

Chapter 12

The USSR, Philosophy and Science

In several letters, Bohm considers what was happening in physics in the USSR. Early in 1952¹ he asks “Why in 25 years didn’t someone in USSR find a materialistic interpretation of quantum theory?” The answer, he thinks, lies in the existence of “an inadequate theoretical background, a background going back to concepts elaborated largely in the 19th century”, and such a background is due, perhaps, to the relative backwardness of the USSR. Then, a bit later in 1952,² he suggests the problem is the conservatism of scientists: “Perhaps the you know whos [i.e. the Soviets] will work on these ideas, but I am even somewhat doubtful of this, because their physicists, like ours, take the lead from a few big shots, who might easily decide that they dont like it.” Bohm then surmises, in 1953,³ that the Soviet philosophers may eventually help: “I notice that a vigorous criticism of the foundations of quantum mechanics is going on in the “East”, and in 5–10 years this may bear fruit, as a large number of people discuss the ideas, counter-discuss them, propose solutions, criticize them, etc.” Finally, in 1955,⁴ he gets a report on what was happening in physics and philosophy in the USSR. This report made the following points: (1) Soviet physicists are carrying out the same kind of long calculations that are carried out in the West, with little interest in philosophical problems. (2) Physicists’ “orientation is strongly determined by the older men, such as Fock and Landau, who, in addition to their training background, are influenced by the fear of a sort of “Lysenko affair” in physics.” (3) Physicists have “not thought much about problems such as the re-interpretation of qu. mechs., but tend[s] to take the word of the “big-shots” that ideas on this such as mine are “mechanistic.” (4) There are “philosophers in Moscow who criticize the usual interpretation, but they haven’t had much influence on the physicists.”

¹(21, **65**, p. 230).

²(23, **78**, pp. 265–266).

³(26, **94**, p. 311).

⁴(19, **50**, pp. 178–179).

There is no doubt some truth in Bohm's 1955 assessment, but such an assessment fails to understand the impact of more than 20 years of Stalinism. The fears of the older scientists like Fock and Landau were very real; their "conservatism" cannot be accurately compared to that of the Western "big-shots". At the same time, to get a deeper understanding of the problems that Bohm identified, it is necessary to explore the way in which philosophy had been very seriously, if not irreparably damaged in the USSR during the Stalinist period. No serious support for Bohm could be expected from that quarter. Later, in the 1960s and 70s, there was perhaps some interest in Bohm's alternative causal approach to quantum mechanics in the narrow scientific sense but not, as far as I am aware, in the philosophy of *Causality and Chance*.

Bohm learned in Israel about the appalling crimes of Stalin's regime, but he could not have known the truth about the repression and bureaucratic treatment of science and philosophy and could not have grasped the reasons for which he was so completely isolated. Some information has in fact only become available in English fairly recently. We now attempt to sketch an outline of the historical background in Soviet science and philosophy, giving references for more details.

From the 1920s onwards, the leaders of the Russian revolution, Lenin and Trotsky, had paid particular attention to Marxist philosophy, as Yehoshua Yakhot explains.⁵ The Sverdlov Communist University was set up in Moscow in order to train party members, most of whom had little knowledge in this area which, compared to politics and economics, took up only a small part of the Marxist tradition. They appointed former Mensheviks Liubov I. Axelrod (known as Orthodox) and Abram M. Deborin to teach philosophy, in which their expertise was recognized despite the fact that they were Mensheviks and thus had opposed the Bolsheviks before the revolution. Lenin and Trotsky also recognized the importance of the philosophical texts written by the principal founder of Marxism in Russia, Georgii Plekhanov. Axelrod had, in fact been Plekhanov's assistant, despite the latter's later opposition to the revolution. The working out of theoretical issues was the task of the philosophers, and during the 1920s, as is clear from both Joravsky and Yakhot,⁶ they were *not* expected to engage in current political questions. Neither did the political leaders, including Stalin himself, enter the philosophical debates. This applied to both the Left faction, led by Trotsky, which was defeated and expelled from the party in 1927, and the Right, led by Bukharin, with whom Stalin was aligned until he defeated them, in 1929. The tradition which Lenin and Trotsky had established acknowledged that, while the class pressures of capitalist society could be expressed in philosophy, the relationship between philosophy and society was a complex one. Philosophy had logical methods of its own, which should be respected and could not be simply subsumed or transferred to politics. This outlook provided a relatively fertile and creative environment for philosophical discussion in the 1920s.

