

# INTRODUCTION

*Michael J. Shaffer*  
St. Cloud State University

## 1. Introduction

This book contains an original translation of Max Planck's 1931 *Positivismus und reale Aussenwelt* and Moritz Schlick's 1932 response, first published in the journal *Erkenntnis*. While the latter work has been widely read — due largely to its inclusion in Ayer's well known 1959 edited collection *Logical Positivism* — the former work has not been widely read. Planck's book is a tidied-up version of a lecture delivered on November 12, 1930 and it was published as a pamphlet by Akademische Verlagsgesellschaft in 1931. But, this critical plank in Planck's defense of realism was not itself widely accessible until now. This all makes for a rather one-sided understanding of Planck's and Schlick's debate about realism and positivism where Planck is supposed to have misunderstood Schlick's views.<sup>3</sup> So, this volume is intended to make both sides of the debate accessible in one place. It is an important chapter in the long-running debate about the possibility of knowledge of the external world and it is an important precursor both to the protocol sentence debate and to the contemporary debate about scientific realism.<sup>4</sup>

---

<sup>3</sup> See, for example, Friedman 1997 and Oberdan 2009 and 2015.

<sup>4</sup> See Carnap 1932, Schlick 1934, Neurath 1932/1933 and Leplin 1984.

To properly understand this important episode in the philosophy of science and epistemology it is important to set the context of the debate. Max Planck received the Nobel Prize in physics for his role in the development of quantum mechanics in 1918, but it is entirely anachronistic to suppose that Planck's interests only involved work in pure physics. The tendency to impose more recent and distinctly more rigid disciplinary divisions on the history of science and philosophy obscures the fact that many thinkers that were deeply involved in the development of modern physics were also deeply involved in debates about the methodology of the sciences and epistemology. All one needs to do is look at the wide-scoped works of Planck's contemporaries to see that this is true. Planck himself is no exception to this point and he wrote extensively on the philosophy of science, especially in his later years. Importantly, his philosophical work was deeply influenced by his teacher Hermann von Helmholtz and this is germane to the Planck/Schlick exchange. What is crucial to understand first about this exchange is that Planck and Schlick had very similar views in many respects that were derived from the Kantian tradition that was prominent in German philosophy prior to the 1930's.<sup>5</sup> They were both empiricists whose work addressed the crucial difference between knowledge and acquaintance that had been a central theme in Russell's positivism in the first two decades of the twentieth century and they were both acutely aware of the role of conventions in systems of knowledge that had become a matter of great importance given the work of Einstein and Poincaré.<sup>6</sup> But, the central dispute that arose between them in the two works presented here had to do with their differing understandings of the nature of perception and the possibility

---

<sup>5</sup> See Coffa 1991, Friedamn 1992, Friedman 1999 and Friedman 2001 on this point.

<sup>6</sup> See Schlick 1915, Einstein 1916, Russell 1912, Russell 1914, Russell 1918 and Russell 1922, and Poincare 1905.

of empirical knowledge of reality as it is in itself.

## **2. The Rise of Positivism in Germany and the Planck/Schlick Debate**

Planck's philosophical views influenced many thinkers associated with the Berlin Circle (headed by Hans Reichenbach) and the Vienna circle (headed by Moritz Schlick). In turn, however, his own views were influenced by the work of the members of both groups. Generally, Planck's views reflect the move away from the prevailing Kantianism that antedated the rise of positivism in the early 20<sup>th</sup> century in Europe, though his views reflect a serious engagement with Kantian philosophy, and the influence of Helmholtz's naturalism and realism. His approach to philosophy and science and its similarities to the thinking of Reichenbach and Schlick is not a surprising one given that Planck directed Schlick's doctorate in Berlin and given that Planck, along with Einstein, also helped to secure a position for Reichenbach at the University of Berlin. Of course, Schlick ultimately helped to develop the logical positivism that influenced Reichenbach's views, but they could not avoid being influenced by Planck's own thinking given Planck's role in their academic lives. So, Planck was directly familiar with the work of the members of the Berlin and Vienna Circles, particularly Reichenbach's and Schlick's views, and he shared the same Kantian background with them. First, it is of special importance here to recognize that all three of these thinkers were acutely aware of the crucial difference that Kant had made between the possibilities of knowledge of phenomena and of knowledge of noumena. Second, they were keenly aware of Kant's view, spelled out in detail in the *Prolegomena to any Future Metaphysics* (1783) and earlier in *The Critique of Pure Reason* (1781), that scientific metaphysics cannot be anything more than the study of the necessary categorical structure of thought and the forms of intuition.

