allowing *Escherichia coli* to resist infection by bacteriophage T1 occurred spontaneously before exposure to the virus, rather than being induced by it. Moreover, they confirmed that such advantageous traits could be inherited by subsequent generations, offering empirical proof of Darwin's mechanism of natural selection at work in microorganisms.

New Scientific Directions and Global Influence
In 1941, Delbrück married Mary Bruce, and they had four children. He settled permanently in the United States and became an American citizen in 1945.

From the 1950s onwards, his interests shifted from molecular genetics to sensory physiology. Using the sporangiophores of *Phycomyces* as a model, he explored how organisms perceive and respond to stimuli, an area of inquiry that occupied him for the rest of his career.

In 1961, he began promoting the creation of an Institute for Molecular Genetics at the University of Cologne, which was formally inaugurated on 22 June 1962. His aim was to demonstrate the feasibility and value of interdisciplinary research within the framework of a German university.

In 1969, Delbrück was awarded the Nobel Prize in Physiology or Medicine, together with Salvador Luria and Alfred Day Hershey, for their discoveries concerning the replication mechanisms and genetic structure of bacteriophages—viruses that infect bacteria, and consist of a protein shell enclosing genetic material.

Scientific Legacy
Max Delbrück was a passionate advocate of interdisciplinarity as a pathway to scientific progress. His integrative vision helped shape new modes of thought in twentieth-century research, bridging the gap between the physical and biological sciences. He introduced the reductionist approach into biology, allowing the application of physical methods to biological problems and opening the path to molecular biology.

He passed away in the United States on 9 March 1981, at the age of 74. Yet his intellectual legacy endures as a reminder that curiosity and the courage to cross boundaries between disciplines can lead to the most profound discoveries.

As Delbrück himself once reflected: *"It is characteristic of physics to ask how much one can know about something, and characteristic of biology to ask how something can do what it does."*