During this period of relatively open debate, the very issues which interested Bohm, namely the relation between dialectics and science and the problem of retaining a causal approach without sinking into mechanical materialism, were discussed

⁵Yakhot (2012).

⁶Yakhot (2012), Joravsky (2009).

by Soviet philosophers and scientists alike. However, there was no way that Bohm could have known that. The whole history was rewritten after Stalin assumed absolute power. For example, Yakhot explains the dispute which took place in 1924 between a philosopher, one of Deborin's group, Jan Sten, and a leading Bolshevik, Ivan. I. Svortsov-Stepanov (usually shortened to Stepanov), who was particularly concerned with the relation between Marxism and the natural sciences. Stepanov had written an afterword entitled "Historical Materialism and Modern Science. Marxism and Leninism" to a book on historical materialism he had translated.⁷ In it, he advocated an approach which became known as "mechanism". Stepanov wrote on the example of plant life (or any other living organism) in biology. It was, as Yakhot paraphrased:

extraordinarily complex and refined, but nevertheless, as a mechanism that absorbs energy from the external world and changes it from one form into another. . . . Nowhere, in Stepanov's opinion, are there any special and mystical forms of energy [i.e. vitalistic life forces CT] above those which are generally observed in chemical and physical processes.

Yakhot also explains how Sten responded to this:

Engels . . . protests against dissolving organic and chemical processes into mechanical ones, and he considers it necessary to discover the specific and qualitatively special laws belonging to each of these processes. . . . dialectical materialism protests against the transfer of the specific laws of a given type of process to other forms and types of processes, and demands a qualitatively concrete investigation of each particular portion of reality.

This was the essential character of the debate which lasted throughout the 1920s, between the "mechanists", led by Stepanov until his death, in 1928, but also by Axelrod and quite a number of scientists that were sympathetic to Marxism, and the "Deborinites" or "dialecticians", represented here by Sten.⁸ The mechanists claimed that they were merely offering an overall philosophical account of the great strides being made in science. In return, Sten could attack Stepanov for belittling dialectical materialism and reversing the debate to the level of 18th century mechanical materialism. Stepanov countered that "mechanism" did not mean the mechanical materialism referred to by Engels, and claimed that Sten's response had amounted to just rehearsing a few pages from Engels. The year after this debate saw the publication of Engels' *Dialectics of Nature*, and the debate continued thereafter, with both sides claiming that Engels could be seen to support their position.

What is significant here in relation to Bohm is that the "portions of reality" referred to by Sten—Engels had actually used the distinctive term of "forms of motion", which he identified with different areas of natural science, transforming among themselves according to the law of the conservation of energy—are the "levels" which were central to Bohm's philosophy. Were such levels and issues of "quality" secondary to explanations in terms of basic physical and chemical entities, which natural science had been increasingly pursuing since Engels' day? Was "dialectics", perhaps, of relevance to social sciences only, as the mechanists seemed to be proposing? Or

⁷Yakhot (2012), pp. 21–27.

⁸Although recommending Yakhot's book, Bakhurst gives a somewhat different exposition of the debate Bakhurst (1991), Chap. 2, as he is particularly concerned with the philosophy of mind.

was it crucial to interpret the latest discoveries of science in dialectical materialist terms, enlisting science in the support for Marxist philosophy, as the Deborinites proposed? It is important to note that it was only after the Sten-Stepanov debate that the Deborin group moved away from concentrating only on the history of philosophy and the elaboration of Hegel's dialectics, beginning their involvement with natural sciences.

Joravsky⁹ points to an interesting speech by the political leader Leon Trotsky on this very issue of levels. In his address to a Soviet congress of chemists in 1925, Trotsky wrote:

Chemistry has its special approach to matter; its own methods of research, its own laws. If without the knowledge that chemical reactions are reducible in the final analysis to mechanical properties of elementary particles of matter, there is not and cannot be a finished philosophy linking all phenomena into a single system, so, on the other hand, the mere knowledge that chemical phenomena are themselves rooted in mechanics and physics does not provide in itself the key to even one chemical reaction. Chemistry has its own keys.

