The theoretical physicist Max Delbrück is considered to be one of the co-founders of molecular genetics. He began his career in biology in the 1930s when he was an assistant at the Kaiser Wilhelm Institute for Chemistry. He was awarded the Nobel Prize for Medicine 50 years ago, for his work on the genetic structure of viruses and how they reproduce.
of Technology (Caltech) in Pasadena. However, he soon realized
that working with the fruit fly would get him nowhere: he want-
ed to discover how genes multiply, and for that he needed a sim-
pler system. He was also running out of time, as his scholarship
was limited to just a year.

That was when, having almost given up any hope of success,
he came across the viruses. He had just returned from a camping
trip in early 1938 when he noticed that he had missed an interest-
ing seminar at the Institute, in which biochemist Emory Ellis had
presented his experiments with bacterial viruses – the so-called
bacteriophages. So Delbrück paid a visit to his colleague, who was
of the same age, in his basement laboratory.

The bacteriophages – or phages for short – are viruses that in-
fect bacteria. The so-called T-phages specialize in the intestinal bac-
terium Escherichia coli, and consist of a head, which contains
their genetic material, and a tail, which serves as grappling hook.
Whenever a phage encounters a bacterium with an appropriate
 cell surface, it attaches itself and introduces its genetic material
into the bacterial cell.

The phage genes then reprogram the cell in such a way that it
starts producing new viruses as if on an assembly line until it fi-
nally bursts. The new phages are released and immediately enter
any other "suitable" bacteria in the immediate vicinity. After just
a few hours, holes become visible on a bacterial lawn cultivated
by researchers in the laboratory and inoculated with phages. Ul-
timately, each of these holes is created by a single virus.

Ellis showed Delbrück his equipment: all the phage research-
er needs for his work are a few petri dishes, pipettes and an auto-
clave. Delbrück can’t believe it: "I was absolutely overwhelmed
by researchers in the laboratory and inoculated with phages. Ul-
timately, each of these holes is created by a single virus.

Delbrück was one of the founders of the new biology.
His research into bacteria and bacteriophages in the 1940s
laid the foundations for modern genetics.

that such simple procedures could be used to make viruses visible
[...] You could conduct the simplest experiments with something akin
to the atoms of biology."

With that, Delbrück had found the perfect model system, and
without hesitation, he asked his colleague if he could collaborate
with him. Whilst Ellis had to give up the phages a year later be-
cause his sponsors were no longer prepared to cooperate, Del-
brück won the Nobel Prize three decades later.

After his scholarship expired, he took up a position as a phys-
ics lecturer at Vanderbilt University in Nashville, Tennessee and
continued his research into phages on the side. Having become
an American citizen, Delbrück then accepted a professorship at
Caltech in 1947. He transformed phage research into a predict-
able and reproducible science that soon attracted more and
more enthusiasts. In the 1940s he founded the legendary "Phage
Group" – a loose association of scientists all conducting research
into the T-phages.

The phage courses he presented each summer at Cold Spring
Harbor near New York also became widely known, and attracted
researchers from all over the world. During the early 1960s, the
courses were also offered in Germany. The Institute of Genetics
was founded at the University of Cologne and Delbrück was ap-
pointed as its Director. He continued his research and teaching
activities on the banks of the Rhine from 1961 to 1963,
during which time Fritz Melchers, now Senior Research Group
Leader at the Max Planck Institute for Infection Biology in Berlin,
was a PhD student at the Institute. He remembers Max Delbrück,
his "second doctoral supervisor" very well: "His working environ-
ment was characterized by a cheerful kind of anarchy, which he
had inherited from Niels Bohr's laboratory," he remembers: "His
colleagues didn't always have an easy time with him. His first re-
action when someone presented important new research results
would be: 'I don't believe a word of it!' And he liked to interrupt
seminars with statements like: 'I haven't understood a single word
yet. Start from the beginning please! And would you please use
three short sentences instead of one long one'.” His phage cours-
es also achieved cult status in Cologne. "Everyone in Germany who
had helped to advance the field of molecular biology had taken
part," says Melchers.

One of Delbrück's most important works was published in the
journal Genetics in 1943. It describes the so-called Luria-Delbrück
experiment, in which he and the physician Salvador E. Luria
demonstrate that mutations, which make bacteria resistant to
phage attacks, are random and do not occur as an adaptation to
the viruses.

Max Delbrück, Salvador E. Luria and the biologist Alfred D.
Hershey won a Nobel Prize in 1969 “for their discoveries on the
mechanism of replication and genetic structure of viruses.” By
that time, Delbrück had long since moved on to other fields of re-
search. Phages had become too fashionable for his liking, and the
versatile scientist was currently working on questions of percep-
tion, such as the reaction of fungal cells to light.

The field of molecular genetics that Delbrück and his col-
leagues set in motion is still developing at a rapid pace today.
Reminiscing towards the end of his life, he once said: "What I dis-
covered for myself at a very early stage is that as a scientist, you
could potentially change the world to a far greater extent than
Caesar or any of the great military or political figures ever did. And
you can sit in a corner and relax while you're about it.” Max Del-
brück passed away in Pasadena on March 9th, 1981.