

INTRODUCTION: BORIS HESSEN AND THE DIALECTICS OF NATURAL SCIENCE

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Boris Hessen (1893 – 1936)¹ is best known for his talk at the 2nd International Congress of the History of Science and Technology in London in 1931, entitled “The Socio-Economic Roots of Newton’s *Principia*”. The talk is considered among the most famous in the historiography of science and yet, the study of Hessen’s work as a whole has been plagued by a number of contradictions that have prevented it from coming to fruition. For instance, while the 1931 talk was, singlehandedly, his most influential work, it was also the least characteristic among his writings overall.² And while this paper was highly influential in North America and in Western Europe indirectly, with few notable exceptions, direct study of Hessen’s thought largely remained at a standstill in these contexts.³ Conversely, Hessen hardly received any attention in the former Soviet Union or Eastern Bloc.⁴ One could say that Hessen was too much of a Marxist for his thought to garner any real interest in the former context, while he was too open to ‘bourgeois’ science to make him a figure of any note in the latter.⁵ But, as the adage goes, ‘what’s old becomes new again’ and the past two decades have witnessed somewhat of a minor renaissance in Hessen studies in a number of different ways. There are ever more translations of his 1931 Newton paper, with it now being available in French, German, Greek, Korean, Italian, Japanese, Spanish and Swedish.⁶ Once seen as the paradigmatic example of so-called ‘externalist’ historiography of science, contemporary scholars have sought to reevaluate Hessen’s legacy and to interpret his thought under new light.⁷ What’s more is that scholars have become less content with studying the 1931 Newton text alone and have begun on a broader scale than before, to begin delving deeper into his oeuvre.⁸ How is it, then, that after almost a century of time, Hessen is only now beginning to speak to us?

The mounting global cultural, political and socio-economic unrest of today suggests the growing need to once again re-imagine the world. The barriers that had for some time stood between different fields of study as well as between theory and practice are crumbling at an ever quickening rate. It is becoming more apparent that sounding of the death knell of the grand narrative was perhaps premature. Hessen, a theoretical physicist, philosopher/historian of science and a Marxist, was a product of the age of the

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grand narrative. But, while he was one of the shining intellectual stars of the early Soviet period, he was not a proponent of the official, Soviet state doctrine known as ‘diamat’.⁹ For this challenge, he paid dearly as he became one of the countless victims of the humanitarian catastrophe that was Stalin’s reign of terror. The reevaluation of Hessen’s legacy, and that of many other similar figures, speaks to a double-movement in the present: on one hand, a call to once again think on a world-historic scale, but on the other hand, a warning so that the tragedies of the 20th century must never be forgotten and never repeated. In this way, the sources of the conflict that once stood as obstacles in the way of Hessen studies, both East and West, are now the very thing propelling interest in it forward; a way of studying the past to see if it can, in any way, shine light on a better path forward.

But, what grand narrative does Hessen advance? Hessen may have been a Marxist, but he was not at all a dogmatist, as he insisted that it be subject to revision to accommodate new discoveries in the natural sciences and vice versa. Moreover, Hessen encouraged collaboration between scientists and the working class to facilitate the cross-pollination of theoretical and practical knowledge. But even this far from exhausts the full range of his thought as he grapples with an overwhelming number of subjects across his oeuvre: classical mechanics v. quantum mechanics and relativity theory, dynamic v. statistical laws, reversible v. irreversible natural processes, macrocosmic v. the microcosmic natural processes, social relations/means of production v. natural science, etc. Many have assumed the core of his thought to be expounded in the 1931 Newton essay, but this is hardly his magnum opus, as his ideas span the course of several books, numerous articles and encyclopedias entries as well as lectures.¹⁰ He also engages with the works of a near endless slew of historical (Sir Francis Bacon, René Descartes, G.W.F. Hegel, Karl Marx, Sir Isaac Newton, etc.) and contemporaneous (Albert Einstein, Ludwig Boltzmann, Werner Heisenberg, V.I. Lenin, James Clerk Maxwell, Erwin Schrödinger, Marian Smoluchowski, etc.) figures. There is, then, still much work to be done to understand if and how Hessen’s various works all fit together and what they may have to tell us in the present day.