This applies to all sciences. Chemistry is a powerful pillar of physiology, with which it is directly connected through the channels of organic and physiological chemistry. But chemistry is no substitute for physiology. Each science rests on the laws of other sciences only in the so-called final instance. (<https://www.marxists.org/archive/trotsky/1925/09/science.htm>)

Joravsky points out that, in general, political leaders kept out of the mechanist-Deborin debate, but considers that, although Trotsky didn't comment on the dispute, his views were "strikingly similar to those of the mechanists"¹⁰ It was reductionist, even though qualified by "in the last analysis", claims Joravsky, to advocate a level of "elementary particles" that would unite all matter into a "single system."¹¹ It seems unlikely that Trotsky would conceive of "elementary particles" to be an ultimate or absolute level of matter as Joravsky claims, but clearly, some Soviet philosophers did think Trotsky was a mechanist. However, prior to the 1930s, no one made that identification. It was regarded as unacceptable to attempt to make any link between Trotsky's politics and mechanist philosophy, even during the height of the struggle against the Left. When, in 1927, A.A. Maksimov, at that time a Deborinite, attempted to link Stepanov's mechanist philosophy with Trotsky, his offending passages were withdrawn from publication. Bukharin, identified with the Right and at that time allied with Stalin, called it "not mighty clever."¹²

It is important to note that the mechanists were more diffuse than the Deborinites but contained a core group around the physicist A.K. Timiriazev (the son of the famous biologist K.A. Timiriazev), who was influential in the Bolshevik party and who was completely opposed to Einstein's theory of relativity. He claimed that Einstein's original support for Mach's philosophy made it a completely idealist and "bourgeois" theory. Timiriazev wanted a return to Newtonian classical mechanics.

⁹Joravsky (2009), p. 98.

¹⁰Joravsky (2009), p. 58.

¹¹Joravsky (2009), pp. 98–99.

¹²Joravsky (2009), p. 55.

According to Joravsky, he saw reduction to classical mechanics as the only basis for all physics, and notably saw the search for “material causes” of phenomena in terms of classical mechanics.¹³ Timiriazev was joined by V.K.Mitkevich, who wanted to identify Faraday-Maxwell force lines as a mechanical explanation for electromagnetism. Both of them wanted to bring back the 19th century mechanical version of the ether.

By the late 1920s, the Deborin group were able to take over the major philosophical institutions and journals. They used the ploy of labelling the mechanists “revisionists”, implying that these were no longer Marxists and thus were not entitled to have their contributions published. This was an extremely unfortunate precedent, considering what was to happen in the 1930s. It may be easy to criticise Timiriazev but, among the mechanists, there were clearly serious philosophers like Stepanov, Axelrod and so on, who Yahkot clearly feels did not get the discussion that was required¹⁴ and who produced serious problems in Soviet philosophy, even in the 1970s and 80s. Yahkot feels that, as well as the unresolved issues of “levels” and “reduction”, there was also confusion over the problem of necessity and contingency, both of which are clearly very relevant to Bohm’s work.¹⁵

Some mechanists, like S.Iu. Semkovskii, the leading philosopher in the Ukraine and a first cousin of Trotsky, who wrote a book attempting to show that Einstein’s theory *could* be seen as a confirmation of dialectical materialism, switched to the Deborinites in the late 1920s. Semkovskii’s approach was influential even among physicists, most of whom were not interested in philosophical questions but were horrified by Timiriazev’s attacks on relativity. In 1927, a philosopher in the Deborinite faction, who was also trained as a physicist, Boris M. Gessen (or Hessen), took up Semkovskii’s approach and led the Deborinites to embrace relativity and later quantum mechanics, interpreting them within the dialectical materialist tradition. The hard-line mechanists around Timiriazev were ousted from leading philosophy circles but were still active in science, continuing their campaign against relativity and demanding a return to 19th century physics throughout the 1930s and beyond.

