

early books and their unexpected peregrinations from generation to generation. And some chapters focus on the relationships between people and rare books as expensive collectibles. I found the latter particularly intriguing. Gingerich's deep knowledge of that particular group of books is intimate: He knows them as individuals, and he recounts several stories of thefts, thwarted sales of stolen copies, and unfinished investigations.

The Book Nobody Read, whose title is an ironic reference to the opinion of novelist Arthur Koestler on *De Rev*, is also a window into the evolution of the historical understanding in recent years of the Copernican revolution. Gingerich describes how he and other historians, notably Edward Rosen and Robert Westman, sometimes debated, sometimes competed, and ultimately collaborated to better understand the reception of the Copernican theory. The insight that Gingerich offers into the formation of current historical views of the subject was a source of mild frustration for me, because the focus on the book as object is so intense that readers might not appreciate the intellectual history behind it. Also, the highly idiosyncratic account Gingerich provides creates its own questions: I kept wondering how Westman, who was simultaneously working on editions of *De Rev*, would tell the story of unraveling the families of annotations in *De Rev*.

Although the book's shortcomings are mostly irritants, the worst is the nearly constant stream of digressive footnotes. Many, perhaps most, of the footnotes are worth reading, but Gingerich should have found a place for them in the main text, where the mere act of reading them would not have interrupted the flow of the writing.

Despite my impatience with stumbling over the footnotes, the book is still well worth reading. Gingerich does an admirable job of treating many technical points in the history of astronomy. He explains fascinating details of early modern printing and book production that provide the clues to unmask fakes and to distinguish pristine copies from genuine, "sophisticated" ones. His narrative wanders into Johannes Kepler's calculation foibles, Tycho Brahe's legal troubles, and Galileo's lunar drawings, among other digressions, but the story always finds its way back to the relationships of the original, surviving copies of *De Rev*. Gingerich also brings in Latin paleography and early modern typography, both of which offer insight into the creation of *De Rev*.

With that said, the book's tone is rarely didactic and sometimes very

clever; it allows the historical figures themselves to come forth in the story. I particularly enjoyed glimpses of Andreas Osiander, the Lutheran pastor of Nuremberg who, without Copernicus's knowledge, inserted the notorious "Preface to the Reader" in *De Rev*. That preface left unwary readers with the impression that Copernicus himself was proposing something well short of a dramatic shift in cosmological thinking. Osiander emerges from the shadows here and there in Gingerich's book, guilty of provoking confusion among readers of *De Rev*.

Overall, I enjoyed *The Book Nobody Read* and learned a lot. More books by historians of science should be like it.

Jim Lattis

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Advanced Astrophysics

Neb Duric
Cambridge U. Press, New York,
2004. \$110.00, \$65.00 paper
(296 pp.). ISBN 0-521-81967-9,
ISBN 0-521-52571-3 paper

Astronomy Methods: A Physical Approach to Astronomical Observations

Hale Bradt
Cambridge U. Press, New York,
2004. \$120.00, \$65.00 paper
(433 pp.). ISBN 0-521-36440-X,
ISBN 0-521-53551-4 paper

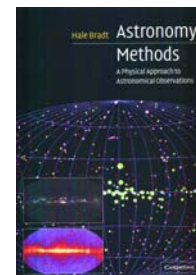
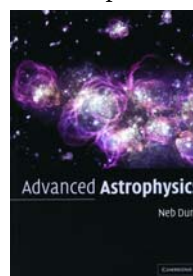
In the past decade, astronomy and astrophysics have undergone developments of fundamental significance. The increased activity in astrophysics and the field's strong coupling with other areas of physics have led to the subject's rising popularity in recent years. This growing interest has resulted in a proliferation of books dealing with theoretical astrophysics at different levels for different kinds of audiences. Neb Duric, once a long-time faculty member at the University of New Mexico's physics and astronomy department before recently moving to Wayne State University's medical school in Michigan, adds to this increasing collection with his latest book, *Advanced Astrophysics*.

