



Feyerabend and the Philosophy of Physics

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In a reference letter for Feyerabend's application to UC Berkeley, Carl Hempel writes that 'Mr. Feyerabend combines a forceful and penetrating analytic mind with a remarkably thorough training and high competence in theoretical physics and mathematics' (Collodel and Oberheim, unpublished, 80). Similarly, Rudolf Carnap says of Feyerabend that he 'knows both the physics and the philosophy thoroughly, and he is particularly well versed in the fundamental logical and epistemological problems of physics' (83). These remarks echo a sentiment widely accepted amongst Feyerabend's colleagues that his knowledge of physics was at an extremely high level. Feyerabend's acumen in physics goes back to his youth, when, at the age of 13, he was offered a position as an observer at the Swiss Institute for Solar Research after building his own telescope (Feyerabend 1995, 27). It is unsurprising, therefore, that physics played an important and long-lasting role in Feyerabend's work.

More specifically, Feyerabend's early work contains several papers engaging with technical and general issues in physics, mostly quantum mechanics. Here, he provided analyses of Bohr's complementarity and its relationship to positivism, von Neumann's no-go proof, Bohm's philosophy of physics, the measurement problem, the relationship between physics and philosophy, hidden-variable theories and theoretical pluralism, and the use of three-valued logic in quantum mechanics (to name just a few topics). These continued to play important roles in his work of the 1970s, although now they appeared alongside more historical examples, such as Galileo's work on the rotation of the earth in *Against Method*.

While scholarship on Feyerabend's philosophy has been burgeoning, especially over the past 10 years or so, comparatively little research has delved into his work in the philosophy of physics. This special issue seeks to ameliorate that gap. The hope is to better understand Feyerabend's philosophy of physics, its historical impact and reception, and discern what fruits Feyerabend's philosophy of physics may still bear.

This special issue comes in two parts. Here, we introduce only the first half, which contains four contributions, touching upon different aspects of Feyerabend's philosophy of physics. It begins with Flavio Del Santo's paper, 'Beyond method: the diatribe between Feyerabend and Popper over the foundations of quantum mechanics.' Here, Del Santo looks at the relationship between Feyerabend and his mentor and eventual philosophical enemy, Karl Popper with fresh eyes. Specifically, Del Santo provides a new explanation for the fracture between Feyerabend and Popper by looking at their recently published correspondence (Collodel and Oberheim 2020) and focusing on the *personal* nature of their relationship. Del Santo shows how Feyerabend's growing 'resentment' toward his authoritarian father-figure and Popper's growing frustration with Feyerabend centred on disagreements concerning quantum mechanics: how to interpret it, how to criticize it, and how to teach it. The juicy details in Del Santo's paper range from funny to heart-breaking, and we are left to wonder whether 'philosophy of science would have lost something without such a conflict.'

Matteo Collodel's paper, 'Ehrenhaft's Experiments on Magnetic Monopoles: Reconsidering the Feyerabend-Ehrenhaft Connection,' presents a newly discovered document from

Feyerabend's Nachlass, one that includes a draft translation of Felix Ehrenhaft's 1947 lectures, and Feyerabend's memoir of Ehrenhaft. Collodel shows how significant Ehrenhaft was as a real-life example of a 'charlatan' who argued against the orthodox physics establishment. In the end, Feyerabend was convinced neither by Ehrenhaft nor by his critics, but he learned important lessons about the tentative, complex, and historically contingent relation between theory and experience, as well as the importance of first-hand participation in science.

Collodel then turns to Eric Oberheim's account of Ehrenhaft's influence on Feyerabend. According to Oberheim, Feyerabend's experiences with Ehrenhaft grounded his 'entire philosophical outlook' (Oberheim 2006, 116). Ehrenhaft's presentation of recalcitrant experiments did not convince rival physicists, not because of any flaw in the experiments, but because he did not have a competing theoretical perspective to back them up. This grounds Feyerabend's view that scientific progress requires competing theories. Collodel draws attention to the virtues of this explanation, but ultimately rejects it for several reasons, including the fact that Feyerabend does not reference Ehrenhaft where we would expect him to, and Oberheim's interpretation conflicts with Feyerabend's own account of his evolving thinking. Instead, Collodel proposes a new interpretation, according to which Feyerabend's work in the 1960s, which was characterized by skepticism and pluralism and then anarchism, gave Feyerabend the framework he needed to go back and make sense of his experiences with Ehrenhaft. The story finishes with a twist: even if Ehrenhaft was not the inspiration for Feyerabend's 'entire outlook,' he *was* nevertheless a major inspiration for Feyerabend's famous teaching style, which adopted aspects of Ehrenhaft's flamboyant charlatanism.