Unfortunately none of the philosophical investigations into relativity and quantum theory made by Gessen and others in this period have yet been translated into English, and would have certainly not been available to Bohm. The brief extracts given by Paul Josephson show an interesting attempt to take a dialectical approach to standard quantum theory,¹⁶ based on an analysis of the relation between “dynamic and statistical laws”. Gessen also tried to develop an approach to a version of the “ether” that was not the mechanical ether of the 19th century¹⁷ prefiguring the approach taken by Bohm. He also worked on probability theory, examining the approach of von Mises, and also on statistical mechanics, again suggesting he was thinking in ways similar to Bohm’s approach above. Gessen (Hessen) is well known in the history

¹³Joravsky (2009), p. 279.

¹⁴Yahkot (2012), Chap. 5.

¹⁵Yahkot (2012), pp. 115–116.

¹⁶Josephson (1991), pp. 266–269.

¹⁷Josephson (1991), p. 244.

of science circles for the “externalist” approach he presented in a paper he gave at the International Congress of the History of Science and Technology in London in 1931.¹⁸

After 1930, the Deborinite philosophers came under a huge attack. Yakhot shows in some detail how the process developed. Stalin gave a speech in December 1929, “On the Problems of Agrarian Policy in the USSR”, intending to show he was a “great theoretician” in philosophy.¹⁹ In his speech, Stalin had focused on his claim that the theoretical front was lagging behind the successes of “practical construction.” The method of criticism and self-criticism of experts was now developed. For more than a year, “bourgeois specialists” had come under attack, and there were a number of highly publicized trials of “wreckers”. Several thousand untrained workers and peasants were brought into the universities, and professors had to be elected to their posts. In most university areas, the process produced few results and was soon dropped, but in the Institute of Red Professors, Deborin and his colleagues came under particular criticism. Party leaders began to demand the immediate linkage of philosophy to politics, and aspiring recent graduates such as M.B. Mitin and P.F. Yudin, later to be called the “Bolshevizers”, were encouraged to criticise the Deborinite professors. They attacked the professors for not having “partisanship” in philosophy. In 1930, Mitin’s group attempted to pass a resolution attacking the Deborinite philosophers for their failure to link Trotsky’s philosophy of science to his politics. Was it because leading Deborinite philosophers like Jan Sten and Nikolai Karev were known supporters of Trotsky? Their resolution on “the well-known separation of Communist philosophical thought from the most pressing political problems that have stood and stand before our Party” was voted down, so they sent it to the main Communist newspaper Pravda. Here, it was published “for discussion” with a note by the editors, who stated that they were in full agreement with its “basic views” and signalled that it had Stalin’s personal support. During 1930, the full weight of the party was placed behind Mitin and Yudin as Deborin was denounced and forced to make a “confession” of his errors, thereby ending up a broken man. Yakhot gives several pages detailing how the Bolshevizers operated, commenting that Mitin, Yudin et al. “brought so much harm to Soviet philosophy that to this day it has not been able to recover from the destructive impact of those years”. In December 1930, Stalin himself spoke to the bureau of the party cell at the Institute of Red Professors, told Mitin and Yudin and the others that they had done a good job, and described the Deborinites as “Menshevizing Idealists”, a term of abuse that was then used for years by the Stalin regime against its opponents.

In the purges from 1936 onwards many of the leading philosophers were arrested and executed, or died in the camps. Yakhot gives brief biographical details in an appendix to his book. For example, Sten was arrested on 3 August 1936 and executed on 20 June 1937. Semkovskii was arrested on 2 March 1936 for allegedly belonging to a “Trotskyist terrorist organisation”, and was shot on March 9 or 19, 1937. Gessen was arrested on 21 August 1936. He was interrogated and tortured seventeen times before

¹⁸Freudenthal and McLaughlin (2009), Graham (1985), Chilvers (2003).

¹⁹He had even taken lessons in philosophy from Jan Sten for 3 years in the 1920s (Tucker 1990).

being brought before a secret military tribunal, sentenced to death for membership in an invented “counter revolutionary TrotskyistZinovievist terrorist organization”, and shot on the same day.²⁰

It was not just the philosophers themselves that were targeted, of course. “Philosophy”, directed by the Bolshevizers, became a standard part of the frame-up techniques used to extract false confessions and then to torture, execute or send to the gulags, especially after 1936. Philosophy itself was transformed and debased during the 1930s, as Yakhot shows in some detail. In his concluding chapter, Yakhot writes:

Under the guise of intensifying the ideological struggle, philosophers actively intervened in the various fields of scientific knowledge – genetics, physics, statistics, sociology and so forth. And everywhere this produced dramatic, and sometimes tragic consequences.