In any case, against this background, it is crucial to note that the Berlin Circle was greatly influential in the intellectual scene in Berlin at the time when Planck wrote his core works on philosophy. The view of science and philosophy that he ultimately espouses is very similar in some important respects to Reichenbach's Kantian-inspired views presented in his *The Theory of Relativity and A Priori Knowledge*, originally published in 1920 and Reichenbach's later 1938 book *Experience and Prediction*, which reflects Reichenbach's own mature realism. Planck, like Reichenbach, was a scientific realist and he opposed the anti-metaphysical logical positivism endorsed by Schlick and the sort of pure empiricism endorsed by Mach.<sup>7</sup> So, while the philosophical atmosphere in Berlin in the 1930s was steeped in the rise of empiricistic positivism, Planck objected to what he took to be one of the foundations of positivism, i.e. its alleged adoption of a form of phenomenalist anti-realism. This was such a bone of contention that Planck thought it necessary to criticize Machian positivism in the celebrated section 4 of his 1925 *A Survey of Physical Theory* titled "The Unity of the Physical Universe." Later, Planck explicitly addressed at length Schlick's own positivism in *Positivismus und reale Aussenwelt* and in chapter 2 of his 1932 book *Where is Science Going?* It is then perfectly clear that Planck took this methodological issue to be one that was deeply important, despite his sharing with Schlick a commitment to empiricism and a commitment to the Kantian idea that knowledge requires conceptualization. In order, however, to see what Planck found specifically objectionable about Schlick's positivism, we need to get a rather more detailed perspective on both Planck's and Schlick's views of science and epistemology. Let us then begin then with Planck's views.

---

<sup>7</sup> See Oberdan 2015, Oberdan 2017 and Friedman 1999.

### 3. Planck's Realism

In his 1936 book *Philosophy of Physics* Planck defends the view that science and philosophy cannot be neatly disentangled. Given Planck's Kantian leanings, this is principally because philosophy concerns itself with the possibility of all knowledge and so must encompass knowledge of physics and the rest of the sciences. But, he also held that any reasonable philosophical system must not conflict with what we have learned about nature via science, for otherwise it would go against our best knowledge of the nature of reality. So, these two epistemic domains are inter-dependent as Planck sees it. Moreover, on this basis we must be careful not to hold philosophical principles to be a priori dictates that would shackle science and we must be careful to understand that science requires a philosophical underpinning. Put simply, Planck saw that physics and the other sciences cannot be practiced in isolation from general philosophy. *All* physical theories presuppose some philosophical framework or principles of classification, but, *pace* Kant, there is no single a priori true framework or principle of classification that must be assumed as a matter of necessity. Such principles stand above the scientific theory and shape how we see and investigate the world, but, given Einstein's and Poincaré's revolutionary introduction of relativity, there are many such frameworks that could be adopted. Planck then held that the adoption of any philosophical framework requires making a value judgment concerning the appropriateness of that framework for the guidance of scientific research and as a set of presuppositions about both methodology and reality. This includes adopting familiar methodological values like respect for truth and commitments to principles like that of causality and the basic concept of a physical object. It is in virtue of this fact that Planck sees that every physical theory presupposes some philosophical system of concepts and he held that one of the

core presuppositions of empirical science is the commitment to realism. This latter commitment is crucial, as the failure to appreciate this would turn science into a purely subjective endeavour.

