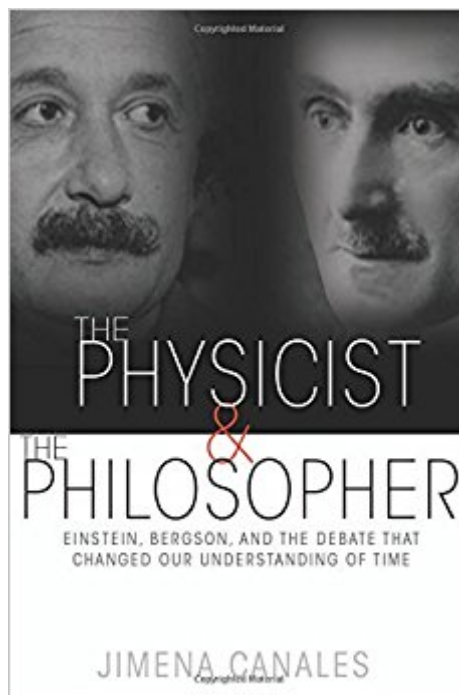


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# The Physicist And The Philosopher: Einstein, Bergson, And The Debate That Changed Our Understanding Of Time



## Synopsis

On April 6, 1922, in Paris, Albert Einstein and Henri Bergson publicly debated the nature of time. Einstein considered Bergson's theory of time to be a soft, psychological notion, irreconcilable with the quantitative realities of physics. Bergson, who gained fame as a philosopher by arguing that time should not be understood exclusively through the lens of science, criticized Einstein's theory of time for being a metaphysics grafted on to science, one that ignored the intuitive aspects of time. *The Physicist and the Philosopher* tells the remarkable story of how this explosive debate transformed our understanding of time and drove a rift between science and the humanities that persists today. Jimena Canales introduces readers to the revolutionary ideas of Einstein and Bergson, describes how they dramatically collided in Paris, and traces how this clash of worldviews reverberated across the twentieth century. She shows how it provoked responses from figures such as Bertrand Russell and Martin Heidegger, and carried repercussions for American pragmatism, logical positivism, phenomenology, and quantum mechanics. Canales explains how the new technologies of the period—such as wristwatches, radio, and film—helped to shape people's conceptions of time and further polarized the public debate. She also discusses how Bergson and Einstein, toward the end of their lives, each reflected on his rival's legacy—Bergson during the Nazi occupation of Paris and Einstein in the context of the first hydrogen bomb explosion. *The Physicist and the Philosopher* is a magisterial and revealing account that shows how scientific truth was placed on trial in a divided century marked by a new sense of time.

## Book Information

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## Customer Reviews

One of Science Friday's Best Science Books of 2015, chosen by Maria Popova  
One of The Independent.ie Irish Writers' Top Reads 2015  
One of Brainpickings' The Best Science Books of 2015

"The Physicist and the Philosopher is an extraordinarily rich and wide-ranging work. Canales has rescued from near oblivion a fascinating, highly significant debate that is still relevant in an age which has begun uneasily to question the hegemony of science and its uncontrollable child, technology."--John Banville, London Review of Books

"In illuminating a historic 1922 debate between Albert Einstein and Henri Bergson about the nature of time, Canales marks a turning point in the power of philosophy to influence science."--Publishers Weekly

"Sparks--both incendiary and illuminating--fly from the collision of two giants!"--Booklist, starred review

"This fascinating, scholarly, readable look at physics and epistemology will interest readers of science, history, philosophy, and biography."--Library Journal, starred review

"Whether or not you agree, this humane and melancholy account of how two talents misunderstood each other will linger in the mind."--New Scientist

"[Canales] weaves a tale around Europe and to America. . . . [Her] subject raises important core philosophical issues, like the scope of philosophy itself."--Michael Ruse, The Chronicle of Higher Education

"This fascinating book traces a debate about the nature of time. . . . Canales has done a masterful job of research and explication. Her account of the debate is lively, the background of it is interesting, and the debate's ramifications as filtered through other minds are downright exciting. Anyone interested in physics or philosophy will have a field day with this book."--Kelly Cherry, The Smart Set

"Canales does sterling work investigating these engagements . . . [A] stimulating book."--Graham Farmelo, Nature

