



George W. Beadle

Nobel Prizewinner

Dr. George W. Beadle, chairman of Caltech's division of biological sciences, is one of three American scientists to be awarded the 1958 Nobel Prize in medicine.

The three men were all honored for achievement in biochemical genetics. Dr. Beadle and Dr. Edward L. Tatum, now of the Rockefeller Institute in New York, share one-half of the \$41,250 award for their discovery that genes act by regulating definite chemical events. The other half of the award goes to Dr. Joshua Lederberg, of the University of Wisconsin, for his discoveries concerning genetic material of bacteria.

Dr. Beadle, who is on leave from the Institute this year to serve as Eastman Visiting Professor at Oxford

University in England, is the fifth Caltech faculty member to receive a Nobel Prize.

In 1923 the late Dr. Robert A. Millikan, professor of physics and chairman of the Caltech Executive Council from 1921 to 1945, received the Nobel Prize in physics for his work on the determination of the charge of the electron.

In 1933 the prize in medicine and physiology was awarded to the late Thomas Hunt Morgan, professor of biology and chairman of the division of biology from 1928 to 1944, for his theory of the gene and his studies of heredity and genetics.

Carl Anderson, professor of physics and an alumnus of the Institute, received the 1936 prize in physics for his discovery of the positron.

Linus Pauling, who received his PhD from Caltech in 1925, and has been professor of chemistry here since 1931, was awarded the prize in chemistry in 1954 for his research on the nature of the chemical bond.

Two Caltech alumni have won the Nobel Prize. Edwin M. McMillan '28, MS '29, who is now professor of physics at the University of California in Berkeley, shared the 1951 prize in chemistry with Glenn T. Seaborg, for their joint discoveries of six radioactive elements which were used in the development of atomic energy.

William Shockley '32, director of the Shockley Semiconductor Laboratory of Beckman Instruments, Inc., shared the 1956 Nobel Prize in physics with Walter Brattain of Murray Hill, N. J., and John Bardeen of Champaign, Ill., for their work in inventing and developing the transistor.

How genes work

The Beadle-Tatum discovery that won them the 1958 prize gave science its first clue as to how genes actually work. Before 1941 there were some indications that genes controlled chemical reactions, but this was not a widely accepted fact. In that year, though, Beadle and Tatum, working at Stanford University, made the significant discovery that the synthesis of vitamins and amino acids in the living cell is under the control of the genes. This in turn suggested that each of the biochemical reactions of a cell is governed by a particular gene.

This discovery opened up a whole new field of research which has led to new knowledge of genes themselves, to new knowledge in biochemistry, and even in bacteriology — where, for the first time, it made possible the study of bacterial genes. In making their discovery the men used the red bread mold *Neurospora Crassa*, and they have been identified not only with the discovery but with the addition of this new tool for genetic research.

George Beadle has worked extensively with all three of the organisms that are of major importance in the development of theoretical genetics — maize, *Drosophila* and *Neurospora*.

A native of Nebraska, Beadle was born in Wahoo in 1903. He got his BS (1926) and MS (1927) degrees at the University of Nebraska's School of Agriculture, then went to Cornell University. There he became seriously interested in genetics and made important contributions to the genetics and cytology (study of cells) of corn.

After he got his PhD in 1931 Beadle came to Caltech as a National Research Council Fellow. Here he began his work on the fruit fly, *Drosophila*, under Thomas Hunt Morgan. In 1935 he left Caltech and went to Paris to work with Dr. Boris Ephrussi, of the University of Paris, whom he had met at the Institute. The men hoped to find a way of analyzing

in biochemical terms certain of the heritable characteristics which geneticists had discovered in *Drosophila*. Up to this time geneticists had been concerned primarily with establishing the existence of the genes and with studying their mode of transmission from one generation to the next. But not much had been done on the mode of action of the genes — the means by which they carry out their control of the structure and the function of the body. Before this work could be done there needed to be some understanding of the biochemical processes leading up to the final, visible expression of the gene.

Beadle and Ephrussi began studies of certain inherited defects in eye-pigment production in *Drosophila*. In a series of papers published during the next five years they were able to show that a gene controls the eye-color by producing a certain chemical substance.

After a year on the biology faculty at Harvard, Beadle went to Stanford as professor of biology in 1937. As he continued his research, it became clear that he needed a simpler organism than *Drosophila* for his biochemical studies. In 1941, then, working with Edward Tatum, he found that the red bread mold *Neurospora* was an ideal tool for these studies — and found, using this tool, that genes control the synthesis of vitamins and amino acids in the living cell.

