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**Title**

Book Reviews

**Permalink**

<https://escholarship.org/uc/item/1wf5r0p8>

**Journal**

Physics in Perspective, 18(2)

**ISSN**

1422-6944

**Author**

Golan, Tal

**Publication Date**

2016-08-01

**DOI**

10.1007/s00016-016-0183-2

Peer reviewed

## Book Reviews

Brandon R. Brown, *Planck: Driven by Vision, Broken by War*, Oxford: Oxford University Press, 2015, 258 pages, \$29.95 (hardcover).

Tal Golan\*

*Planck: Driven by Vision, Broken by War*, by Brandon R. Brown, is a thoughtful and moving biography of the famous Max Planck, the doyen of German science during its best and worst periods and the fountainhead of quantum physics, which revolutionized our understanding of nature. Planck's life is a tale of tragic proportions. As a father, he lost all of his four children: two sons to the two world wars, and two daughters in between. As a scientist, he started a revolution he did not wish for, one that threatened to undermine his fundamental belief in a causal universe, transparent to human reason. As a German patriot, he felt obligated to cooperate with a regime he thoroughly detested, which eventually robbed him of all that he cared for and challenged his deep-seated belief in a moral universe, accessible to human conviction.

Most tragic, perhaps, was the dilemma Planck faced during the early 1930s, with the rise of the Nazis to power. What should an honest scientist do when his beloved country turns into a bastion of extraordinary evil? Albert Einstein, the brightest star of German science and Planck's close colleague and friend, did not hesitate. In 1933, he left Germany for the US and deployed his international status and fame to attack the Nazi regime and trumpet its atrocities. Einstein, however, was a free-spirited, left-leaning, cosmopolitan Jew with little formal obligations, whereas Max Planck was a conservative Prussian gentleman who held several key executive positions with heavy responsibilities and whose loyalty to the state equaled his devotion to science. He chose to stay at the helm and cooperate with the new regime, in order to protect and salvage as much as possible of German science from the Nazi deluge.

Einstein's and Planck opposite choices shaped not just the rest of their lives but also their legacies. Siding with the winners, Einstein became a global icon—the beloved Uncle Albert who joyfully played with the wonders of creation. Planck, on the other hand, paid the ultimate price for his Faustian deal. He died shortly after the war, wretched and in much agony, after seeing his last and dearest son

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\* Tal Golan is an associate professor in the history department at the University of California, San Diego.

convicted for treason and executed by the very Nazi regime he, Planck, got into bed with.

The scholarly attention of later historians has been similarly slanted. Whereas Einstein has been the topic for a multitude of biographies, Brown's is only the second of Max Planck in English. The first was John Heilbron's *The Dilemmas of an Upright Man: Max Planck and the Fortunes of German Science*, which came out in 1986 and was written for a scholarly audience. Brown's *Planck* therefore fills an important lacuna. It makes heavy use of Heilbron's biography, but also contributes plenty of new information and insights, all in a style that makes Planck's epic story accessible to the general reader.

Historians have argued long and hard about the lessons to be learned from Planck's life and choices. Some admired his principled decision to stay and do his best to protect German science. Others considered his hope to keep a clear conscience while cooperating with the devil pure folly and argued that he could and should have done more to oppose the Nazi regime. Brown avoids taking a clear position in this debate, though his sympathies for Planck are often clear. Instead, Brown chooses to illuminate his subject in sixteen chapters, each titled after a particular month during Planck's final years. Each chapter starts by describing an event that took place during that specific month, then uses that event as a stepping-stone to a wider discussion that travels back and forth in time, in an attempt to illuminate certain aspects of Planck's life, character, and choices.