"In The Physicist and the Philosopher, Canales recounts how Bergson challenged Einstein's theories, arguing that time is not a fourth dimension definable by scientists but a 'vital impulse,' the source of creativity. It was an incendiary topic at the time, and it shaped a split between science and humanities that persisted for decades--though Einstein was generally seen as the winner and Bergson is all but forgotten."--Nancy Szokan, Washington Post

"A book remarkable both for its profound research and for its elegance in presentation. Intellectual history should always be so accessible."--Benjamin Franklin Martin, Key Reporter

"[General and professional readers] will learn much from a study that is accessible and edifying to a great diversity of readers."--Choice

"The Physicist and the Philosopher . . . is at least three things: a monument to precise scholarship, an exemplar of logical clarity, and a fine example of excellent writing. I have rarely learned more from a book."--Peter A.Y. Gunter, Physics in Perspective

"Brilliant."--James Gleick, Bits in the Ether

"A masterwork of cultural forensics."--Maria Popova, Brainpickings

"It's hard to imagine that any single author will ever outdo this account of the

recent history of our concepts of time."--Chris Nunn, *Journal of Consciousness Studies*"A gripping critique of Einstein's thought and a convincing rehabilitation of Bergsonian time, freed from the tyranny of mathematics."--Hilary Davies, *The Tablet*

"*The Physicist and the Philosopher* explores the nature of time, the meaning of relativity, and the place of philosophical thought in a scientific age. Canales aims to reposition Einstein's work in a field of disputation and give Bergson back the significance he had in his contemporaries' minds."--Cathryn Carson, University of California, Berkeley"Like a stone cast on still waters, the Einstein-Bergson debate on the nature of time set off ever-widening ripples in physics and philosophy, but also in art, politics, and religion. In this fascinating book, Canales has written a kind of alternative intellectual history of the interwar decades of the twentieth century, one full of color and improbable conjunctions of people and ideas."--Lorraine Daston, Max Planck Institute for the History of Science, Berlin"Is time too important to be left to the physicists and their measuring devices? That was the issue at stake in a 1922 debate between Albert Einstein and philosopher Henri Bergson, celebrated at the time and wonderfully recovered in Jimena Canales's new book. A fascinating look at a pivotal moment in how we think about one of the most fundamental features of the universe."--Sean Carroll, author of *From Eternity to Here: The Quest for the Ultimate Theory of Time*"Sometimes past battles have repercussions that resonate long after memories have faded. In dramatic fashion, Jimena Canales demonstrates how a seemingly forgotten debate between Einstein and Bergson about the enigma of time changed the course of intellectual history."--Palle Yourgrau, Brandeis University"Whether readers side with Einstein's physics or Bergson's philosophy isn't the most important thing: this book opens up new ways of thinking about the relationship between science and the humanities that unsettle both."--Gerald Holton, Harvard University"This exciting, hugely interesting book opens out from a short but critical encounter between the philosopher Henri Bergson and the physicist Albert Einstein to consider their philosophies and the effects of their argument on the modern idea of time. Canales turns what is at first sight a limited debate into a major transatlantic encounter of profound implications. Well-researched, well-argued, and elegant, *The Physicist and the Philosopher* is a first-rate work of scholarship."--Stefanos Geroulanos, New York University"*The Physicist and the Philosopher* is a lively and engaging account of the meaning of time in the twentieth century. Canales uses the 1922 debate between Albert Einstein and Henri Bergson as a starting point from which to discuss an astonishing array of thinkers, technologies, and cultural developments. The book is an innovative, rich, and almost encyclopedic exploration of a crucially important question."--Edward Baring, author

I have been following the issue of 'time' in science and philosophy for a long time and this book was a revelation. I was not aware of the 'pointed' event of the meeting of A. Einstein and H. Bergson where two very different conceptions of time encountered each other personally in April 6, 1922. Without giving a full detailed account of the book, which would require a full essay, I can unambiguously say that the content of the book is extremely complete in discussing the background, the meeting itself and the social and scientific implications of the debate. Fortunately, for the people interested in the theme (scientifically and philosophically), the conflict that was unresolved at the meeting, although the consensus was that Einstein's conception of time won the argument, has been followed and developed by the scientific studies in non-equilibrium thermodynamics by Prof. I. Prigogine that have shown the existence of the 'arrow of time' in physico-chemical phenomena and the real world. This is something that was not developed in Einstein's time. As a starter, I recommend following this book by 'The End of Certainly' (Prigogine, 1997. English Translation published by The Free Press).

