



The missing history of Bohm's hidden variables theory: The Ninth Symposium of the Colston Research Society, Bristol, 1957



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ABSTRACT

In this paper, I analyze the historical context, scientific and philosophical content, and the implications of the thus far historically largely neglected Ninth Symposium of the Colston Research Society held in Bristol at the beginning of April 1957, the first major international event after World War II gathering eminent physicists and philosophers to discuss the foundational questions of quantum mechanics, in respect to the early reception of the causal quantum theory program mapped and defended by David Bohm during the five years preceding the Symposium. As will be demonstrated, contrary to the almost unanimously negative and even hostile reception of Bohm's ideas on hidden variables in the early 1950s, in the close aftermath of the 1957 Colston Research Symposium Bohm's ideas received a more open-minded and ideologically relaxed critical rehabilitation, in which the Symposium itself played a vital and essential part.

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1. Introduction

Scientific meetings - congresses, conventions, conferences, symposia, workshops and other formal and informal scientific gatherings - lie at the very heart of the scientific enterprise, providing one of the most essential means for exchanging information and ideas among members of the scientific community. In the first place, they are organized events where scientists “can meet in a legitimate context to expose their recent and contemplated research and obtain direct and frank feedback,” as well as occasions that “foster consensus around a research field and create criteria for the acceptance or rejection of topics that may be judged to belong to another domain of knowledge”, delimiting thus “cognitive territories” and giving rise to “shared opinions on what constitutes interesting research and what does not” (Lieberman & Wolf, 2013, pp. 134–135). However, as seen from an anthropologist's point of view, “there is more to a scientific meeting than an instrumental exchange of data and information” (Lomnitz, 1983, p. 5). In particular, “these major tribal get-togethers are ostensibly organized [not only] for the purpose of trading - in this case, the exchange of information and ideas, which is the stock-in-trade of the scientific

community,” but also for the purpose of establishing tribal hierarchy and cohesion through strongly ritualized actions in the sense that “competition between groups or scientific families is ritualized and conflicts are symbolically expressed and resolved in the interest of the community” (ibid.). Scientific meetings can thus be – and usually they are - occasions of a great dramatic charge, where not only an impersonal intellectual trading takes place but also where the full drama of the scientific enterprise is passionately lived, acted and spoken out in a complicated net of psychological and social relations between groups of involved scientists, and this especially applies when scientific meetings turn out to be occasions where a scientific orthodoxy is either being established or, once established, being defended against dissents.

The early history of quantum mechanics and its interpretations is without doubt a unique period in the history of physics that particularly fits into such an anthropologized view of scientific meetings, with the celebrated Fifth and Sixth Solvay Conferences held in Brussels in October 1927 and October 1930 being undoubtedly its most plastic illustrations. Organized neutrally as conferences “on electrons and photons”, and “on magnetism”, respectively, they in fact turned out to be places of heated and passionate discussions between the founders and defenders of the Copenhagen interpretation of quantum mechanics and its critics. That something was happening at these conferences other than a

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simple exchange of information is extensively described in the literature (see, e.g., Mehra, 1975; Bacciagaluppi & Valentini, 2009), and we know almost every detail about how, for example, at the 1927 Solvay conference the young Wolfgang Pauli and Werner Heisenberg had been passionately attacking and marginalizing the opponents of the just establishing Copenhagen orthodoxy like Louise de Broglie and Erwin Schrödinger, or how Einstein with his *Gedankenexperiments* brought unrest into the ranks of the freshly established orthodoxy at the 1930 Solvay conference, to the extent that Niels Bohr – the very father of the orthodoxy and mentor of its young defenders – was “extremely agitated”, and was continually “passing from one scientist to another, seeking to persuade them that it could not be the case, that it would have been the end of physics if Einstein were right” (as recalled by Léon Rosenfeld; cit. in Wheeler & Zurek, 1983, p. ix). Obviously, not only the participants of these anthological conferences clearly felt that a lot more was at stake there than mere physics, but they played their roles carrying a great emotional baggage, and with stubborn dedication and passionate group commitments both during the conferences’ formal and informal events.

While, however, the scientific meetings like the Fifth and Sixth Solvay Conferences, to which we could also add many other important early conferences on the foundations of quantum mechanics, like, for example, the Volta Conference held in Como in September 1927, which was “a kind of dress rehearsal for the fifth Solvay conference” (Pancaldi, 2005, p. 270), are very well known and researched, one important conference in the history of quantum mechanics and its interpretations curiously went below the radar of historians and philosophers of science – the Ninth Symposium of the Colston Research Society held in Bristol at the beginning of April 1957, the first major event after World War II at which “during 4 days from early in the morning until late at night we have been fighting on the foundations of quantum mechanics,” as put one of the speakers at the Symposium (Hilbrand J. Groenewold to Hugh Everett and John Wheeler, 11 April 1957; Hugh Everett III Manuscripts/Correspondence, University of California, Irvine Libraries, Irvine, California). Its importance can be recognized already from the list of invited speakers and participants; thus, among speakers, there were respectable physicists of the time David Bohm, Fritz Bopp, Charles Darwin, Markus Fierz, Hilbrand J. Groenewold, Leon Rosenfeld, Georg Süssman, Jean-Pierre Vigié, and eminent philosophers Alfred J. Ayer, Richard B. Braithwaite, Paul K. Feyerabend, Walter B. Gallie, William C. Kneale, Stephen Körner, Michael Polanyi, Karl R. Popper (he, in fact, did not attend, but he sent a written report that was read by Feyerabend), and Gilbert Ryle, while participants consisted of such names like John O. Wisdom, Adolf Grünbaum, Norwood Hanson, Mary Hesse, Peter T. Landsberg, Phillip Frank, and many other physicists, mathematicians, chemists and philosophers, thirty-six of them in total.