Brown is a professor of physics at the University of San Francisco and some of the chapters bring out his considerable ability to paint vivid pictures of the science involved. Such is, for example, Chapter 10, titled "July 1944," which starts with the celebration that the Berlin Academy of Sciences arranged for the fiftieth anniversary of Planck's induction into the academy, expanding from there to discuss Planck's major contributions to modern physics. Other chapters may cause professional historians slight discomfort. One such, for example, is Chapter 5, titled "January 1944," which centers on a hypothetical box of books that Planck may have received and expands from there to discuss a fuzzy spectrum of Planck's intellectual interests. Still, overall, the book's peculiar structure works well and allows Brown to paint a multi-faceted, nuanced portrait of Planck as a family man, friend, scientist, intellectual, administrator, patron, and a German patriot, and to describe how these facets were shaped by and conflicted with the tumultuous developments of science and politics of the time.

The biography ends with a coda titled "1945–1947," which describes Planck's last gift to Germany and science. In July 1946, as part of the effort to reconstitute a new Germany, divorced from its traditions of militaristic mystic and expansionist ambitions, the Western Allies dissolved the Kaiser Wilhelm Society, Germany's central scientific organization that cooperated with the Nazi regime. In its stead, Planck agreed to give his name to a new scientific society that vowed its alliance to the universal truths of nature alone, independent of human whims and follies. Guided by these creeds, the Max Planck Society has since grown to become

Germany's quintessential scientific engine, today operating eighty-three research institutes and employing more than ten thousand scientists. Planck would have probably considered this his greatest honor, if not a suitable amends for a tragic life.

History Department  
9500 Gilman Drive  
La Jolla, California 92093, USA  
E-mail: [golan@ucsd.edu](mailto:golan@ucsd.edu)

Giuseppe Bruzzaniti, *Enrico Fermi: The Obedient Genius*, translated by Ugo Bruzzo, New York: Birkhäuser, 2016, 348 pages, \$29.95 (hardcover).

Peter Pesic\*

Despite Enrico Fermi's commanding importance in twentieth-century physics, surprisingly few larger studies have addressed his life and work. For a long time, apart from Laura Fermi's engaging *Atoms in the Family* (University of Chicago Press, 1954), Emilio Segrè's *Enrico Fermi, Physicist* (University of Chicago Press, 1970) was the only book-length work available, particularly valuable because of its author's expertise as a physicist as well as his intimate perspective as a close friend and colleague of Fermi's.\*\* Giuseppe Bruzzaniti's biography first appeared in Italian in 2007; its English translation makes it accessible to a wider audience curious about Fermi. Strangely, the translated version provides no description of its author; the only information I have been able to find identifies Bruzzaniti as serving in the Italian Ministero dell'Istruzione in Rome.

Bruzzaniti chose an unusual structure for his biography. His first chapter gives an overview of Fermi's whole life and career in fifty pages. Chapter 2 gives a summary account of twentieth-century physics, including relativity, quantum theory, and nuclear physics, up to 1933. Chapter 3 treats Fermi's "research itineraries" (as the author calls them) during that same period; the fourth chapter turns back to summarizing physics from 1934–54 (the year of Fermi's death), including nuclei and particle accelerators, cosmic ray physics, and the early stages of "fundamental particle physics" (as Fermi preferred to call it, rather than "elementary particle physics"). The fifth and final chapter considers Fermi's "research itineraries" during those last twenty years of his life. Fully a third of the

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\* Peter Pesic is director of the Science Institute at St. John's College in Santa Fe, NM, and is co-editor-in-chief of *Physics in Perspective*.

\*\* James Cronin edited a helpful selection of documents and reminiscences in *Fermi Remembered* (University of Chicago Press, 2004). Carlo Bernardini and Luisa Bonolis edited the valuable collection *Enrico Fermi: His Work and Legacy* (Società Italiana di Fisica, 2004); there are also brief accounts, such as Pierre de Latil, *Enrico Fermi: The Man and his Theories* (Eriksson, 1964) and Dan Cooper, *Enrico Fermi and the Revolutions of Modern Physics* (Oxford, 1999).

book (almost a hundred pages) is devoted to various appendixes, including an extensive chronology of Fermi's life, six documents (including Wolfgang Pauli's letter on the neutrino hypothesis and reminiscences of Fermi by T. D. Lee), and thirteen brief accounts of various topics in physics (such as basic relativity, isotopic spin, hyperfine structure, and particle accelerators). I do not think this episodic and broken-up structure served the author well; one has the feeling of reading every history twice, and not necessarily with much greater insight.