Rory Kent's paper, 'Paul Feyerabend and the Dialectical Character of Quantum Mechanics: A Lesson in Philosophical Dadaism,' emphasizes that Feyerabend's Dadaism was not a mere presentation device, provocation, or fun exercise, but a serious position concerning seriousness itself. Kent's goal is to say just what Feyerabend's Dadaism was and how it developed, and then develop it further, via a close reading of Feyerabend's short article 'Dialectical Materialism and the Quantum Theory,' published in 1966.

According to Kent, Dadaism is a core methodological feature of Feyerabend's philosophy. The Dadaist must be ready to take any human position or practice seriously (especially those that are outside the mainstream), and put it into dialogue with others. A central aim of employing this methodology is to develop openness, humility and readiness, and become more epistemically responsible citizens (Kidd 2016). The point, and this coheres nicely with Collodel's article, is to allow oneself to be provoked, and find value in traditionally maligned places. This is precisely what Feyerabend does with the Marxist philosophy of dialectical materialism. A popular criticism of dialectical materialism was that governments should not interfere with science. But why not, especially if the government has the best interests of the people in mind? Feyerabend presents dialectical materialism as a number of 'pieces,' including mandates to see science as fallible, historically contingent, and to overcome the distinction between theory and practice. Feyerabend then analyzes Bohr's changing views on quantum mechanics from a dialectical materialist standpoint. Using this framework, he is able to capture the mainstream judgment of physicists and philosophers concerning Bohr, but also to go beyond them in interesting ways. Kent finishes by pointing out that merely pointing out a problem is not enough for progress. To avoid making the same mistake as Feyerabend, Kent then outlines a set of strategies that a Dadaist could use to make people minimally open-minded, which is required to get Dadaism itself off the ground in the first place.

Finally, we have Daniel Kuby and Patrick Fraser's paper entitled 'Feyerabend on the Quantum Theory of Measurement: A Reassessment.' This paper has a historical dimension, which is to unearth and present Feyerabend's only technical contribution to physics, 'On the quantum-theory of measurement,' delivered at the Colston Research Symposium in Bristol in 1957. It has a philosophical dimension as well, which is to relate this paper to Feyerabend's famed theoretical pluralism. And it also has a contemporaneous physics dimension, which is to look at the ways in which Feyerabend's theory anticipates modern theories of quantum decoherence. Kuby and Fraser reconstruct Feyerabend's paper as an attack on the philosophical positivism he saw in von Neumann's wave function collapse account of measurement. Wave function collapse is supposed to make sense of the transition between quantum and classical phenomena and allow for a clean separation between theoretical and observational terms (a central goal of positivism). Wave function collapse chafed against Feyerabend's realism, as that it was postulated to be fundamentally non-knowable. Feyerabend argued that collapse can occur in a quantum system before that system is observed by humans, and such a system would now be classical (because collapsed), yet still necessarily described at least partially in quantum terms. The existence of such 'incomplete' measurements tells us that whether something counts as classical or quantum depends not only on that thing itself, but on our epistemic relation to it. In response, Feyerabend presents an account of measurement without a collapse process.

Ultimately, Kuby and Fraser think that Feyerabend's approach to the measurement problem fails on several fronts. This is not too worrisome for Feyerabend fans, since Feyerabend not only never even mentions this attempt again in subsequent papers on adjacent topics but eventually came to abandon the view himself. In any case, Kuby and Fraser speculate that Feyerabend wasn't particularly invested in the solution itself but was more concerned with raising red flags with quantum orthodoxy to open the door to alternatives. In other words, the paper was principally an exercise in proliferation. Still, Feyerabend's failure is interesting not only for historical reasons but also as it substantially anticipates and finds stronger motivation in more recent research on decoherence theory.

Overall, these four papers build on and complicate earlier work on Feyerabend's philosophy of physics (e.g., Del Santo 2019; Kuby 2021; van Strien 2020). Through them, we learn more about Feyerabend's changing relationship with Popper in terms of their work on quantum mechanics, we see an early exemplar for Feyerabend's charlatanism (via access to a new original document and interpretation of that document), we better understand Feyerabend's Dadaism in view of an exercise using Marxism to analyze Bohr, and we get the first serious attempt to understand Feyerabend's only technical contribution to physics. Stay tuned for the second iteration of this special issue on Feyerabend and the philosophy of physics for more!

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