This is an academic work, but it is readily accessible to a popular audience, as long as that audience is even a little willing to navigate some fine points of history that have been long smothered by the triumphalist declarations of physicists who've built their careers on (among other things) never learning the back-story on their own discipline. This is an exceptionally well-researched work, and it is in that detail that the more casual reader might get lost. But the details are vital, and it is from those tiny nuances that the greater narrative emerges, as well as the evidence for how that narrative has come to be systematically misrepresented in the "just so" stories that now command popular science. I have a few professional cavils with the book. Were Dr. Canales and I to sit down together, I'd argue some minor issues regarding how she reads Cassirer's role in this fascinating debate. (I would maintain that Cassirer was far more subversive than Dr. Canales gives him credit, but Einstein and others missed this fact.) On the other hand, her treatment of Whitehead, while fairly restrained (she never touches on Whitehead's metaphysical works, which I have argued emerged as a need to address the philosophical failures of his epistemologically oriented philosophy of science) is nevertheless both accurate, and arguably more accurate than much of the secondary literature that is nominally supposed to be centered on Whitehead's thought. I am reluctant to give this book only four stars, as I gobbled it up in an unusually fast (for me) and intense reading. I'm not sure my criticisms above really merit "dinging" the book by a star. Call this my, perhaps misguided,

attempt to resist rating inflation. Because anyone with a genuine interest in the historical foundations of contemporary gravitational cosmology **\*MUST\*** read this book.

A scholarly, elegantly written history, so well researched that it could serve as a text for a college level course. The author details the history of a debate between Albert Einstein and Henri Bergson in Paris on April 1922, in which they discussed the meaning of time. The narrative uses the Hero concept, the Great idea concept, the Great event concept and Tolstoy's idea that he who talks the loudest makes history, to present the history and impact of the debate. I found the book to be an interesting and thorough discussion of the relationship between Art (Philosophy) and Science as we consider our understanding and perception of Time. It would make a nice companion to Werner Lowenstein's *Physics in Mind*.

Props to Jimena Canales for bringing attention to Bergson's critique of modern physics. The time may be right for a Bergson revival -- our own intellectual climate resembles the one Bergson reacted against, in that both are dominated by a scientific way of thinking that leaves no room for any robust kind of human freedom. The book effectively paints the science-vs-humanities chasm of the last 100 years as the result of a network of cracks spreading from this 1922 impact between Bergson and Einstein. The outward path of those cracks is tracked exhaustively here. One thing that might have been nice is a self-contained examination of where Bergson went wrong, or might have gone wrong, in "*Durée et simultanéité*" (his main response to the relativity theory). As it is, we hear a lot of personalities debating what the core issue is, without really getting an opportunity to judge for ourselves. In general, the approach here is more historical/sociological than analytical. One promising direction I'd suggest for Canales and other Bergson scholars is this -- ask whether Bergson lost his debate with Einstein simply because the mathematics didn't yet exist to make his ideas precise. I've always found the core of Bergson's philosophy to be that new possibilities emerge over time -- that the world is not the successive instantiation of pre-existing possibilities, but the continual creation of radically new possibilities. Bergson asserts this in "*Creative Evolution*" (1907) and its centrality becomes clearer in the 1920 paper "*The Possible and the Real*" (which I recommend above all Bergson's other works; it is short and gripping). Bergson couldn't make his world-as-creation-of-new-possibilities theory mathematically precise in 1920, since the idea of new **\*mathematical\*** possibilities would have made no sense in the context of the reigning "logician" approach to mathematical foundations. But the logicist approach was swept away by Goedel in the early 30's. In the 60's, Paul Cohen and others showed how new "generic" mathematical structures

can be added via "forcing" to a putatively complete universe of mathematical possibilities. This idea is so central to set theory nowadays as to be almost banal to its practitioners, but others might take note of this line from Jech's "Set Theory" (2000 ed.): "The modern approach to forcing is to let the ground model be the universe [of all sets]  $V$ , and pretend that  $V$  has a generic extension." What if there were no need to "pretend" that new sets arise -- what if generic extension were the actual mechanism by which Bergson's core idea was realized?

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