Given this understanding of science, Planck asserted that many bitter scientific controversies are really just disputes about the selection of principles of classification or frameworks, rather than disputes about purely empirical matters. This is especially important because, given the influence of Einstein, Planck believed that judgments concerning which philosophical framework to adopt are matters of conventions guided by purely pragmatic implications. Different scientists or scientific communities can, at least in principle, approach empirical inquiry differently in terms of different assumed frameworks grounded in different value judgments even if they are not aware of this. So, it is of the utmost importance *both* that scientists concern themselves with the search for truth and that scientists concern themselves with the search for correct values. There simply is no science practiced independently of philosophy, and specifically independently of both conventional principles of classification and values. In other words, scientists should not pretend that empirical science is free of presuppositions and scientists should not pretend that science does not require philosophical support. But, he is also clear that if these varied ways of understanding the empirical world are to be scientific, then they must assume realism.

Planck's way of looking at science and its philosophical presuppositions then suggests that there can be importantly different kinds of conflicts between belief systems involving empirical theories. There can be disputes about the non-empirical philosophical frameworks associated with empirical theories and there can be disputes about empirical theories framed in terms of the same non-empirical philosophical framework. Importantly, as Planck sees it, the first kind of dispute can be resolved only by appeal to the pragmatic impli-

cations associated with the conflicting frameworks, whereas conflicts of the second sort can be resolved by appeal to the empirical basis of science (i.e. measurements). Where we have conflicts of the first sort we can then only look at the conventional frameworks adopted and then consider the consequences they entail and how we pragmatically value them. So, as we have already noted, this view involves the rejection of Kant's idea of the fixed and a priori warranted categories of thought and the forms of sense and replaces it with the idea that all science is conducted in terms of some contingently adopted philosophical framework or other. But, the selection of any such framework is a non-empirical matter (i.e. a convention). So, Planck's view is very nearly identical to Reichenbach's adoption of what has come to be called the relativized a priori and its supposed role in the conduct of science.<sup>8</sup>

Reichenbach too held that all scientific theories are presented in conjunction with a philosophical framework that makes the empirical application of that theory possible and that such philosophical frameworks are not selected on the basis of empirical considerations.<sup>9</sup> However, Planck coupled this sort of view with a thorough-going empiricism based on Helmholtz's causal theory of perception and this yielded a theory of science that stressed both the limits of empiricism and the role of philosophical presuppositions in scientific frameworks. It is on this basis that Planck saw that one could potentially synthesize Kantian and realist themes. Observations yield up understanding of systematic structural relations caused by objects conceived in terms of a conventionally adopted framework and it in this manner that we can transcend the unified structure of appearances.<sup>10</sup> While the nature of our percepts is not knowable objectively and things in

---

<sup>8</sup> See Friedman 2001.

<sup>9</sup> See Shaffer 2011 for critical discussion of this view.

<sup>10</sup> Oberdan 2015.

themselves might not resemble those percepts, the relationships among them are objectively discernable by careful empirical enquiry.

#### 4. Schlick's Positivism

Moritz Schlick began his work in physics, though he ultimately assumed the Chair of *Naturalphilosophie* in Vienna in 1922. As noted earlier, Schlick's 1904 doctorate in physics was directed by Planck in Berlin and Schlick was thus introduced to a philosophically rich approach to physics. His first book, *Space and Time in Contemporary Physics*, was published in 1917. It laid out an interpretation of Einstein's general theory of relativity that was warmly welcomed by Einstein himself. But, the deep philosophical problems associated with the new physics led Schlick to switch his focus from physics to more pure and traditional philosophical problems. To this end, he published his *General Theory of Knowledge* in 1918 and this shift in focus was consciously made under the aegis of the recognition that Einstein's theories had deeply serious implications for the Kantian framework that took Newtonian mechanics to be a priori true of space and time. Schlick's early work in epistemology then was concerned with the Kantian problem of the relationship between perception and conceptual knowledge and with the conventional nature of concepts that followed from relativity theory. In this stage of his work, Schlick defended the position that knowledge cannot be had by acquaintance and that all knowledge involved subsuming perceptual contents under some system of concepts. But, when this problem is contextualized in terms of the conventional nature of concepts that follows from relativity, we are left with the problem that no single system of concepts can be said to be a priori true.