Yakhot describes how the Bolshevizer Mitin operated in 1939 against Nikolai Vavilov, the great Soviet geneticist. Mitin ridiculed Vavilov for his use of probability theory in biology, alleging it was like using fortune-telling or using a horoscope:

. . . What is this: two aces, two deuces, two fours, and so forth – if not fortune-telling, a horoscope! This has nothing to do with science! It is monstrous when people try to hand out such nonsense as scientific popularization, or even worse as scientific discoveries!²¹

As Yakhot explains, Mitin would not have dared to speak like this if plans had not already been made for the arrest of Vavilov, which took place four months later. He died in prison in 1943. His fate, as Yakhot states, was a harbinger of the fate of Soviet genetics.

Yakhot only gives details of the 1920s and 30s, but after the Second World War, as noted in the comment we take from Loren Graham in Chap. 6, “the most intense ideological campaign” was stepped up, continuing until Stalin’s death in 1953. Bolshevizers like Mitin remained in leading positions in the Soviet academia long after Stalin’s death, and even though there was something of a “thaw” under Khrushchev, no serious discussion of either the reductionism debate of the 1920s and of the “infinite levels” question that Bohm had raised, or of the relation between causality and chance could take place. Yakhot tried to get the history of the 1920s and 1930s in philosophy reconsidered but made no headway.²² Though still a convinced Marxist, Yakhot left the USSR for Israel in 1975. His book was published in Russian in the US in 1981, and only appeared in Russia (to his surprise) as the USSR was collapsing, in 1991.

To my knowledge, although I am not a Russian language expert, although there was some interest in Bohm’s scientific work, no support was given by Soviet philosophers to *Causality and Chance*.²³ One has only to consider the sensitive nature of

²⁰Chilvers (2003).

²¹Yakhot (2012), pp. 223–224.

²²The difficulties that the brilliant and creative Soviet philosopher Evald Ilyenkov faced are explained in Bakhurst (1991), Introduction.

²³Since this was written I have noted that there are passing references in Svechnikov (1971), pp. 175 and 198. These relate only to the causal interpretation of quantum mechanics and not to Bohm’s more general philosophy.

the topics involved. Trotsky's speech in 1925, for example, a key part of the reductionism debate, could not have been mentioned. He was only rehabilitated in Russia in 2001, but never in the USSR, where his books were banned until 1987. The issue of probability and chance would have also been a very difficult topic, as Lysenko attacked geneticists by condemning them for the use of probability and chance, as demonstrated above in Mitin's goading of Vavilov.²⁴

Bohm's work would have thus been completely marginalized in the USSR, especially inasmuch as his philosophical endeavours of the 1950s are concerned. At the scientific level, Soviet physicists were understandably wary of Bohm's causal interpretation, although they were perhaps more open to discussing it in the "thaw" period. Let us consider the historical background in physics.

During the 1920s, Soviet physics made huge strides, assembling, mainly at the Leningrad Physico-Technical Institute, under the leadership of A.F. Joffe, physicists such as V.R. Bursian, Ia.I. Frenkel', V.A. Fock, L.D. Landau, and the young, but brilliant researcher, M.P. Bronshtein. This small group of physicists frequently travelled to key centres abroad. Landau, for example, spent 18 months as a graduate student visiting Cambridge, Copenhagen, Göttingen, and Berlin. Not only did they absorb the latest developments in quantum theory, translating key papers into Russian, but by the late 1920s, they also began making their own contributions, publishing in international journals. There was little concern amongst them, or amongst most Russian scientists at that time, according to Joravsky's figures, for Marxist philosophy. In quantum mechanics, they concentrated mainly on the mathematical formalism, adhering to complementarity, the probabilistic interpretation of the wave function and so on.

