



Book Review

Olival Freire Junior, *David Bohm: A Life Dedicated to Understanding of the Quantum World*, Cham: Springer, 2019, xi + 250 pp., \$84.99 (hardcover)

Christian Forstner*

With his scientific biography of David Bohm, the historian of science Olival Freire has published an important piece of work. The biography closes several gaps in the historical research on David Bohm. None of the previous works on Bohm (including my own) goes so deeply into his scientific work, or contextualizes it so fully. Whereas most of the previous works only considers a partial aspect of Bohm's scientific work or personality, Freire provides a comprehensive picture and analyzes the change of this picture in political, philosophical, and cultural contexts.

Bohm's life was strongly influenced by the Cold War. The emerging conflict between East and West was already evident during the Second World War. At that time, Bohm was employed at the Radiation Laboratory in Berkeley, investigating the behavior of plasma. He later developed this work further with his doctoral student David Pines. At the Radiation Laboratory, Bohm, together with a group of friends, founded a left-wing union group. Like many such groups, it was subjected to surveillance by the intelligence services, and these intelligence observations emerged after the end of the war, during the McCarthy era, and were used against Bohm. By this time Bohm was already a professor at Princeton. After he refused to testify before the House Un-American Activities Committee, he was charged with contempt of Congress. Princeton University suspended him and did not renew his contract. Bohm emigrated to Brazil in 1951. He subsequently relocated to Israel in 1955 and to Great Britain in 1957.

Physics experienced an upswing in Brazil in the early 1950s. New institutions and positions were created, and numerous international conferences were initiated. Freire describes these developments clearly. During this time, Bohm was

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focused on developing his interpretation of quantum mechanics with hidden variables and its philosophical interpretation. This led to an intensive cooperation with the French physicist Jean-Pierre Vigi er. In Israel, together with his student Yakir Aharonov, he investigated the significance of vector potential in quantum mechanics. After the twentieth Congress of the Communist Party of the Soviet Union, he completely detached himself from Marxism in 1956.

By the time he arrived in Great Britain, Bohm had moved away from his work on hidden variables. It was not until the late 1970s that students and doctoral candidates brought the subject back to the table. The visualization of quantum potential with computers played an important role in the reinvigoration of Bohm's work on hidden variables. Bohm himself regarded his work on quantum mechanics as part of the Implicate Order, which he developed together with his colleague Basil Hiley. Bohm died in London in 1992.

The discontinuities of Bohm's biography ensured that he did not leave behind a systematic collection of papers. Some of his papers were collected at Birkbeck College in London after his death. In addition, there is an oral history interview at the American Institute of Physics that Maurice Wilkins conducted with Bohm in the mid-1980s. This complicates the work of the historians, and previous work has focused primarily on the periods of Bohm's life for which there is ample material. Freire's biography now fills the existing gaps. As one of the foremost connoisseurs of the history of quantum mechanics in the post-war period, Freire has found plenty of other material. Freire's expertise helps to understand Bohm's scientific work in Brazil, Israel, and the United Kingdom in a broader context. This is also true of Bohm's textbooks on quantum mechanics and the theory of relativity. The result is a picture of a scientist who by no means worked in isolation, but who developed his thoughts in close exchange with colleagues, co-workers, and also opponents. Freire's book is not only enriching those already interested in David Bohm and the history of quantum mechanics. It also shows what a scientific biography can do for the historical understanding of physics. The book is highly recommended.

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