Because astronomy is a field of science driven by observations, one of the main objectives of astronomy instructors is to acquaint students with the techniques behind astronomical observations. That is done routinely in good graduate schools, and one

would have thought the market would be flooded with books on observational astronomy. Surprisingly, that is not the case. *Astronomy Methods: A Physical Approach to Astronomical Observations* by Hale Bradt, a professor emeritus in MIT's physics department, is a wonderful welcome to a field in desperate need of more textbooks covering the subject.

Advanced Astrophysics claims to cover the field in a short span of about 290 pages. I personally believe such a task is impossible if one aims for complete coverage of the subject at a reasonable level. Yet Duric has bravely attempted the impossible, and the result is rather disappointing: If readers do not know the subject, they will find the discussions inadequate; if they are fairly familiar with the subject, they will find the discussions to be of little value.

The problem is further aggravated by the author's experimenting with a somewhat unconventional structuring of the chapters.



His idea, as emphasized in the preface, is to start with a physics topic and describe applications of that topic in different areas of astronomy and astrophysics. Thus, part 1 of the book treats cosmic expansion and large-scale structure as a part of classical mechanics. The thermal history of the universe comes later in part 2 after statistical mechanics has been introduced. It became obvious to me that Duric's approach leads to a very fragmented view of physics and, to a lesser extent, astrophysics. I was amused to see that a section in part 2 deals with barrier penetration in quantum mechanics while, much later in the book, part 4 is titled "Quantum Mechanics." Stellar structure is also discussed in part 2, while radiation from accelerated charges and radiative processes are mentioned later, in part 3 and beyond. A better reordering of the topics would be to cover the necessary physics background first and then apply the physics to astrophysical phenomena.

Another shortcoming of the book is that it has no exercises for students to test their understanding. The lack of exercise problems can be a major setback for students. I also did not find

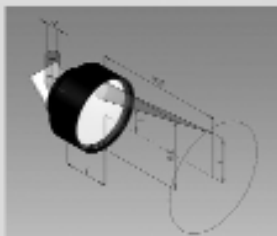


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any innovative or insightful discussions of conventional topics. Rather, virtually every topic is presented in the familiar manner of several other conventional textbooks. The figures are inadequate and often redundant. For example, I cannot understand why one needs figures 6.1 or 8.3—nothing is conveyed by them that cannot be stated simply in the text. Omitting some of the figures would have given more space for the author to discuss concepts in greater detail. Altogether, I found *Advanced Astrophysics* to be rather disappointing, especially since several other excellent textbooks deal with the same subject.

Although a fair number of good treatises on theoretical astrophysics exist, there are very few good textbooks on observational astronomy for graduate instruction. One notable exception for several years was the second, revised edition of *Observational Astrophysics* (Springer-Verlag, 1988) by Pierre Léna, François Lebrun, and François Mignard. But students can certainly do with many more textbooks at that level. Bradt's *Astronomy Methods* is a brilliant addition to the pedagogy. It is timely, focused, well written, and at the appropriate level, which makes it an invaluable contribution to the field.

I found several features of the book particularly attractive. First, it is eminently student oriented and suitable for self-study. Each chapter begins with a brief summary in a box explaining what the student can expect to learn, and each chapter concludes with several problems that have been compiled with care. The discussions are kept at an elementary level throughout, and the illustrations are well done and adequately supplement the discussion. In addition to covering the conventional topics one expects in such a book, the author devotes three final chapters to neutrino astrophysics, cosmic-ray physics, and aspects of gravitational-wave observatories.

Bradt provides very insightful coverage of conventional topics. For example, the absorption and scattering of photons in different contexts are illustrated nicely with appropriate diagrams, and issues that are usually confusing to a beginner are clarified with care. I also found that the author actually made the subject of celestial motions and timekeeping quite interesting, a task I thought was virtually impossible! The theoretical descriptions are adequate but are necessarily kept to a minimum. I would have been happier to see a little more theory sprinkled throughout the book or presented in the form of additional prob-

lems, but I gather from the preface that a more theoretical volume is under preparation by the author.

