stood, in the same way a good lecturer enlivens a class discussion. A course based on this book could be an excellent elective in a physics department; it might even draw students from other STEM fields due to the intrinsic interest of the material or the usefulness of its techniques.

In presenting the subject, the author draws from the past 30 years of developments that have advanced our understanding of dynamics beyond the linear examples—for instance, harmonic oscillators—that permeate current physics curricula. The advances came from theoretical and computational scholars, and the book does a great job of acknowledging them. The methods and techniques that form the bulk of the book's content apply useful concepts—bifurcations, phase-space analysis, and fractals, to name a few—that have been widely adopted in physics, biology, chemistry, and engineering. One of the book's biggest strengths is that it explains core concepts through practical examples drawn from various fields and from real-world systems; the examples include pendula, Josephson junctions, chemical oscillators, and convecting atmospheres. The illustrations, in particular, have been enhanced in the new edition.

The techniques needed to understand the behavior of nonlinear systems are inherently mathematical. Fortunately, the author's excellent use of geometric and graphical techniques greatly clarifies what can be amazingly complex behavior. For example, in carefully working through the development and behavior of the Lorenz equations, Strogatz introduces a simple waterwheel machine as a model to help define terms and tie together such key concepts as fixed points, bifurcations, chaos, and fractals. The reader gets a feel for the science behind the differential equations. Moreover, for each concept, the mathematics is accompanied by clear figures and nicely posed student exercises.

This is fast becoming a staple book among practitioners of nonlinear dynamics. Both my theory and experimental colleagues often recommend it to their students. Other books in the same genre are worth mentioning: Edward Ott's *Chaos in Dynamical Systems* (2nd edition, Cambridge University Press, 2002) is an excellent introduction at a graduate level, and Robert Hilborn's *Chaos and Nonlinear Dynamics: An Introduction for Scientists and Engineers* (2nd edition, Oxford University Press, 2001) is quite reader friendly. This second edition of *Nonlinear Dynamics and Chaos* is a great addition to our communal bookshelf. It serves for a wide range of uses and will be of interest to audiences with diverse backgrounds and levels of expertise.

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Serving the Reich

The Struggle for the Soul of Physics Under Hitler

Philip Ball
U. Chicago Press, 2014. $30.00
(320 pp.). ISBN 978-0-226-20457-4

Several books have been written about the German scientists who worked under the Nazi regime. One early classic was Alan Beyerchen's *Scientists Under Hitler: Politics and the Physics Community in the Third Reich* (Yale University Press, 1977). Other examples are Mark Walker's *Nazi Science: Myth, Truth, and the German Atomic Bomb* (Plenum Press, 1995) and the more recent monograph edited by Walker and Dieter Hoffmann, *The German Physical Society in the Third Reich: Physicists Between Autonomy and Accommodation* (Cambridge University Press, 2012).

Most of that literature is motivated by such underlying questions as the following: How could men like Max Planck, Werner Heisenberg, and other pioneers of modern physics proceed with their work while Adolf Hitler ruled their country? Did they display moral qualms? Philip Ball, a freelance writer with 20 years of experience as an editor for *Nature*, attempts to answer those questions in *Serving the Reich: The Struggle for the Soul of Physics Under Hitler*. Has he anything new to add to this oft-debated topic?

The notes and bibliography show that Ball is aware of the most pertinent literature, including a good deal of the extensive German-language contributions and some archival sources, such as the Rockefeller Foundation Archives and the Samuel A. Goudsmit Papers at the American Institute of Physics (which publishes PHYSICS TODAY). In addition to Planck and Heisenberg, Ball focuses in particular on Peter Debye, who in 1938 signed an infamous letter requesting the resignation of Jews who had remained members of the German Physical Society.

In his introduction, Ball writes that the case histories of Planck, Heisenberg, and Debye display "the grey zone between complicity and resistance adjusted to Nazi rule." With regard to Planck, he adopts, without further probing, the conclusion of biographer John Heilbron, who summarized Planck's case with the title of his book *The Dilemmas of an Upright Man: Max Planck as Spokesman for German Science* (University of California Press, 1986). Heisenberg's case is more controversial, but here, too, Ball adds little new information; mostly he relies on David Cassidy's authoritative biography, *Uncertainty: The Life and Science of Werner Heisenberg* (W. H. Freeman, 1991).

Among historians, Debye's case is most controversial. It turned into a scandal when science writer Sybe Rispens portrayed him as a Nazi sympathizer; others regarded him as a victim. Ball's analysis of those diverging historical accounts deserves attention. In some details the narrative violates its stated goal to avoid black-and-white interpretations. For example, Philipp Lenard and Johannes Stark, the spokesmen for the Aryan Physics movement, appear from the beginning of the book as outspoken villains. Lenard, however, only became an aggressive enemy of Albert Einstein in 1920; in 1913 he revealed in a letter to Arnold Sommerfeld how much he appreciated Einstein. Stark, too, was one of Einstein's early admirers.

Both Lenard's and Stark's conversion to fanatic enemies of "Jewish" physics was largely a result of German nationalism resulting from World War I—right-wing Germans associated the Jews with the defeat of Germany and the rise of communism. Also, Stark did not have to defend himself before the Nuremberg court, as Ball suggests on page 254, but before a *Spruchkammer*, a local denazification court.

Another deficiency concerns the annotation. In most places, Ball pulls quotes from the secondary literature without reference to the original archival sources. Furthermore, he only references direct quotes, which makes it difficult for the reader to discern the source of other, unquoted material. This critique may sound like historical pettiness, but a narrative concerned with controversial interpretations should avoid any doubts about the sources from which its conclusions are derived.

Apart from those few criticisms, *Serving the Reich* is a remarkable achievement—not only for its popularization of historical debates but also for the depth of its analysis. Both the layperson interested in the moral dilemma of physicists under Hitler and the historian familiar with the controversial debates will find Ball's account highly instructive.

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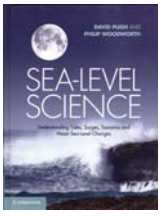
Sea-Level Science
Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes

David Pugh and Philip Woodworth
Cambridge U. Press, 2014. $99.00
(407 pp.). ISBN 978-1-107-02819-7

The study of long-term sea-level variations has intensified in the past two decades, largely because those variations are used as indicators of global warming. Global climate models call for acceleration in the rate of sea-level rise over the next century; the negative impact on low-lying coastal infrastructure and coastal populations could be significant.



For more than three decades, David Pugh and Philip Woodworth have been two of the most respected and referenced experts in the field of sea-level science. Their combined research and publication experience continues to inform the community. What's most impressive is the consistency and continuity of their work. *Sea-Level Science: Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes* is an acknowledged second edition to Pugh's *Tides, Surges and Mean Sea-Level: A Handbook for Engineers and Scientists* (Wiley, 1987). This update is a perfect companion to the earlier work.

Sea-Level Science will immediately become a useful and practical reference for government and private-industry educators, academic researchers, and coastal scientists and engineers, whether or not they are directly involved in the field of oceanography. The book is comprehensive; it covers the breadth of sea-level variations across the frequency spectrum—tsunamis, meteotsunamis, storm surges, periodic (for example, hourly) tidal variations, decadal sea-level variations, and variations spanning a century or more. The technical material in each chapter gives readers an opportunity to obtain a thorough understanding of the latest developments in the field.