

A New edition of Reichenbach's book

Anita Kasabova

New Bulgarian University

email: anita.kasabova@gmail.com

[review for the book Hans Reichenbach. *Ziele und Wege der heutigen Naturphilosophie* (new edition by Nikolay Milkov, Philosophische Bibliothek, vol. 621, Meiner: Hamburg, 2011), pp. xlv +160]

Hans Reichenbach (1891-1953), a founder of logical empiricism, member of the *Vienna Circle* and founder of the *Berlin Group* of logical empiricism, was a leading figure in modern philosophy of science. Yet Reichenbach's contributions to the philosophy of physics, logic and the foundation of probability, though well-known in the US and the English-speaking world, have remained relatively unknown in his native Germany. Nikolay Milkov's new German edition of five papers by Reichenbach, published by Felix Meiner, the prestigious publisher of philosophical works in their traditional series *Philosophische Bibliothek*, therefore marks a refreshing turn in German philosophical policy from idealism and its continental outgrowth, to a thematic focus on the sciences and their methodological rigor. Milkov's edition is the first German publication of Reichenbach's work in 40 years and it encourages contemporary German-speaking readers to become acquainted with the latter's theory of science.

This new edition contains the following papers by Reichenbach, divided into two parts. Part I, *Die neue Naturphilosophie (The new philosophy of science)* includes the complete version of "*Neue Wege der Wissenschaft*" ("*New approaches in science*"), i. *Physikalische Forschung (Physical research)*, ii. *Philosophische Forschung (Philosophical research)*, iii. *Mathematische Forschung (Mathematical research)*, (1929); "*Die philosophische Bedeutung der modernen Physik*" ("*The philosophical significance of modern physics*") (1930) and "*Ziele und Wege der heutigen Naturphilosophie*" (*Aims and Methods of Modern Philosophy of Nature*) (1931) which is the main focus of this edition. These papers were originally written in German.

Part II, *Radikaler Empirismus*, presents German translations of two important papers by Reichenbach on empiricist philosophy: i. "*Der logistische Empirismus in Deutschland und der gegenwärtige Stand seiner Probleme*" ("*Logistic empiricism in Germany*

and the present state of its problems") (1936) and ii. "*Rationalismus und Empirismus: eine Untersuchung der Wurzeln philosophischen Irrtums*" ("*Rationalism and empiricism: an inquiry into the roots of philosophical error*") (1948).¹ While the first three papers present Reichenbach's early ideas during the time that the *Berlin Group* was established (1929-1932), the last two papers show his take on empiricism (1933-1953).

Nikolay Milkov (*A hundred years of English philosophy*, Springer, 2003; *Kaleidoscopic mind: an essay in post-Wittgensteinian philosophy*, Rodopi, 1992) is a philosopher of science whose recent research is focused on late 19th and early 20th century philosophy of science in Austria and Germany. In particular, he examines the similarities and differences between two important German-speaking schools of exact philosophy in the 1930's: the *Vienna Circle* and the *Berlin Group* and their influence on 20th century philosophy of science in the US. As he points out in his introduction to *Ziele und Wege der heutigen Naturphilosophie* (vii-iii), none of Reichenbach's students were affiliated to German universities, which is one of the reasons why his philosophy of science was not propagated in Germany. In the US, by contrast, Reichenbach's students were leading figures in theory of science, such as Carl Hempel, Hilary Putnam and Wesley Salmon and they in turn taught a number of today's influential philosophers of science, namely John Earman, Bas van Fraassen, Larry Laudan and Philip Kitcher. An obvious reason why Reichenbach's views found little resonance in Germany was that country's po-

¹ There appears to be a lack of consensus on whether to translate '*Naturphilosophie*' as *philosophy of science* or *philosophy of nature*. While the latter is the literal translation, the former seems more appropriate in rendering the modern or non-idealist philosophical sense of *Naturphilosophie*.

litical climate in the 1930's, causing his dismissal from the university of Berlin and his relocation to Istanbul in 1933 and to Los Angeles in 1938.

In addition, the philosophical climate in Germany was no less hostile to Reichenbach's views, as Milkov's introduction to the new German edition shows. Thus Reichenbach's little book *Ziele und Wege der heutigen Naturphilosophie* (1931), published by Felix Meiner, received absolutely no reviews in Germany. Only Reichenbach's lecture on this topic at the Berlin Society for Scientific Philosophy (*Gesellschaft für wissenschaftliche Philosophie*) in Nov. 1930 was discussed in a disapproving review by Richard Wolf for the *Deutsche Allgemeine Zeitung (Berliner Rundschau)*, 7.11.1930. Milkov (*Introduction*, xxxvi) cites Wolf's reprimand as emblematic of the German philosophical consensus in the 1930's:

Any philosophy other than this theory of knowledge (*diese Erkenntnistheorie*) of philosophy of science and mathematics seems superfluous to the lecturer, and he attempts to label thinkers with other views, who attribute a wider scope of tasks to this discipline, as well as providing different ways of explanation, as literati. [...] For us, who are consciously living in a time overcast by horror and in which politics has become our fate, such a philosophy is a bloodless being (*blutarmes Wesen*). It appears bloodless and a little lacking in depth, even in the limited domain in which it is legitimate and in which its exponent resides as specialist, despite all the fine clarity of its exposition. (my translation).

