

# Addendum

## How Hume and Mach Helped Einstein Find Special Relativity

John D. Norton

Department of History and Philosophy of Science

Center for Philosophy of Science

University of Pittsburgh

[www.pitt.edu/~jdnorton](http://www.pitt.edu/~jdnorton)

Prepared for M. Domski and M. Dickson, eds., *Discourse on a New Method: Reinvigorating the Marriage of History and Philosophy of Science*. Open Court.

After preparing the main text of this chapter, I found that it overlooked some material that further illuminated Einstein's attitude to David Hume.<sup>1</sup> A revealing remark is made in Reiser's biography<sup>2</sup> that notes Einstein's early philosophical reading:

He approached the broader aspects of thought through philosophical studies, chiefly through his readings in Kant and Schopenhauer, and later through his study of Hume, with whom he felt a special kinship.

We have good reason to accept the report of "special kinship" to Hume. Anton Reiser was a pseudonym for Rudolf Kayser, Einstein's son-in-law. Einstein began a preface for the volume conceding its authority: "The author of this book is one who knows me rather intimately in my

---

<sup>1</sup> I was alerted to this material by Alberto Martinez, *Kinematics: The Lost Origin of Einstein's Relativity*. Baltimore: Johns Hopkins Press, 2009. See especially pp. 266-68 for further discussion of Einstein's special appreciation for Hume's thought.

<sup>2</sup> Anton Reiser, *Albert Einstein: A Biographical Portrait*. New York: Albert and Charles Boni, 1930. p.55

endeavor, thoughts, beliefs—in bedroom slippers” and then noting that he “found the facts of the book duly accurate.”

This special kinship is suggested directly in Einstein’s appreciation of Bertrand Russell’s theory of knowledge, in a chapter authored by Einstein for the Schilpp volume in honor of Russell.<sup>3</sup> While the chapter’s announced focus was Russell’s thought, Einstein embedded that thought in a broader picture of the development of empiricism. In that broader picture, Hume enjoys a dominant position. Einstein is clearly very sympathetic to Hume’s contributions and not shy to reveal his disdain for much of what comes after him. He remarks (p. 21):

Hume saw that concepts which we must regard as essential, such as, for example, causal connection, cannot be gained from material given to us by the senses. This insight led him to a skeptical attitude as concerns knowledge of any kind. If one reads Hume's books, one is amazed that many and sometimes even highly esteemed philosophers after him have been able to write so much obscure stuff and even find grateful readers for it.

In the main text, I’ve urged that Einstein may have found support from Hume’s thought more important than Mach’s in Einstein’s 1905 insight into simultaneity, in that he thought Mach denied the free creation of concepts in scientific theories, whereas Hume was more tolerant of it. That this is so is suggested by Einstein’s continuation of his appreciation of Hume’s thought in his chapter on Russell. He notes (pp. 23-24) how Hume’s views could lead one to a severe prescription for the removal of metaphysics from thinking:

As soon as one is at home in Hume's critique one is easily led to believe that all those concepts and propositions which cannot be deduced from the sensory raw material are, on account of their "metaphysical" character, to be removed from thinking. For all thought acquires material content only through its relationship with that sensory material. This latter proposition I take to be entirely true; but I hold the prescription for thinking which is grounded on this proposition

---

<sup>3</sup> Einstein, Albert, “Remarks on Bertrand Russell’s Theory of Knowledge,” in P. A. Schilpp, ed., *The Philosophy of Bertrand Russell*. Tudor, 1944; reprinted in A. Einstein, *Ideas and Opinions*. London: Souvenir Press, 1973, pp. 18-24.

to be false. For this claim--if only carried through consistently--absolutely excludes thinking of any kind as "metaphysical."

An obvious and vociferous exponent of the elimination of such metaphysics is Ernst Mach. Einstein then immediately contrasts this severe view with his own more lenient view:

In order that thinking might not degenerate into "metaphysics," or into empty talk, it is only necessary that enough propositions of the conceptual system be firmly enough connected with sensory experiences and that the conceptual [sic] system, in view of its task of ordering and surveying sense experience, should show as much unity and parsimony as possible. Beyond that, however, the "system" is (as regards logic) a free play with symbols according to (logically) arbitrarily given rules of the game. All this applies as much (and in the same manner) to the thinking in daily life as to the more consciously and systematically constructed thinking in the sciences.

Then Einstein absolves Hume of responsibility for the "fateful 'fear of metaphysics'" Einstein deprecated.

It will now be clear what is meant if I make the following statement: by his clear critique Hume did not only advance philosophy in a decisive way but also--though through no fault of his--created a danger for philosophy in that, following his critique, a fateful "fear of metaphysics" arose which has come to be a malady of contemporary empiricistic philosophizing; this malady is the counterpart to that earlier philosophizing in the clouds, which thought it could neglect and dispense with what was given by the senses.

Finally, we may wonder whether Einstein, in his reading of Hume prior to the 1905 critique of simultaneity, may have lingered over Hume's treatment of time; or whether he was attracted by the more general discussion of, say, the concepts of causality and substance. That the latter is the case is suggested by Solovine's brief report of the Olympia Academy's reading of Hume. He wrote:<sup>4</sup> "We devoted weeks to the discussion of David Hume's eminently penetrating criticism of conceptions of substance and causality."

---

<sup>4</sup> Maurice Solovine, p.9 of Preface to Albert Einstein, *Letters to Solovine: 1906-1955*. New York: Citadel, 1993.