A summation of Hessen’s thought, of course, far exceeds the capacities of any single volume. But, the tasks we have set out to accomplish here, nevertheless, remain ambitious and they are as follows: (1) to better familiarize the reader with Hessen’s biography, (2) to assess his legacy and propose new interpretations of his thought and, finally, (3) to encourage study of his still largely untapped oeuvre. The first aim is admirably taken up by Paul Josephson in his “Boris Hessen as Philosopher and Polemicist”, a sprawling recreation of the context of physics research in the early Soviet Union. Josephson masterfully paints a picture of the figures, schools of thought and the conflicts between them against the backdrop of Russia in the post-October years. Here, one gets a sense of the tectonic shifts in the nascent Soviet experiment and how the context in which Hessen rose to prominence, so suddenly became the one in which he perished. Josephson also provides an analysis of some of Hessen’s

lesser-studied works, assessing that while Hessen's contributions to theoretical physics may have been modest, those to the philosophy of science remain of considerable worth. Gerardo Ienna & Giulia Rispoli and Ioannis Trisokkas take up the second task in their respective papers, each striking out new ground in the interpretation of Hessen's thought. In "Boris Hessen at the Crossroads of Science and Ideology", Ienna & Rispoli take up where Josephson leaves off, by providing a comprehensive account of the reception of Hessen's work up to the present day. They explain that the circumstances of Hessen's reception call for a reevaluation of his legacy, contending that, while Hessen was a Marxist, he was not a dialectical/historical materialist, but rather an empirio-monist. Like the founder of empirio-monism, Alexandr Bogdanov, Hessen disagreed with Lenin's reflection theory of knowledge, instead arguing in favor of the mutual interaction and co-constitution of subject and object. Also like Bogdanov, Hessen believed that Einsteinian relativity theory provided not only the necessary natural scientific confirmation of empirio-monism and but a new scientific foundation for Marxism as well. In "Boris Hessen and Newton's God", Trisokkas offers his own reassessment, as he contends that externalism is an improper label for Hessen's 1931 study of Newton. A successful externalist account, Trisokkas argues, would have to provide an exhaustive proof that the internal logic of a scientific theory is incomplete, showing that its sufficient reason only lies outside of it. Newton's resorting to God is not, he maintains, a product of external factors, but rather, a product of the internal logic of his mechanics and effort to explain the organization of matter. To accomplish the third aim of this volume, we have provided an English translation of Hessen's "Preface to Articles by A. Einstein and J.J. Thomson" (1927), which is the first new, complete text of Hessen's to appear in English translation since his 1931 Newton paper. Written in commemoration of the bicentennial of Newton's death, the work is a fascinating counterpoint to Hessen's better-known text. In the 1927 piece, Hessen reflects upon the legacy of Newtonian mechanics in light of the crisis of early 20th-century physics, arguing that just as Newtonianism had played an integral role in usurping Scholastic Aristotelian physics, Newton's thought was now being replaced by quantum mechanics. Hessen also maintains that quantum mechanics on its own could not singlehandedly remedy the crisis of contemporary physics, but rather, needed to be supplanted by dialectical/historical materialism. At the end of this volume, we have also provided a brief "Selected Bibliography" of some of Hessen's most relevant works related to the theme of the dialectics of natural science.

In closing, I would like to thank, first and foremost, the contributing authors to this volume: Paul Josephson, Gerardo Ienna, Giulia Rispoli and Ioannis Trisokkas. They have each offered stimulating and thought-provoking work, all of which attests to the fact there is still much to be gained from the study of Hessen's thought. To the National Research University – Higher School of Economics, thank you for providing the research context in which the editing of this volume could take place. Thank you to Sergei Korsakov for

so generously sharing your, A.V. Kozenko and G.G. Gracheva's *Борис Михайлович Гессен. 1893 – 1936* [Boris Mikhailovich Hessen. 1893 – 1936]; to my knowledge, it is the most comprehensive treatment of Hessen's life and thought to date and we would be most fortunate to one day see it in translation. To Irina Sirotkina, thank you for bringing the *РЕВОЛЮЦИЯ, ЭВОЛЮЦИЯ И ДИАЛОГ КУЛЬТУР* [Revolution, Evolution and Cultural Dialogue] volume to my attention. To Olga Bashkina, thank you for your help in completing the translation of Hessen's 1927 Newton paper and in compiling the "Selected Bibliography". Thank you to *Society and Politics* for providing the platform to publish on the work of this most noteworthy figure. My thanks also goes out to the eight anonymous peer-reviewers who made this volume possible. And finally, please allow me to extend my gratitude to you, the reader. I hope that from the following, you will see that while Hessen's life came to a most tragic end, the work that he started is still far from being finished.