Dr. Joshua Lederberg later worked with Dr. Tatum, applying some of the techniques of the mold studies to bacteria, and discovering that some strains could be made to cross, and that their offspring received new heredity factors in the crossing.

An expansive chairman

In 1946 Beadle became chairman of the Caltech biology division, succeeding the late T. H. Morgan. The division has been in a constant state of expansion ever since. With natural enthusiasm and enormous energy Beadle has built his department into one of the best in the country — both in terms of personnel and facilities.

He runs this bustling department in a relaxed and permissive atmosphere (some people have *never* heard him say "No") which turns out to be highly efficient.

As an administrator, fund-raiser, teacher and lecturer, there are constant demands on Beadle's time — particularly for his popular talk on heredity, which he has probably given between 50 and 100 times to date. (This talk includes his favorite definition of heredity, coined by a harried freshman on a biology examination at Stanford: "Heredity is where if your grandparents didn't have any children, you probably won't either.")

Time, however, is something Beadle manages to find for everything. He lives with his wife and 15-year-old son in the early-California-style ranch house that used to belong to T. H. Morgan — and which is

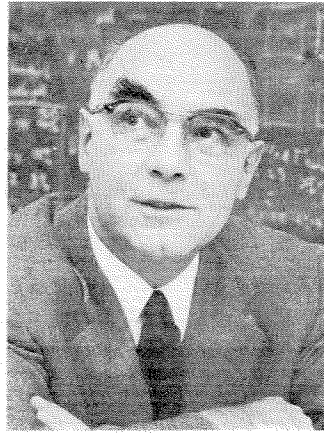
Past Prizewinners



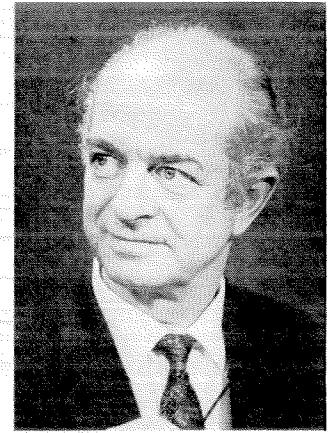
R. A. Millikan
1923 prize in physics



Thomas Hunt Morgan
1933 prize in medicine



Carl Anderson
1936 prize in physics

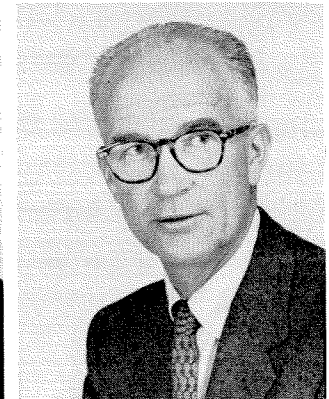


Linus Pauling
1954 prize in chemistry

Six other Caltech men who have won Nobel awards



Edwin M. McMillan
1951 prize in chemistry



William Shockley
1956 prize in physics

located directly across the street from Beadle's office on campus. This leads inevitably to a certain amount of blending of Beadle's home and professional life. He is an ardent gardener, but the impressive flowers and corn he produces in his home garden are also grown for genetic studies, too. So are the Siamese cats he raises. His interest in mountain and rock climbing is pure and unadulterated, however; once, with two equally-dedicated Caltech colleagues he made a two-week trip to a remote section of Alaska to climb a mountain that had never been climbed before.

Beadle is past president of the American Association for the Advancement of Science and of the Genetics Society of America. He has received honorary degrees from a number of universities, including Nebraska, Northwestern and Yale. He is a member of the National Academy of Sciences, the American Philosophical Society and the Royal Danish Academy of Sciences. He is co-author (with his Caltech colleague A. H. Sturtevant) of *An Introduction to Genetics*, published in 1939. Among other awards, he received

the American Public Health Association's Lasker Award in 1950, and Denmark's Emil Christian Hansen Prize in 1953.

"I am, of course, happy and grateful to share the high honor," he said when he was told last month that he had won the 1958 Nobel Prize in medicine. "At the same time, I am more than ever aware that my own personal contribution to the science of heredity has been a small one, and I should not have made it had I not had the good fortune to be associated with able and generous co-workers and generous teachers."

When Caltech got the word that Beadle had received the Nobel award, 29 biology graduate students sent a congratulatory wire to their chief in England: **TREMENDOUSLY PLEASED AND PROUD OF YOU COME HOME BRING MONEY.**

Beadle promptly wired back: **THANKS FELLOWS YOU TOO CAN WIN NOBEL PRIZES STUDY DILIGENTLY RESPECT DNA DON'T SMOKE DON'T DRINK AVOID WOMEN AND POLITICS THAT'S MY FORMULA.**