Albert Einstein’s letter to Moritz Schlick (14 December 1915)

Physics Today 58, 12, 17 (2005)
https://doi.org/10.1063/1.2169428
Translated and annotated by Bertram Schwarzschild

Einstein writes to physicist—philosopher Schlick (1882–1936), a professor of philosophy at the University of Rostock who was to become a founder of the Vienna Circle of logical empiricists. Einstein is responding to an essay Schlick wrote on special and general relativity shortly before the general theory was published in its final form in November 1915. Einstein points out that relativity theory is a blow to the Kantian doctrine that the human mind has a priori knowledge of some absolute truths about the real world—for example, its supposed obedience to Euclidean geometry. For an extended discussion of the philosophical issues and Einstein’s friendship with Schlick, see the article by Don Howard on page 34 of this issue.

Berlin, 14 December 1915

Highly honored colleague,

I received your paper yesterday, and have studied it thoroughly. It’s among the best yet of what’s been written about relativity. Nothing nearly as clear has previously been written about its philosophical aspects. At the same time you have full command of the theory itself. …
Truly masterful is your discussion of relativity theory’s relationship to the philosophy of [Immanuel] Kant and his disciples. Their trust in the “incontrovertible certainty” [apodiktische Gewissheit] of “a priori synthetic judgments” is badly shaken by the recognition that even a single one of those judgments is invalid. Your argument that positivism suggests the theory of relativity without requiring it is also very right. You’ve also correctly recognized that this line of thought has had great influence on my efforts, specifically [Ernst] Mach and, even more, [David] Hume, whose Treatise of Human Nature I studied with passion and admiration shortly before discovering the [special] theory of relativity. Very possibly, I wouldn’t have come to the solution without those philosophical studies.

Your comments on the general theory of relativity are also completely correct. … The new finding is that there exists a theory, consistent with all observations thus far, whose equations are covariant under arbitrary transformations of the space-time variables. One just has to regard the world as a four-dimensional (hyperbolic) continuum. …

The empirical testability of the theory is not entirely as dismal as you indicate. The theory explains quantitatively the motion of Mercury’s perihelion discovered [in 1855] by [Urbain] Leverrier. The influence of the gravitational potential on the color of emitted light required by the theory has been qualitatively confirmed by astronomical observation ([Erwin] Freundlich). There is also a good prospect for testing the theory’s prediction of the deflection of light rays by the gravitational field.

Asking you to visit me when your path leads to Berlin, I remain your entirely devoted

A. Einstein