So, Schlick adopted the position that systems of concepts were adopted as mere conventions. Via Einstein's influence,



this led to Schlick's correspondence with Reichenbach concerning the relativized a priori and its role in physical theory.<sup>11</sup> Schlick adamantly denied that there were any a priori truths and so appeared to be at odds with Reichenbach. However, following their correspondence, ultimately Schlick came to the recognition that his differences with Reichenbach were largely terminological. In other words, Reichenbach's relativized a priori claims are just Schlick's philosophical conventions.<sup>12</sup> Notice too that this position is essentially the same position defended by Planck about the role of concepts in scientific theories.<sup>13</sup> So, on this matter Planck, Schlick and Reichenbach were really in agreement.

It is clear then that the dispute between Planck and Schlick has more to do with the nature of perception and the matter of realism, but, as we shall see, the matter is complex. Moreover, this matter is made more complicated by the fact that Schlick's thinking had taken a fairly dramatic turn away from his early more Kantian views by the 1930s, largely due to the influence of Wittgenstein's and Carnap's works.<sup>14</sup> By 1932, when Schlick's response to Planck was published, Schlick had developed much of the sort of logical positivism that is characteristic of the Vienna Circle and, on the basis of the verification principle, it had at its core the rejection of metaphysics as meaningless. The verification principle simply said that the meaning of an expression is its (possible) method of verification by observation statements and so claims that were in principle unverifiable by appeal to observation sentences were deemed to be meaningless. This ultimately caused serious problems for Schlick's empiricist views on the perceptual basis of science and his early view that there can be

---

<sup>11</sup> See Oberdan 2009

<sup>12</sup> See Schlick 1920a, 1920b and 1920c, Reichenbach 1920, Einstein 1915, Einstein 1916, Einstein 1920, Oberdan 2017 and Shaffer 2011

<sup>13</sup> Shaffer 2011.

<sup>14</sup> See Wittgenstein 1922 and Carnap 1928.

no knowledge by acquaintance. Given the anti-metaphysical stance of his later positivism, it was not just that there can be no knowledge by perceptual acquaintance, but rather that the whole of Helmholtz's causal theory of perception (and any other similar view) was meaningless in terms of the verification principle. We simply cannot know from where and how observation sentences come about. In point of fact, the very question of realism vs. anti-realism was, as the mature Schlick saw it, meaningless. So, we cannot ever know that the content of our observations sentences and their relations do/do not resemble things in themselves and their relations. As such, there can be no knowledge of reality in itself of any sort for Schlick. In good Carnapian fashion, Schlick adopted the view that various empirically equivalent systems of empirical knowledge are simply reductions of theoretical claims to basic statements that we call observation statements in virtue of their particular syntactic features. So, the exchange between Planck and Schlick reproduced here then anticipates the infamous protocol sentences controversy that soon followed between Schlick and Neurath.<sup>15</sup> It is then also here that we can begin to see where Planck objects to Schlick's views and why Schlick takes Planck to have misunderstood him. Specifically, as the two essays reproduced here demonstrate, it originates with a deep difference in their perspectives on theoretical knowledge and how it relates to perception.

## References

Carnap, R. (1928). *The Logical Structure of the World*. Berkeley: The University of California Press.

Carnap, R. (1932). "Über Protocolsätze," *Erkenntnis* 3: 215-

---

<sup>15</sup> See Carnap 1932, Schlick 1934 and Neurath 1932/1933.

228.