During the 1930s, whilst the physicists were allowed to carry out their work without direct interference in their scientific output and there was a huge expansion in the expenditure on physics, they were, nevertheless, put under considerable pressure from "Bolshevizer" philosophers. Maksimov, for example, trained in physics as well as philosophy, though apparently not as capable as his former junior Gessen, and possibly resentful about this, left the Deborinites and joined the Bolshevizers. He wrote attacks on Joffe, Frenkel', Gessen and others, presenting them as "idealists". He was even prepared to side with the crude mechanists Timiriazev and Mitkevich. Josephson explains how, in 1934, Gessen, Joffe, and other physicists were attacked in philosophical journals. At a special session of the Communist Academy in 1934, Joffe courageously defended the physicists against the attacks, utilising Gessen's work in order to demonstrate that relativity and quantum mechanics could be interpreted in terms of dialectical materialism, and showing that the anachronistic views of Timiriazev and Mitkevich, along with Maksimov's, were doing serious damage to Soviet physics.²⁵

²⁴In his speech in 1948, Lysenko stated "We must firmly remember that science is the enemy of chance." (Graham 1971, p. 236.) According to Graham, Lysenko was still influential as late as Khrushchev's death in 1965.

²⁵Josephson (1991), p. 270.

After the physicist George Gamov and his wife defected to the west at the Solvay conference in 1933, travel abroad was stopped, and Soviet physicists became increasingly isolated internationally. Peter Kapitza, who had worked on nuclear physics at Cambridge, UK, for 15 years, was detained in Russia in 1934. The brave defence of physics against charges of idealism by Joffe, Fock and others didn't stop several physicists and philosophers from losing their lives in the purges.

Bronshstein, known for his brilliant research and popularization of physics in Leningrad,²⁶ was arrested in 1936 and shot in February 1938, at the age of only 32.²⁷ Bursian was arrested in 1936 and died in the camps in 1945. Joravsky, in an appendix to his book *The Lysenko Affair*,²⁸ lists 22 physicists or philosophers of physics and 83 biologists and philosophers of biology who were repressed, though the actual numbers were much higher. ("Repression" here means arrest followed either by execution, sending to a camp, or internal exile. The official documents could cite "association with Trotskyite conspirators" and refer to their "Menshevizing idealism").

By 1936, Kapitza²⁹ managed to ship his equipment from Cambridge to Moscow. In 1937, he was able to obtain liquid helium and then to make a great scientific discovery, the superfluidity, i.e. flow with practically no viscosity, of helium at very low temperatures. He employed Lev Landau to help develop the theory of this newly discovered process. This was at the time of the Great Purges, and Kapitza apparently had the ear of a number of top politicians, including Stalin, so he intervened on behalf of a number of scientists in order to try to obtain their release. In February 1937, he pleaded on behalf of Vladimir Fock, who had been arrested, and successfully obtained his release. Landau was arrested in April 1938, while giving out leaflets calling for socialism to be saved by "resisting the criminal Stalinist clique." A year later, Kapitza secured his release in return for a pledge that he would stop him from committing further "counterrevolutionary" acts. Landau went on to develop the theory of the superfluidity of liquid helium, receiving the Nobel Prize for this work in 1962.

After World War Two the philosophical attacks on scientists increased, as detailed by Ethan Pollock in *Stalin and the Soviet Science Wars*³⁰ Although the best known, and the one with the most dire consequences, was the attack on geneticists in the Lysenko issue, Pollock shows how a parallel assault on physicists was being orchestrated for their alleged "idealism". As referred to above, in Chap. 6, this was led from the top and would almost certainly have influenced Bohm in 1951, when he embarked on his causal interpretation. What was certainly not understood by Bohm was that the key players in the anti-idealist campaign, the same Maksimov and Timiri-azev referred to above, were not just criticizing "idealist" interpretations of quantum

²⁶Gorelik and Frenkel (1994).

²⁷According to Josephson, Josephson (1991), p. 314, Bronshstein was well-known as a supporter of Trotsky.

²⁸Joravsky (1970).

²⁹The information in this paragraph is obtained from Kojevnikov (2004), pp. 116–120.

