

found in the progressive stages of certainty brought about by systematic actions over nature rather than passive contemplation; authorization was the basic role of the House of Solomon, later to be materialized in the Royal Society; confirmation is related to all the personal virtues of the natural philosopher as prophet and gentleman (patience, self-sacrifice, constancy etc.); divination is identified with the inductive method; and prophecy appears in the supposedly plain style of reporting which included genres such as fables and aphorisms for the outsider in order to generate more debate. In Chapter 4 the book delves into the analogy between the prophetic temples as loci outside the *polis* and the Royal Society as a supposedly neutral environment in the political unrest of seventeenth-century England.

After an interlude in which the author establishes an important distinction between the expert (who offers knowledge as if attainable by the majority) and the prophet (who presents knowledge as beyond the reach of the general public), the second part of the book takes us to America in the second half of the twentieth century. J. Robert Oppenheimer's self-portrayal before, during and after his trial and Rachel Carson's use of mass media are the two main examples Walsh presents of modern individual prophets: the former as a cultic prophet, an apostle for peace and a victim of political fear; the latter as an average housewife on the peripheries of academic science and political decisions creating a *kairos* for public debate on pesticides. More difficult to follow is the argument of Chapter 9 on the rhetorical technologies of climate change, where advocates and deniers of the importance of climate change seem to replicate prophetic patterns such as the accusation of bias in the opponents' reports or the mixture of present description and future predictions. Furthermore, since debates on climate change are still under way, this case epitomizes one of the main roles of the prophetic ethos: negotiations with uncertainty.

This book is interesting, nuanced and stimulating. At times it is difficult to see how it all works towards a consistent argument. Chapter 8, for instance, builds on the work of Karl Giberson and Mariano Artigas in their *The Oracles of Science* (2007) and analyses the rhetorical devices of celebrity scientists; but by so doing Walsh moves away from the main argument of the book, which is, as far as I understand, the role of scientists as prophets in the political debate and not so much as media stars. The non-American reader may at times find it difficult to relate to the dynamics of public debates presumed in this book.

JAUME NAVARRO  
*University of the Basque Country*

MASSIMILIANO BADINO and JAUME NAVARRO (eds.), **Research and Pedagogy: A History of Quantum Physics through Its Textbooks**. Berlin: Edition Open Access, 2013, Pp. 296. ISBN 978-3-8442-5871-4. €37.84 (hardback).  
doi:10.1017/S0007087415000485

The project sounds innocent enough. We all know what textbooks are, and it seems to be an interesting question to trace the history of an emerging theory through an analysis of its early textbooks. But as this book shows, not surprisingly perhaps, it is not nearly as simple as this. For one thing, quantum physics has a long and convoluted history, it was shaped by many contributors, and it is even questionable whether it constitutes a discipline or theory of its own or rather pertains to several different disciplines or theories in physical science. To complicate matters even further, it turns out that the category of a textbook is an elusive one as well. It seems straightforward to name typical examples of textbooks – we all have learned science through textbooks. But it is one of the surprises of this collection of essays, each of them dealing with one textbook from the early years of quantum theory, that each and every one of those textbooks is an individual, if not idiosyncratic, piece of scholarship, and each and every one of them defies classification as a typical textbook of quantum physics. There really is no such thing as a typical exposition of quantum physics prior to the mid-1930s, which is the cut-off

date for the volume. This, at least, is my impression from the ten essays that the editors have assembled, all written by competent historians of physics.

The collection starts out with a contribution by Marta Jordi Taltavull on Paul Drude, whose textbooks *Physik des Aethers* (1894) and *Lehrbuch der Optik* (1900, 1906) belong, of course, to the realm of textbooks that need to be considered, although they do not contain any quantum physics – yet. Dieter Hoffmann discusses Max Planck as a textbook author, commenting on the ‘bizarre’ fact that the quantum hypothesis ‘received almost passing treatment in his lectures and anything but center stage’ (pp. 78–79) and that one of the founders of and main contributors to the new theory never wrote an independent textbook on quantum physics. Massimiliano Badino writes about Otto Sackur and his *Lehrbuch der Thermochemie und Thermodynamik* (1912), which blurred the distinction between classroom pedagogy and presentation of new research. Similarly, Clayton Gearhart presents Fritz Reiche’s *Die Quantentheorie: Ihr Ursprung und ihre Entwicklung* (1921) as a snapshot of ongoing research across disciplines. Arnold Sommerfeld’s *Atombau und Spektrallinien* in its various editions and translations is discussed by Michael Eckert. First published in 1919, it saw new and revised editions almost every year in 1921, 1922 and 1924. Perhaps one of the most influential monograph expositions of the mature old quantum theory, it is an individual par excellence, with its hybrid form of non-technical exposition and highly technical extensive endnotes, and its emphasis on, and inclusion of, new research in every edition. Charles Midwinter and Michel Janssen take a look at the situation outside Europe and discuss John H. Van Vleck’s 1927 exposition of the old quantum theory in a book-length *Bulletin* for the US National Research Council as well as his later textbook on *The Theory of Electric and Magnetic Susceptibilities* (1932). They go into technical details in a discussion of ‘Kuhn losses’ (p. 139), explanatory feats of an old theory that get lost with the establishment of a new paradigm. Domenico Giulini emphasizes the uniqueness of Max Born’s *Vorlesungen ueber Atommechanik*, the first volume of which appeared in 1925 and is remarkable both for the epistemological aspect of its axiomatic treatment and for the technical aspect of Bohr–Sommerfeld quantization of multiply periodic systems. Jaume Navarro takes a look at the teaching of quantum physics in the tradition of the Cambridge tripos in the 1920s, highlighting the two textbooks on *The Quantum Theory of the Atom* (1926) and *The New Quantum Mechanics* (1928) of the now lesser-known Cambridge-trained physicist George Birtwistle. The situation in Cambridge changed when Paul Dirac entered the stage, whose abstract and somewhat inaccessible *Principles of Quantum Mechanics* (1930) is presented by Helge Kragh. Don Howard finally discusses Pascual Jordan’s *Anschauliche Quantentheorie* (1936) as ‘an unusual and complicated textbook authored by an unusual and complicated working physicist in an unusual and complicated setting’ (p. 265).

