succeeding chapters have summaries of its thermodynamic properties, most of the book is written as a series of review articles with virtually all figures and tables taken from journal articles. The book reflects Jacobs's unusually wide interests and range of understanding, which extend from the seismic, thermal regime and constitution of the Earth's inner and outer core to (in a particularly strong chapter) the origin and spatial and temporal characteristics of the Earth's magnetic field. The origin of the Earth with its core is treated extremely broadly in a long chapter that covers both the relation of the core's composition to different theories of the cooling of the solar nebula as well as the formation of planetesimals and their accretion into the terrestrial planets.

The breadth of the book's coverage is demonstrated by several pages devoted to geophysical tests (both morphologic and paleomagnetic) of the famous 1938 speculation by Paul Dirac that the gravitational constant might be decreasing with time, and that the Earth (as well as clusters of galaxies) might be expanding with time.

Although some sections of the book have references as recent as 1986, notably absent in the discussion of the accretion of the Earth and other terrestrial planets is any mention of the research in the area of large-body impacts on the young Earth conducted by A. G. W. Cameron and Willy Benz (Harvard) in 1986 or the theories of magma ocean production developed by Yutaka Abe and Takafumi Matsui (University of Tokyo) in 1985.

My major concern about the book is that Jacobs does not critically evaluate the large number of hypotheses he reviews; as a result, readers without previous knowledge may be confused. Summaries and conclusions for each chapter would have been a welcome addition. Nonetheless, I highly recommend the book as a definitive reference.

Paul Melchior's considerably shorter *The Physics of the Earth's Core* is sometimes terse, but it is in fact an adequately referenced outline of virtually all the physics you need to know to understand the thermal regime, hydrodynamics, geomagnetism and evolution of the Earth's core. It emphasizes the considerable range of physics associated with the flow and the vibrations of the solid and liquid portions of the Earth's core. The book summarizes the core motions that can be detected, and some that appear difficult to detect, via the study of the Earth's proper motion, its seismological behavior and the myriad phenomena associated with the magnetic field and its variation.

The mathematics and physics in the introductory chapter are hard to follow, but the presentations of thermodynamic, hydrodynamic, and geomagnetic theory in the book's later sections are clear and well-outlined. These sections, though not generally tutorial, provide good summaries of the mathematical and physical basis of our understanding of the core. Melchior explains some topics, for example, the Brunt–Väisälä oscillation, exceptionally clearly. He discusses poorly understood phenomena and limitations of both theory and observations and states explicitly the problems to be solved. The book has many unique figures and tables such as a five-entry listing of physical models of mechanical core–mantle coupling that includes thorough references to a rich literature. Melchior's expert presentation of core properties includes values for the various dimensionless ratios of hydrodynamic and electromagnetic quantities for both the outer (liquid) and inner (solid) regions of the core. This short book is an excellent value and I highly recommend it.

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Inside Relativity

Delo E. Mook and
Thomas Vargish
Princeton U. P.,
Princeton, N. J., 1987. 306 pp.
$30.00 hc ISBN 0-691-08472-6

Go to the source. The first strength of *Inside Relativity* by Delo E. Mook, professor of physics at Dartmouth College, and Thomas Vargish, professor of English at the University of Maryland, is that they have observed this dictum. Their laudable collaboration across two cultures hews closely to the opening pages of Einstein's great papers, drawing strength and legitimacy from Einstein's simple and powerful insights and beautiful prose.

But insights are simple and powerful only when they answer the right questions. Many intelligent laypeople (and some professionals) are not clear about what questions relativity answers. Providing this context is the second strength of the book. The title of the second section says it simply: "Models: The Products of Science." The authors take us quickly through a "heuristic history" of astronomical models as illustrations of the kinds of questions that science can (and cannot) confront. The elements of Newtonian mechanics illustrate these models and prepare us for Einstein's first paper on relativity.

This presentation is for those who wish to work carefully through the subject, anticipating difficulties, hearing it in different ways, tucking in each loose thread, relating new ideas to those that go before. The style is methodical and pedantic, employing long sentences rather than the staccato statements of much popular science writing. The understated stick-figure illustrations are mostly adequate, though I wished for figure legends to restate and to reinforce the concepts being illustrated.

The author's procedure works beautifully for the kinematics of special relativity, that is, the description of motion in flat space–time. And it helps us to penetrate some distance into general relativity, as far as Einstein's principle of equivalence. Their method runs into a brick wall, however, when Einstein turns to tensors. We still await the popular breakthrough in how to present the general theory of relativity. As an unfortunate result, their treatment of cosmology is mostly hand waving.

A section on how very fast objects would appear to the eye is exciting and unusual for a popular book. And readers will appreciate the book's helpful glossary. Several appendices provide more formal treatments for the more ambitious.

The weakness of this book is the obverse of its strengths. Setting the context, beginning with the sources, and carefully elaborating the logical consequences does not inform us about modern developments. We hear little about $E = mc^2$ or its implications, from particle physics to politics. We hear nothing about the ferment in general relativity that has transformed that field during the past 25 years. Readers who finish the book will want to move on to the brilliant popular description of recent applications of general relativity by Clifford M. Will in *Was Einstein Right?* (Basic Books, New York, 1986; reviewed in PHYSICS TODAY, May 1987, page 93).

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Fractals

Jens Feder
Plenum, New York, 1988.
283 pp. $49.50 hc
ISBN 0-306-42851-2

How long is the coast of Norway? Actually, the question has no unique answer. Jens Feder shows in *Fractals* that the length depends on the resolu-