

exploratory culture sought to reach and map previously uncharted regions, whereas adherents of the latter were keen on collecting data through which they could discern meteorological, geomagnetic, and hydrographical patterns.

The concept accords well with contemporary arguments that pitted “adventurers” against “scientists” and therefore provides a useful way of carving out the reasoning used by the various parties involved in preparing and conducting the expeditions. Schillings’s main claim is that the fundamental differences between the two “exploratory cultures” are discernible during all phases of both expeditions, from their inception through to the publication of the expeditions’ results.

*Der letzte weiße Flecken: Europäische Antarktisreisen um 1900* is well written and clearly structured. At no point in the almost 400-page-long study is the reader left to wonder why certain information is being provided. Even the fact that this sturdy hardback contains relatively few illustrations for a topic in which visualization plays an important role does not detract from its clarity.

The book leaves the reader hungry for more. In part, this has to do with its title, which translates as “The last white spot: European Antarctic journeys around 1900” and raises high expectations. The German and the British Antarctic expeditions were the most prominent and closely connected, but the turn of the century saw many more efforts to study the Antarctic regions, which Schillings mentions only in passing without explaining why he focuses on Scott’s and von Drygalski’s undertakings. At almost exactly the same time Scott and von Drygalski were in the Southern Hemisphere, the Swede Otto Nordenskjöld, for instance, also led a privately funded expedition to Antarctica. One of the only two historians to have published extensively on German Antarctic expeditions, Cornelia Lüdecke (the other is Reinhard Krause), has pointed out that von Drygalski and Nordenskjöld were in contact during the preparatory phase of their expeditions (Lüdecke: “International Magnetic and Meteorological Cooperation in Antarctica,” in *Antarctic Challenges*, ed. Aant Elzinga, Torgny Nordin, David Turner, and Urban Wråkberg [Royal Society of Arts and Sciences, 2004]). Applying the concept of “exploratory cultures” to other expeditions could also help to identify the merits of this new terminology.

But above all the reader is hungry for more because this study provides an excellent and enjoyable example of just how fruitful an analysis of Antarctic research can be for issues of general interest to every historian of science: the impediments to international cooperation, the path to funding scientific endeavors, the gathering of reliable data in extreme circumstances, and the channels through which knowledge is shared.

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**Jimena Canales.** *The Physicist and the Philosopher: Einstein, Bergson, and the Debate That Changed Our Understanding of Time.* vii + 479 pp., bibl., index. Princeton, N.J./Oxford: Princeton University Press, 2015. \$35 (cloth).

Jimena Canales’s first book, *A Tenth of a Second* (Chicago, 2011), exploring the importance of precise time measurements to modern science and society, has received overwhelming acclaim. The present book grew out of the last chapter of her previous monograph. *The Physicist and the Philosopher* describes how the debate between Einstein and Bergson—an interplay between philosophical dispute, political disagreement, and personal pique—had a far-reaching impact on our culture’s perception of “the nature of time, the role of philosophy, and the reach and power of science” (p. 8).

*The Physicist and the Philosopher* is a scholarly and erudite monograph written in a vivid and entertaining style. Canales’s compelling narrative revolves around the meeting between Einstein and Bergson

on the occasion of a discussion on relativity in Paris on 6 April 1922 (Pt. 1). After having set this contentious encounter against a vividly depicted intellectual, sociological, and political background (Pt. 2), the book focuses on the opposition between Einstein's measured "physical time" and Bergson's experienced "human time" (Pt. 3), an opposition that our rational discourse has still not been able to reconcile (Pt. 4). Canales has the ability to present this rich material in an evocative way. The reader has the sense of witnessing the unfolding of epoch-making events that left an indelible mark on our culture. However, Canales's captivating style sometimes comes at the expense of a critically detached use of the sources. This is the aspect of the book that I found less convincing.

Canales, for instance, opens the book by claiming that Bergson, a philosopher, was behind the decision to award Einstein the Nobel Prize, but not for relativity. However, this conjecture is based on a questionable reading of the Nobel presentation speech (p. 1): "Bergson had shown that relativity 'pertains to epistemology' rather than to physics" (p. 4). However, the speech says only that relativity "pertains to epistemology" and that *therefore* philosophers, including Bergson, have discussed it (Wayne Myrvold, personal communication). The role played by the ophthalmologist Allvar Gullstrand reported in all major biographies of Einstein is not even mentioned. Canales's dramatic account of the central event of the book, the Einstein-Bergson meeting, seems to me based on an equally questionable reading of the meeting's transcript. For example, consider this sentence (about a statement by Einstein): "Yet, nothing in our conscience permits us to conclude the simultaneity of events, because *these are no more than mental constructions, logical entities*" (Albert Einstein *et al.*, "La théorie de la relativité," *Bulletin de la Société Française de Philosophie*, 1922, 22[3]:91–113, on p. 107). Canales quotes only the italicized part of the passage and refers "these" to the "psychological conceptions of time" (p. 47). In this way, the reader has the impression that Einstein deemed psychological time a mere "mental construction" that "did not correspond to anything concrete" (p. 47). This is, however, misleading. Reading the entire passage, one can see that "these" actually refers to "events." I suspect that the French *constructions mentales* was meant to correspond to the German *Gedankenkonstruktionen*, an expression that Einstein uses when referring to Bergson in his travel diary. Thus, a better translation might have been "conceptual construction." What Einstein seems to argue is that it is not legitimate to conclude from psychological simultaneity of sensation to the physical simultaneity of objective space-time events, because the latter are conceptual constructions that we use to organize our experience. This is exactly the opposite of Canales's interpretation. Canales's agenda is to suggest that, for Einstein, the "physical" is real and the "psychological" is not. However, a few weeks after the Paris meeting, when asked about the nature of the relationship between psychological and physical, Einstein declared himself a supporter of psychophysical parallelism—psychological and physical are two sides of the same coin. "Physics," Einstein wrote "signifies *one* possible way among others equally justified to put experience in a certain order" (Ernest Bovet, "Die Physiker Einstein und Weyl antworten auf eine metaphysische Frage," *Wissen und Leben*, 1922, 15[19]:901–906; Einstein's answer is on p. 902).

Canales often makes skillful use of the textual evidence, turning dry academic writing into something that has a narrative flow. However, she sometimes indulges in an overdramatized reading of the sources. For example, Canales suggests, in a letter to a Maurice Solovine (20 May 1923), that Einstein "connected his decision to resign" from a committee chaired by Bergson "*directly* to Bergson's reception of relativity" (p. 123; my emphasis). However, on closer inspection, the two issues are simply mentioned one after another in the letter (at the end of a longer list of other unrelated issues). In conclusion, the reader should take advantage of the impressive number of historical sources that Canales was able to collect in this book. However, the reader should also be warned not to embrace uncritically Canales's reading of this material.

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