With all this richness in material, presented with detailed historical context, the book calls for historiographical reflection, and the editors offer interesting thoughts on the epistemological role of textbooks. These represent media that facilitate deductive organization, although they often come with historical introductions. Their contents reveal the necessity of having some organizational principle to deal with the sheer amount of material. In the case of quantum physics, the textbooks also reflect an emerging division between theoretical and experimental physics. There is a history to the genre, too, emerging from a nineteenth-century tradition of university lecturing, embedded in a Humboldtian ideal of unity of research and pedagogy. David Kaiser completes the volume with some general historical reflections on the use of textbooks in science.

Notwithstanding the fact that there is no typical textbook, the selection of works analysed in this collection offers a fairly representative cornucopia of books about an unwieldy field of quantum physics in its first three decades. Some important textbooks and authors are missing, such as John von Neumann and Werner Heisenberg, but they get mentioned by way of comparison with their competitors. The book is a thought-provoking read and offers many insights and nuances for our understanding of the history of quantum physics as well as for a general

historiography of science. Nevertheless, as a book about books, one needs an independent, prior knowledge of quantum physics and its early history in order to fully appreciate its interest.

TILMAN SAUER  
Universität Bern

KENNETH D. MCRAE, *Nuclear Dawn: F.E. Simon and the Race for Atomic Weapons in World War II*. Oxford: Oxford University Press, 2014. Pp. xxviii + 284. ISBN 978-0-19-968718-3. £35.00 (hardback).

doi:10.1017/S0007087415000497

In recent years, the study of German-speaking émigré scientists in Britain after 1933 has received considerable scholarly attention, shedding light on this previously often overlooked facet of the British history of science. Kenneth D. McRae's monograph *Nuclear Dawn: F.E. Simon and the Race for Atomic Weapons in World War II* contributes to this area of study. Focusing on Franz (Francis) Simon, McRae explores the life and scientific work of one of the most important of these émigrés. Born in Berlin in 1893, Simon trained as a physicist and subsequently became widely known for his pioneering work in low-temperature physics and, especially during the Second World War, uranium separation.

For the most part, McRae's book is an orthodox biography of Franz Simon that largely adheres to a chronological structure and is divided into eleven chapters. After the first chapter has focused on Simon's and his wife Lotte's formative experiences of the First World War, the ensuing three chapters follow them through three important stages in their lives, from 1920s Berlin to Breslau, where Franz Simon was appointed to a chair at the local university. Chapter 4 deals with the Simons' emigration to Oxford, where Simon found employment in wake of Adolf Hitler's appointment as German chancellor and the subsequent implementation of legislation that excluded Jewish scientists like him from working in German academe. Chapters 5 and 6 then focus on the Second World War and Simon's contribution to the making of the first atomic bombs in the joint Anglo-American-Canadian Manhattan Project. The subsequent chapter attempts to offer an explanation as to why Nazi Germany failed to develop a working atomic weapon, before the next one looks at Simon's work in the early postwar period. Chapter 9 focuses on the Klaus Fuchs atomic espionage case. The following part explores the extent to which Franz Simon re-established contact with former colleagues inside Germany and others who, like him, had been forced to leave Germany because of National Socialist policies. *Nuclear Dawn* concludes with a final chapter in which McRae explores Franz Simon's professional travels and the Simon family's holidays in the postwar period, ending with Franz's death in 1956.

In some ways Kenneth D. McRae's biography is a curious book. On the one hand, the author had access to primary source materials that no other researcher has used before him. On the other hand his study often fails to place these sources adequately within their wider historical and historiographical contexts. Instead, McRae offers for most part a close reading of these documents. And this is one of the major weaknesses of McRae's book. Existing key historiography of émigré scientists in Britain (e.g. Paul K. Hoch's pioneering work, or Sabine Lee's edited selected correspondence of Rudolf Peierls) or of nuclear history more widely (e.g. Ferenc M. Szasz's work on British scientists and the Manhattan Project, or Andrew Brown's biographies of Sir James Chadwick and Joseph Rotblat) is absent from *Nuclear Dawn*. Similarly, recent work on German-born refugee scientists who emigrated to the United States and played an important role in the Manhattan Project, such as James Franck (Jost Lemmerich, *Science and Conscience: The Life of James Franck* (2001)), might have offered an insightful comparative angle on Simon's experience. The lack of engagement with recent historiography becomes particularly evident in Chapters 7 and 9. In Chapter 7, 'an essay in comparative analysis of the five nuclear programmes that were active during the war year' (p. 137), Cathryn Carson's work on Werner