Nearly a century would pass before Reichenbach's booklet was to obtain its rightful place amongst important contributions to German philosophy, together with four papers expounding his views on the relations between science and philosophy. *Ziele und Wege der heutigen Naturphilosophie* was rehabilitated by the same publisher who, eighty years ago, considered his theory worthy of publication and first published *Erkenntnis*, the journal of scientific philosophy founded by Reichenbach and Carnap in 1930. Despite hard times and political horrors, Meiner's publishing policy has consistently adhered to its pluralistic standard of values.

Milkov reconstructs Reichenbach's scientific theory and analytic method, and examines his complex relationship with German-speaking philosophy, his anti-Kantian epistemology, his discussions and

disputes with fellow-scientists Schlick, Einstein, Lewin and Carnap, as well as providing insight into Reichenbach's connection to the two main German-speaking schools of his time, the *Vienna Circle* and the *Berlin Group*. Milkov begins his introduction with a short review of Reichenbach's scientific method, showing how the latter considered his program as a correction of Kantian epistemology, in particular a correction of Kant's notion of *a priori* from which Reichenbach removes the 'apodeictic necessity' whilst retaining the 'constitution of objects' by means of his principles of coordination (*Zuordnungsprinzipien*). These latter constitute the elements of conceptual systems in science, as, for example, the spatio-temporal relations in the doctrine of space and time. Hence principles of coordination relate (or coordinate) elements of conceptual systems to elements of experience. Reichenbach thus refines and restricts Kant's generalization that all knowledge of objects is grounded on necessary *a priori* truths to the claim that there are only particular presuppositions of respective theories for particular sciences and that it is precisely these particular presuppositions which have to be worked out. In addition, Reichenbach supplements Kant's principle of causality with a principle of probability in his doctoral dissertation *The Concept of Probability in the Mathematical Representation of Reality* (1915).

As Milkov explains (*Introduction*, xi-ii), Reichenbach's anti-Kantian approach to philosophy was reinforced by his encounter with Moritz Schlick in 1920, who became one of the founders of the *Vienna Circle* in 1922. Schlick persuaded Reichenbach to replace the notion that principles constitute objects by the notion that principles constitute definitions or conventions and Reichenbach substituted coordinative definitions for coordinative principles. Hence he could show with Schlick that modern science, especially Einstein's physics and Hilbert's axiomatic mathematics, had no need of Kantian *a priori* principles for knowledge of objects.

However, the collaboration between the two philosophers was short-lived. While Schlick remained a logical positivist and became increasingly influenced by Wittgenstein's *Tractatus*, Reichenbach turned to 'natural philosophy' and logical empiricism. Resuming his earlier work on causality, he considered the latter as a probability relation and sustained the realist view that science deals with reality rather than sense impressions or linguistic symbols. This 'empiricist turn' brought Reichenbach closer to the psychologist and philosopher Kurt

Lewin. In 1923, the two philosophers founded a journal for exact philosophy, published by Springer. They collaborated on reformulating certain scientific notions, such as causality, in order to bring to light alternative scientific structures. Thus Lewin introduced the notion of *genidentity* for explaining the temporal persistence of objects of physics and biology – a notion which is still in use today. Reichenbach and Lewin also collaborated with Gestalt psychologist Wolfgang Köhler, as well as the philosopher and chemist Paul Oppenheim.

In 1929 he founded what was to become the *Berlin Group for scientific philosophy*, first named *The Berlin Society for empirical philosophy*, together with Walter Dubislav, Kurt Grelling and Gerhard Herzberg. The *Berlin Group* and *Vienna Circle* began their dispute at a colloquium on probability in 1930. While Carnap and other *Vienna Circle* members insisted on justifying scientific knowledge by means of the principle of verification, Reichenbach and Grelling of the *Berlin Group* argued that actual science always rests on a principle of induction which grounds scientific prognosis (Milkov, *Introduction*, xvii). Milkov supplements his account of Reichenbach's development of the problem of induction by a citation from the latter's work *The rise of scientific philosophy* (1951): "Every inductive prediction is similar to a net thrown into the sea of physical events" (277)." After 1931 Reichenbach considered his epistemology as radically empiricist, whilst Carnap criticized Reichenbach's naturalism. This dispute between the logical positivists of the *Vienna Circle* and Reichenbach continued until the early 1940's.

