John Robert Schrieffer Biography

John Robert Schrieffer

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.



Contents

John Robert Schrieffer Biography.....1

Contents.....2

Biography.....3

Biography

Schrieffer was born in Oak Park, Illinois, on May 31, 1931. He earned his bachelor's degree from the Massachusetts Institute of Technology and his master's (1954) and doctoral (1957) degrees from the University of Illinois. While a graduate student, Schrieffer was invited by John Bardeen to work with him on the problem of superconducting theory.

Superconductivity had been discovered in 1911 by Heike Kamerlingh-Onnes. Over the next 40 years, physicists learned a great deal about the superconducting state, but had developed almost no theoretical explanation for their empirical observations. By the early 1950s, the stage was set for such a theory. F. London, W. Meissner, R. Ochsenfeld, H. Fröhlich, and D. Pines, among others, had laid out some of the fundamental propositions that would be necessary in any theory of superconductivity. Between 1955 and 1956, Bardeen, Schrieffer, and Leon Cooper developed such a theory.

The first clue to the theory, known today as the BCS theory, arose out of Cooper's discovery of paired electrons, now called Cooper pairs. Such pairs develop in a superconductor when two electrons interact with the positively charged *ionic matrix* of a metal in such a way that there develops a force of attraction *greater than* the normal electrostatic force of repulsion between the electrons. Schrieffer's task was to find a system of mathematical equations that could be used to generalize the phenomenon of Cooper pairs to *all* electrons in a metal.

The task seemed daunting at first. In fact, it is said that Schrieffer was so discouraged that he considered changing the topic of his doctoral research from superconductivity to ferromagnetism. He stayed with the problem, however, and eventually found a statistical procedure for dealing with 1023 Cooper pairs all at once. Schrieffer's solution was so successful that the BCS theory is now able to account for all observed properties of superconductors. Schrieffer described his research and findings in his Theory of Superconductivity, published in 1964. For his part in the development of this theory, Schrieffer shared the 1972 Nobel Prize for physics with Bardeen and Cooper.