³⁰Pollock (2006).

theory, but wanted quantum mechanics and relativity removed from university physics altogether and dismissed as “bourgeois idealist theories.” They were demanding, in that sense, the physics version of Lysenkoism, and wanted to mount a conference in the late 1940s in which Fock, Landau and the leading physicists were to be pilloried for “idealism”, which, as with the geneticists, would have led to dismissal from jobs and worse.

This conference was eventually called off in 1949. Pollock gives two conflicting versions of why this happened. The first was that Kurchatov, a leading physicist in the Soviet atomic bomb project, reported to Beria and Stalin that the conference would interfere with the development of nuclear weapons. Beria was informed by espionage in the US that their physicists had used these so-called idealist theories to develop the bomb. Stalin is reported to have said, “Leave them in peace, we can always shoot them later.” According to the second version, the physicists were well prepared to defend a Marxist approach to their subject, and bureaucrats, worried that the conference would lead to damaging public disagreements, called it off.

In either case, states Pollock:

“Without the stunning example of the power of nuclear weapons, it is almost certain that the number of Soviet philosophers and physicists willing to cross the line from criticizing idealist interpretations of quantum mechanics and relativity to dismissing the theories themselves would have been substantially larger.³¹

The attacks of Maksimov and company still rumbled on. Eventually, a letter backing Fock’s reply to Maksimov was delivered to Beria by Kurchatov, backed by 11 of the most important atomic physicists, including Igor Tamm and Landau, both future Nobel laureates, and Andrei Sakharov, then unknown outside Russia. Personal comments were included in the letter by the physicist Blokhinsev, who had publicly disagreed with Fock over the “idealist” interpretations of quantum mechanics,³² but who fully backed Fock here against Maksimov. In 1953, Fock’s rebuttal of Maksimov, “Against Ignorant Criticisms of Modern Physical Theory”, was published in the key journal *Questions of Philosophy*, which for the previous 6 years had only published articles from Maksimov and his supporters. They had finally been routed.

With some knowledge of this background, it is much easier to see why Fock and Landau were so concerned about a “Lysenko affair” in physics and would have feared, even in the “thaw” period, that Bohm’s “mechanical” approach could be interpreted as a concession to the campaign of Maksimov, Timiriyaev and others, who wanted the complete removal of quantum mechanics from Soviet physics. We have noted Blokhintsev’s position in 1951, and he may, in fact, have been more sympathetic to Bohm. Fock had proceeded with what he regarded as a dialectical materialist interpretation of the standard theory, with an approach that is not dissimilar to Bohm’s original one in *Quantum Theory*. In 1957, Fock flew to Copenhagen to discuss with Niels Bohr, and attempted to persuade the latter that there were weaknesses in his philosophical approach which could be improved using dialectical

³¹Pollock (2006), pp. 92–93.

³²Graham (1966).

materialism. He criticised Loren Graham's exposition of his philosophy, insisting that he *was* a dialectical materialist.³³ However, Fock, writing in 1959, dismissed de Broglie, Vigier and Bohm's work as "examples of classical interpretations". Loren Graham translates some of Fock's paper³⁴: "All these interpretations, according to Fock, were extremely artificial and had no heuristic value; not only did they not permit the solution of problems which were previously unsolvable, but their authors did not even attempt such solutions." This, of course, was hardly fair, but perhaps understandable, given the assault on physics that had taken place and Fock's lack of knowledge of Bohm's work, scientific and philosophical.

I have tried to show, in this introduction to the letters, that Bohm's approach to physics in the 1950s contained much more than the causal interpretation of the 1952 papers. One can be repelled by his Stalinist politics, and he clearly was often overwhelmed by personal problems. However, in order to do him justice, his interpretation of quantum mechanics should be taken together with his work on probability and statistical mechanics, and above all, with the philosophical work that went into *Causality and Chance*. Unfortunately, the consequences of Stalin's politics, which Bohm embraced for more than a decade, had such a disastrous impact on science, and particularly on the way in which Marxist philosophy related to science, that Bohm ended up completely marginalized, not least in the USSR itself. It is hoped that the publication of these letters will help contribute to a revival of the understanding of Bohm's philosophy, parallel to that which has begun to take place in relation to his physics.

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³³Fock (1966).

³⁴Graham (1966).

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