However, despite the fact that the published proceedings of the Symposium soon appeared in a volume that would become widely read and highly cited not only by physicists but also by historians and philosophers of science, we know little about the Symposium itself, with the exceptions of brief accounts in Jammer (1974, pp. 295–296), Cushing (1994, pp. 154–155), and Freire (2015, p. 148). This relatively poor historical interest in the event is especially curious knowing that the 1957 Colston Symposium has been not only recognized as the first big public event at which “Bohm’s ideas were not simply rejected out of hand” (Cushing, 1994, p. 154), but also identified as a possible turning point in the reception of Bohm’s ideas from their almost unanimously negative reception in the early 1950s to their rehabilitation during the 1960s (Howard, 2004, p. 679). The main purpose of this paper is therefore just this – to fill the gap in the social history of Bohm’s heterodox ideas on quantum mechanics, and in order to do this I will offer a detailed

examination of the context, content and possible implications of the Ninth Symposium of the Colston Research Society in Bristol in 1957 for the early reception of Bohm, who, even more curiously, never mentioned the Symposium, neither publicly nor privately even to his closest colleagues and friends (David Peat, e-mail correspondence with author, 17 April 2014; Basil Hiley, e-mail correspondence with author, 24 April 2014).

2. The Bristol 1957 gathering

When in 1957 the forty years old Bohm arrived at the University of Bristol, England, to start his four-years research fellowship offered to him by the distinguished theoretical physicist Maurice Pryce, head of the Physics Department at Bristol, this move seemed to Bohm a promising and relieving refuge after his exile in Brazil and Israel, where he had difficulties to settle, both privately and professionally. Indeed, on the one hand, this fellowship certainly did not disappoint Bohm’s expectations. Together with the young research student Yakir Aharonov, whom he brought with him from Israel, Bohm predicted an effect now widely known as the Aharonov-Bohm effect (Aharonov & Bohm, 1959), a discovery worth of the Nobel Prize, which he unfortunately never received.¹ However, on the other hand, his stay in Bristol turned out to be a difficult period for him. As Bohm recalled later, “although we did some work there,” soon after the arrival he began to feel “a bit uneasy with the sort of pecking order in Bristol, the social emphasis on status and the people there” (Interview of David Bohm by Maurice Wilkins on 30 January 1987, Niels Bohr Library & Archives, American Institute of Physics), especially among physicists, including Pryce himself. Luckily, to relieve this uneasiness, Bohm found very helpful long conversations with Stephen Körner, head of the Philosophy Department. As Bohm also recalled, “we talked about all sorts of questions,” and this “helped to revive my energy sometimes” (ibid.). Besides, contrary to Pryce’s “acerbic personality” (Berry & Pollard, 2008, p. 478), Körner with his “generosity, warmth of feeling, his disarmingly droll sense of humor, and his abiding delight in philosophy” (Harrison, 2001, p. 5) was simply more compatible with Bohm’s own introverted and non-competing character. During his Bristol years, Bohm also talked a lot with Paul Feyerabend, who was at the time a visiting fellow at the Department of Philosophy, and who also found the atmosphere at Bristol, and especially Pryce, very unpleasant, so that both Bohm and Feyerabend found “discussing the philosophy of science and philosophy more generally... helpful to make the thing more tolerable” (Feyerabend, 1995, p. 101). When thus the Colston Research Society, then under the chairmanship of S. H. G. Barnett, asked Körner to organize a symposium at which philosophical topics of modern physics would be discussed, his choice to invite Bohm and Feyerabend to participate was not hard to make.

Named after Edward Colston, a seventeenth-century merchant philanthropist, the Colston Research Society was founded in 1899 as the University College Colston Society by a group of reputable Bristol citizens to support and promote the University College, and it were those efforts that finally culminated with the founding of the University of Bristol in 1909 (Körner, 1962/1957, p. v). However, the Colston Research Society would make its name widely known

¹ So far, we know that Bohm was nominated at least on one occasion – already in 1958 (the year when the nomination was declared valid), and thus before the discovery of the Bohm-Aharonov effect – the nominator being the Japanese physicist H. Nakano. There could be other nominations, but according to the statutes of the Nobel Foundation, names of the nominees and other information about the nominations cannot be revealed until 50 years later. See “Nomination Database,” Nobelprize.org, Nobel Media AB 2014. <<http://www.nobelprize.org/nomination/archive/show.php?id=15054>>.

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