Clearly, Bruzzaniti intended giving general educated readers enough supplementary material so that they could better follow the meaning and impact of Fermi's work. In this, he seems to have wanted to go more deeply into certain aspects of that work than Segrè had done in his readable and nontechnical book. At some points, Bruzzaniti has given us more detail and information, especially about Fermi's early work on relativity, which I found the most interesting part of the book. This account of Fermi's work in general relativity changed the picture I had of his accomplishment and interests. That said, the remainder of Bruzzaniti's book goes over ground that Segrè had already covered quite well; indeed, Bruzzaniti properly cites and acknowledges Segrè at many points. Given Segrè's fine book, I think Bruzzaniti should not have tried to write another general book but rather went into greater detail, such as Abraham Pais's fine biography of Einstein (*Subtle is the Lord...*, Oxford University Press, 1982). It is also lamentable that Bruzzaniti does not give any bibliography beyond the list of works by Fermi that one already finds in Segrè's book; such a bibliography would have helped readers to locate studies of Fermi that have emerged in the past few decades.

Bruzzaniti tries to offer interpretative insight into Fermi through concepts he calls "research itineraries" and "global maps," though he never sufficiently clarifies what exactly these meant or revealed; as far as I could judge, a "research itinerary" refers to an individual scientist's sequential projects or discoveries, whereas a "global map" indicates a larger movement, such as "quantum physics" or "relativity," shared by many scientists. I was intrigued by the implied relation between the individual and the larger community and would have liked Bruzzaniti to go much further with it. But he does not help us understand its relation to other interpretative approaches by historians of science that might have situated what he is doing in a larger context. As it stands, he gestures towards these concepts at certain points without really allowing us see what they could mean or help us understand.

Bruzzaniti also periodically refers to Fermi as "Galilean," by which he means that Fermi, like Galileo, sought "sensible experiences" as well as "certain proofs" (1). Certainly Fermi seems to have practiced both theory and experiment at a level not seen since; certainly Galileo was comparable. But were not many physicists between them also "Galilean" in that combination of activities? Indeed, until the time of Max Planck or even Fermi, theoretical physics was not generally acknowledged as a separate practice from experiment, with its own academic chairs. Surely the comparison between Fermi and Galileo should go beyond

merely their shared Italian identity. Nor does the author ever explain his intriguing subtitle, “The Obedient Genius,” beyond a passing reference to “the young researcher’s obedience to the academic rules” as part of “the different nuances of his scientific ‘prudence’” (259). Bruzzaniti never really clarifies, much less justifies, this striking epithet. Does Bruzzaniti consider Fermi’s relation to the Fascists (whom he escaped) as “obedience”? And what of his “obedience” to the American government? The issue is too important to leave hanging thus.

Though this book has some fine moments and will certainly be serviceable to general readers, I regret to say that it is marred by many gross errors of English usage. Careful editorial review by a native speaker could have fixed the lapses found on so many pages (such as using “resumed” to mean “summarized” or even typos like “50” for “so”). Not merely embarrassing mistakes, these errors at times impede the reader’s understanding; one has to pause to puzzle out what the text could possibly mean. Such a distinguished publishing house as Birkhäuser should not allow its books to appear without the requisite editorial supervision and careful copyediting.

Unfortunately, this is not the biography that Fermi deserves and we need. In the light of Pais’s example (and many other fine works), hasn’t the time come for more real biographies of physicists that combine readability, insight, historical awareness, and the scientific substance that were so essential to their lives?

St. John’s College  
1160 Camino de la Cruz Blanca  
Santa Fe, NM 87505, USA  
E-mail: ppsic@sjc.edu