References

¹ For more on Hessen's biography, see Freudenthal, G. and P. McLaughlin, "Boris Hessen: In Lieu of a Biography," in *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, ed. G. Freudenthal and P. McLaughlin (Dordrecht: Springer, 2009), 253 – 255; Корсаков, С., А. Козенко, Г. Грачева [Korsakov, S., A. Kozenko, G. Gracheva], *Борис Михайлович Гессен. 1893–1936* [Boris Mikhailovich Hessen. 1893–1936] (Москва [Moskva; Moscow]: Наука [Nauka; Science], 2015). Further details about Hessen's life can be found throughout the following texts as well: Graham, L., "The Socio-Political Roots of Boris Hessen: Soviet Marxism and the History of Science," *Social Studies of Science* 15 (1985): 705–722; Joravsky, D., *Soviet Marxism and Natural Science, 1917–1932* (London/New York: Routledge, 2009 [1961]); Josephson, P., *Physics and Politics in Revolutionary Russia* (Berkeley/Los Angeles/Oxford: University of California Press, 1991); Josephson, P., *Totalitarian Science and Technology, 2nd Ed.* (Amherst: Humanity Books, 2005); Schäfer, W., "Boris Hessen and the Politics of the Sociology of Science," *Thesis Eleven* 21 (1988): 103–116; Sheehan, H., *Marxism and the Philosophy of Science: A Critical History* (Atlantic Highlands: Humanities Press International, Inc., 1993 [1985]); Werskey, P.G., Introduction to *Science at the Cross Roads – Papers Presented to the International Congress of the History of Science and Technology, Held in London from June 29th to July 3rd, 1931 by the Delegates of the U.S.S.R.*, ed. N. Bukharin (London: Frank Cass & Co. Ltd., 1971), xi – xxix; Winkler, R.L., „Ein unveröffentlichtes Manuskript von Boris M. Hessen: 'Materialien und Dokumente zur Geschichte der Physik' (Druckfahnen – 1936 [?], ca. 700 Seiten, russisch): Kurzvortrag vor der Klasse für Sozial- und Geisteswissenschaften am 14.12.2006, gewidmet Boris Hessen anlässlich seines 70. Todestages am 20. Dezember 2006 [An Unpublished Manuscript by Boris M. Hessen: 'Materials and Documents on the History of Physics' (Proofs – 1936 [?], approx. 700 pages, Russian): Short Presentation to the Class of Social Sciences and Humanities on 14.12.2006, dedicated to Boris Hessen on the 70th Anniversary of His Death on 20 December 2006],“ *Sitzungsberichte der Leibniz-Sozietät der Wissenschaften zu Berlin [Proceedings of the Leibniz Society of Sciences in Berlin]* 92 (2007): 133–152.

² Graham, L., (1985), 707; Schäfer, W., (1988), 113, 114.

³ Back in 1991, M.I.T. Press planned to publish a volume, edited by Wolf Schäfer, which would have included English translations of some of Hessen's most important works. It would have also contained an essay by Schäfer, an essay by Paul Josephson as well as a reissue of Loren Graham's "The Socio-Political Roots of Boris Hessen". Unfortunately, the volume was never released, but selected passages of some of these translations have appeared in some of the aforementioned authors' works. Josephson, P., (1991), 385n68.

⁴ Schäfer, W., (1988), 103.

⁵ Freudenthal, G., "The Hessen-Grossmann Thesis: An Attempt at Rehabilitation," *Perspectives on Science* 15/2 (2005): 167–170; Freudenthal, G. and P. McLaughlin, "Classical Marxist Historiography of Science: The Hessen-Grossmann-Thesis," in *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, ed. G. Freudenthal and P. McLaughlin (Dordrecht: Springer, 2009), 32–33; Olwell, R., "Condemned to Footnotes?: Marxist Scholarship in the History of Science," *Science & Society* 60 (1996): 7–26; Young, R., "Marxism and the History of Science," in *Companion to the History of Modern Science*, ed. R.C. Olby, et al. (London: Routledge, 2009), 77.

⁶ For the references to these texts, please see the "Selected Bibliography" below.

⁷ For the references to secondary literature since 2015, please see *Secondary Literature (2015–Present)* in the "Selected Bibliography" below.

⁸ Корсаков, С. [Korsakov, S.], «Слово товарищу гессену [Slovo tovarishchu gessenu; The Floor is Given to Mr. Hessen]», *Эпистемология и философия науки* 55 (2018): 202–204.

⁹ Joravsky, D., (2009), 185–187; Josephson, P., (1991), 246; Josephson, P., (2005), 84; Sheehan, H., (1993), 179–182.

¹⁰ Please see the "Selected Bibliography" below.