Coffa, A. (1991). *The Semantic Tradition from Kant to Carnap*. Cambridge: Cambridge University Press.

Einstein, A. (1915). Letter to Moritz Schlick, December 14, 1915, Einstein Collection, Hebrew University, EC 21620.

Einstein, A. (1916). "Die Grundlage der allgemeinen Relativitätstheorie," *Annalen der Physik*, 49: 769-822.

Einstein, A. (1920). Letter to Moritz Schlick, April 19, 1920, Einstein Collection, Hebrew University, EC 21633.

Friedman, M. (1992). *Kant and the Exact Sciences*. Cambridge: Harvard University Press.

Friedman, M. (1997). "Helmholtz' *Zeichentheorie* and Schlick's *Allgemeine Erkenntnislehre*: Early Logical Empiricism and its Nineteenth-Century Background," *Philosophical Topics* 25: 19-50.

Friedman, M. (1999). *Reconsidering Logical Positivism*. Cambridge: Cambridge University Press.

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

Helmholtz, H. (1924-5). *Treatise on Physiological Optics*. Milwaukee: Optical Society of America.

Helmholtz, H. (1977). *Epistemological Writings*. Dordrecht: D. Reidel.

Leplin, J. (1984). *Scientific Realism*. Berkeley: University of California Press.

Neurath, O. (1932/1933). "Protocolsätze," *Erkenntnis* 3: 204-214.

- Oberdan, T. (2009). "Geometry, Convention, and the Relativized *A priori*: The Schlick-Reichenbach Correspondence," in Stadler, et al. *Stationen, Dem Philosophern und Physiker Moritz Schlick*. Vienna: Springer, 186–211.
- Oberdan, T. (2015). "From Helmholtz to Schlick: The Evolution of the Sign-theory of Perception," *Studies in the History and Philosophy of Science* 52: 35-43.
- Oberdan, T. (2017). "Moritz Schlick," *The Stanford Encyclopedia of Philosophy* (Winter 2017 Edition), Edward N. Zalta (ed.), <https://plato.stanford.edu/archives/win2017/entries/schlick/>.
- Planck, M. (1931). *Positivismus und reale Aussenwelt*. Leipzig: Akademische Verlagsgesellschaft.
- Planck, M. (1933). *Where is Science Going?* London: George Allen and Unwin.
- Poincare, H. (1905). *Science and Hypothesis*. London: Scott.
- Reichenbach, H. (1920). *The Theory of Relativity and A Priori Knowledge*. Los Angeles: University of California Press.
- Russell, B. (1912). *The Problems of Philosophy*. London: Oxford University Press.
- Russell, B. (1914). "On the Nature of Acquaintance," *The Monist* 24: 1-16.
- Russell, B. (1918). *The Philosophy of Logical Atomism*. Chicago: Open Court.
- Russell, B. (1922). *Our Knowledge of the External World*. London: Allen and Unwin.
- Schlick, M. (1920a). *Space and Time in Contemporary Physics*. Oxford: Clarendon Press.

- Schlick, M. (1920b). Letter to Hans Reichenbach, September 25, 1920, *Archives for Scientific Philosophy*, No. 015–63–23.
- Schlick, M. (1920c). Letter to Hans Reichenbach, November 26, 1920, *Archives for Scientific Philosophy*, No. 015–63–22.
- Schlick, M. (1925). *General Theory of Knowledge*. New York: Springer Verlag.
- Schlick, M. (1932). “Positivismus und Realismus,” *Erkenntnis* 3: 1–31.
- Schlick, M. (1934). “Über das Fundament der Erkenntnis,” *Erkenntnis* 4: 79–99.
- Shaffer, M. (2011). “The Constitutive A Priori and Epistemic Justification,” in *What Place for the A Priori?* M. Veber and M. J. Shaffer (eds.). Chicago: Open Court, 193–210
- Wittgenstein, L. (1922). *Tractatus Logico-Philosophicus*. New York: Humanities Press.