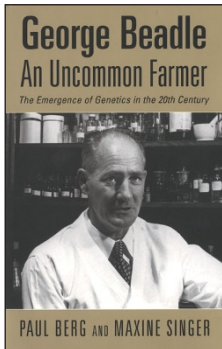


A giant of genetics



George Beadle, An Uncommon Farmer: The Emergence of Genetics in the 20th Century

By Paul Berg & Maxine Singer

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Reviewed by Gunther S Stent

“Isaac Newton’s famous phrase reminds us that major advances in science are made ‘on the shoulders of giants’. Too often, however, the ‘giants’ in our field are unknown to many colleagues and students... The ignorance is perhaps understandable because there is so much biology to learn today. Yet when presented with the stories of the discoveries and of the scientists who made them, people are fascinated and deepen their understanding of the science. Our goal in writing this book was to tell such stories about the giants who, in the first part of the 20th century, established the foundations for the now flowering science of molecular genetics.”

Thus begins the biography of George Beadle by two eminent biochemists, Paul Berg and Maxine Singer (the former a Nobel Laureate and the latter the President Emerita of the Carnegie Institution of Washington). In relation to his outstanding scientific and administrative contributions to the rise of molecular genetics, Beadle is probably the least known of its founders. None of his seminal discoveries—not even his ‘one-gene-one-enzyme’ doctrine—bears his name, and amazingly, Berg and Singer’s is the first full-length biography of Beadle to appear in the nearly 15 years that have passed since his death.

George Beadle was born in 1903 on a farm on the outskirts of Wahoo, Nebraska. Despite his father’s advice that, as a farmer, he was in no need of higher education, George enrolled in the University of Nebraska’s College of Agriculture. At college he became interested in the then-mysterious phenomena of genetics, and rather than returning to the family

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farm after obtaining his baccalaureate at Nebraska Ag, he went to Cornell University as a graduate student to work on the cytogenetics of maize. On receiving his Ph.D. from Cornell in 1931, Beadle was awarded a National Research Council fellowship to do postdoctoral work in T. H. Morgan’s Division of Biology at Caltech, where the fruit fly, *Drosophila*, was then being developed as the premier experimental object of vanguard genetics.

On encountering Boris Ephrussi—a visiting geneticist from Paris—at Caltech, Beadle began his work on the mechanism of gene action. He and Ephrussi studied certain mutants of *Drosophila* whose eye color differed in various ways from the red hue characteristic of the wild-type fly. They inferred from these results that the embryonic development of animals consists of a series of chemical reactions, each step of which is catalyzed by a specific enzyme, whose formation is, in turn, controlled by a specific gene. This inference provided the germ for Beadle’s one-gene-one-enzyme doctrine. To Beadle and Ephrussi’s disappointment, however, a group of German biochemists beat them to the identification of the actual chemical intermediates in the biosynthesis of the *Drosophila* eye color pigments.

In 1937 Beadle was appointed to the faculty of Stanford University, where he was joined by the biochemist Edward Tatum in the continuation of the kind of studies on the genetic control of biochemical metabolism that Beadle had begun at Caltech. This time, Beadle chose the bread mold *Neurospora* as his experimental material, which turned out to be much more amenable to genetic and biochemical analysis than was the fruit fly. This enabled Beadle and Tatum to prove conclusively the one-gene-one-enzyme doctrine; for this proof, they were awarded the 1958 Nobel Prize for Physiology or Medicine.

Beadle returned to Caltech in 1946 as T.H. Morgan’s successor in the chairmanship of the Biology Division. He made several outstanding faculty appointments—among them Max Delbrück, Renato Dulbecco, Ray Owen and Roger Sperry—and by dint of his wisdom and admirable persona, he turned Caltech into an ideal venue for front-line life science research.

In 1961 Beadle left Caltech to become the president of the University of Chicago, which was faltering because of the social deterioration of the Hyde Park neighborhood in which its campus is located. Here, too, Beadle was successful. He managed to restore the University to its former high academic standing by improving the neighborhood and thus stemming the loss of its first-class faculty members. Beadle died in Chicago in 1989.

Berg and Singer’s biography of Beadle is authoritative and complete, in that it covers in considerable detail both scientific and personal aspects of the life of this remarkable (in my view, almost uniquely appealing) biologist-administrator. ■