Despite this polemic, he is often considered as a member of the *Vienna Circle*, although, as Milkov (*Introduction*, xxii) points out, the lecture program of the *Berlin Group* was more closely related to current scientific interests such as quantum mechanics, the foundations of space and time, the direction of time and the logical foundations of probability. In the US, it was this program which attracted and influenced Reichenbach's students such as Adolf Grünbaum, Hilary Putnam and Bas van Fraassen, who were interested in Reichenbach's philosophy of physics rather than in his radical empiricism.

In any case, as Milkov remarks towards the end of his introduction (xxxix), Reichenbach was inappropriately considered as a radical empiricist, since his thought retained traces of Kantian *a priorism*. Since on Reichenbach's view, scientific investigation is accompanied by a construction of scientific

concepts, Milkov argues that his program is constructivist rather than empiricist in a Machian sense. Moreover, it seems that Reichenbach's anti-Kantianism in the *theory of relativity and a priori knowledge (Relativitätstheorie und Erkenntnis a priori)* (1920), is suffused by neo-Kantianism, as Michael Friedman (2001) has shown by examining Reichenbach's notion of the "relativized *a priori*".² Kant's influence on Reichenbach seems to have been more pervasive than either Reichenbach or Milkov acknowledge – he even uses the Kantian adjective 'transcendental' for characterizing his principle of probability, which was supposed to replace Kant's 'transcendental principle of causality' (1915). Nonetheless, after 1933, Reichenbach held that mathematics and physics are radically empirical sciences and that their laws are derived from experience and hence are not logical necessities. Milkov adds this point to his list of disparities between Reichenbach and the *Vienna Circle*, where he also mentions the former's inclusion of thought experiments in epistemological analyses. (*Introduction*, xxix-xxx).

Milkov aptly situates the main difference between the linguistic turn advocated by the *Vienna Circle* and the empiricism supported by the *Berlin Group* in their respective relations with Wittgenstein and Einstein. Schlick and Carnap were influenced by Wittgenstein's analytic philosophy of language, as Reichenbach was influenced by Einstein's theory of relativity, which he examined in 1920-1928 and considered as a refutation of Kantian *a priorism*. Likewise, both respective relations ended in conflicts – between Reichenbach and Einstein on one hand and Carnap and Wittgenstein, on the other. Milkov outlines the other main disparity between the *Vienna Circle* and Reichenbach as a difference in perspective: the latter opting for a panoramic overview of philosophical issues rather than analyzing a particular problem (*Introduction*, xxviii-ix).

The penultimate section of Milkov's introduction to *Ziele und Wege der heutigen Naturphilosophie* deals with Reichenbach's endeavors to make scientific discoveries accessible to the general public, not only at university but also in lectures diffused by two German radio stations (1924-1932). Milkov explains Reichenbach's role in popularizing science by the fact that the latter had first-hand knowledge of major discoveries in nuclear physics

²Friedman, M. (2001), *Dynamics of Reason*, Stanford: CSLI publications.

and astrophysics which, during the 1920's, took place in Berlin. In addition, Milkov cites several of Reichenbach's students and colleagues who praise his talent for clear and concise presentations of the problem of space and time and Einstein's relativity theory. Yet not all scientists approved of Reichenbach's project to axiomatize scientific theories. Thus Einstein did not accept Reichenbach's axiomatization of relativity theory and the mathematician Hermann Weyl criticized his *Axiomatik der relativistischen Raum-Zeit Theorie* (1924), as did Ernest Nagel and John von Neumann in the US.

The latter's criticism is omitted by Milkov, who takes a charitable view of Reichenbach's failure to address the challenges by Nagel and von Neumann and his omission of Andrei Kolmogorov's measure theoretic axioms for probability. In the last section of his *Introduction*, Milkov argues that Reichenbach's disregard of his contemporaries' work was due to the latter's belief that once a problem was solved, it was no longer of interest (*Introduction*, xxxii). Clark Glymour and Frederick Eberhardt

(2008, 55), however, sustain a less favorable view than Milkov of Reichenbach's neglecting "contemporaneous or prior efforts of others that address the issues that concerned him, efforts that are in one or another way as good as, or importantly better, than his own", in regard to A. Robb, A. N. Kolmogorov, G. Birkhoff and J. von Neumann.³ Then again, their publication is not an introduction to a new edition of Reichenbach's work.

The significant contribution of this new edition to the contemporary discussion in philosophy of science and its history, however, lies in Milkov's choice of Reichenbach's papers, concerned with bridging the gap between philosophy and science, as well as the gulf between scientific thought and everyday thought – which did much to establish his philosophy of science in the US as a mainstream trend. Hopefully, the new German edition of Reichenbach's work will help to achieve this in Reichenbach's native land – as a history of philosophy of science which is part of that country's philosophical heritage.

³Glymour, C. and Eberhardt, F. (2008). "Hans Reichenbach", *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/entries/reichenbach/>, accessed Nov. 7. 2011.