Chapter 1
Introduction

David Bohm (1917–1992) was a physicist, but his influence has gone far beyond the world of physics. He has become one of the most widely discussed intellectual figures of the twentieth century. While his work is still relevant to physicists and plays a part in contemporary areas of cutting edge research, Bohm's ideas have taken on a much wider cultural significance, reflecting his own wide-ranging genius. Growing up in the coal mining town of Wilkes-Barre, Pennsylvania, his outstanding talent eventually led him to be recruited into Robert Oppenheimer's theoretical physics group at Berkeley, where he joined the world's leading physics researchers at the beginning of World War II. He carried out brilliant investigations in a number of areas of front-line research, especially plasma physics, and was recognized as an equal to Richard Feynman in original thinking. At Berkeley he mixed with politically radical students in Oppenheimer's group, such as Joseph Weinberg and Rossi Lomanitz, and became a convinced supporter of Marxism and of the Soviet Union, joining the Communist Party for a brief period. Because of his political views, he was refused security clearance to work under Oppenheimer on the development of the atomic bomb at Los Alamos. However, his doctoral dissertation was regarded as so important that it was classified and used in the Manhattan Project.

At the beginning of 1947, Bohm was appointed to an Assistant Professorship at Princeton, where he delivered undergraduate lectures on quantum mechanics. He supervised research into plasma physics and other areas, and was able to hold discussions with Einstein on issues of fundamental physics. With the McCarthyite witch-hunt at its height during the Cold War, Bohm was summoned to appear before the House Un-American Activities Committee (HUAC) in 1949. He pleaded the Fifth Amendment and refused to testify. In response, in December 1950 he was indicted for contempt of Congress and arrested. He was driven to Trenton, the local capital, by a marshal, with whom he later recalled that, in his characteristic fashion, he had discussed Einstein's theories. He was eventually granted bail and released, but he was suspended from his post at Princeton. In May 1951 he appeared in court and was acquitted on all counts. His students had campaigned in his support and the physics

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department had praised his teaching and research, recommending that his contract be continued. However, in the anti-communist atmosphere of the time, Bohm was sacked by Princeton president Harold W. Dodds in June 1951. Unable to find work in the US and worried he could be imprisoned by a government he saw as increasingly fascistic, he took a job as Professor of Physics at the University of São Paulo, Brazil.[1] Most of the letters collected in this book were written during Bohm's stay in Brazil.

When he had spent a year at Princeton,[2] Bohm began lecturing on advanced quantum mechanics to graduate students. The notes from this course, based originally on courses given by Oppenheimer at Berkeley, became the basis for Bohm's highly regarded text-book *Quantum Theory*,[3] which was published in 1951, before Bohm left for Brazil. In the physics of quantum mechanics, there were, and still are, particularly difficult philosophical problems. It was the standard or "Copenhagen" approach to quantum mechanics that was being taught in universities in Bohm's day—and still is today, with very few exceptions.[4] Bohm's distinctive approach in his book was to develop the student's conceptual understanding, attempting to clarify the strange features of the theory rather than stressing the formal mathematical side, which most textbooks had done and still do. He brought out the intrinsic randomness of individual processes at the atomic level, and the so-called wave-particle duality. He investigated the measurement process which, some claimed, showed that the consciousness of the observer would determine the outcome of experiments, etc., etc. It is also evident, and this will become clearer when we look at the letters, that, without any explicit references, Bohm was attempting to develop a Marxist dialectical materialist approach to standard quantum mechanics.[5]

References

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[1] For this earlier period see Peat (1996), Chaps. 1–7, Freire (2015), Chap. 2, and Mullet (2008).

[2] Peat (1996), p. 74.

[3] Bohm (1989).

[4] See Chap. 6 for a brief outline.

[5] See Chap. 6.