In summary, *Astronomy Methods* will be useful to all students of astronomy and astrophysics, irrespective of whether they intend to specialize in observational astronomy. The material can be adapted easily for various related courses, which makes the book even more valuable.

T. Padmanabhan

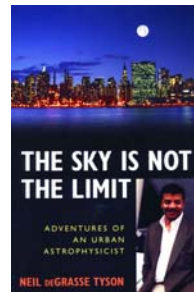
Inter-University Centre for Astronomy
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The Sky Is Not the Limit: Adventures of an Urban Astrophysicist

Neil deGrasse Tyson
Prometheus Books, Amherst,
NY, 2004 [2000, reissued].
\$18.00 paper (203 pp.).
ISBN 1-59102-188-X

The trouble with most scientific memoirs is that they are often composed late in the author's life. By the time an active scientist finds enough leisure time to publicly muse about the meaning of it all, he or she is usually a gray eminence and so accomplished that a younger reader is apt to be dazzled by a lifetime of achievements—and perhaps even discouraged into thinking that a life of science is only for those few endowed with overwhelming genius. Admittedly, one can profit from the voice of experience, but it's also refreshing to hear from someone closer to the beginning of the game, someone who can talk about present times as well as the good old days, and whose insights come not from the perspective of a lifetime but from a more immediate point of view.

Fresh introspection is part of what makes Neil deGrasse Tyson's *The Sky Is Not the Limit: Adventures of an Urban Astrophysicist* a pleasure to read. The book, a small collection of personal essays, was originally published in 2000 by Doubleday, but much has happened since then for Tyson, who revised and expanded the text and included new photographs. To be sure, his curriculum vitae is impressive: Bronx High School of Science graduate, Harvard University undergraduate, Columbia University graduate, Princeton University postdoc, and current director of New York City's Hayden Plane-



tarium—a powerful position at the nexus between astronomical research and public science education. He writes a regular column for *Natural History* magazine; has served on several US presidential commissions; recently hosted the television NOVA miniseries *Origins*, which aired on PBS in the fall of 2004; and, with Donald Goldsmith, coauthored the program's companion book, *Origins: Fourteen Billion Years of Cosmic Evolution* (W. W. Norton, 2004).

Tyson's story should strike a responsive chord with anyone interested in science. His parents were educators, and he spent his formative years as a middle-class kid in New York City. He caught the science bug early and was one of the many young people who frequented weekly astronomy classes at the Hayden Planetarium. He was a college wrestler and had a pretty smooth academic career right through his postdoctoral work. In one chapter of his book, he eloquently conveys his entrancement with science and the excitement he experienced in Chile while studying the Milky Way, a standard undertaking for most observational astronomers. Other chapters deal with exciting ideas in modern astronomy and some of Tyson's later adventures as a public figure interacting with the academic world. From his writing, one can see that the author is not just urban but also urbane: thoughtful, cosmopolitan, witty, and insightful.

Among the things that distinguish Tyson from so many others is his unique perspective as one of only a handful of black astrophysicists in the US. Although that circumstance doesn't figure heavily in his essays, Tyson does recount a number of anecdotes that must be achingly familiar to anyone of color in our country: He recalls being stopped by police for no particular reason and having strangers at parties or in shops talk to him as if he were a child, a boor, or a criminal. In spite of that, the author writes, "I have retained enough confidence in myself to treat these encounters as the entertaining side shows that they are."

Above all, Tyson sees himself as an educator, and if there is one overarching theme in his essays, it is that what really matters is the life of the mind and the sharing of the excitement of astrophysics with upcoming generations. *The Sky Is Not the Limit* expresses this theme well. I recommend the book to all who, whatever their date of birth, want to learn about what it means to do science in this day and age.

Larry Marshall
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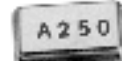
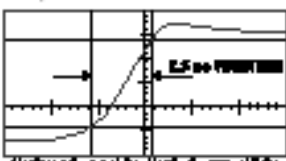


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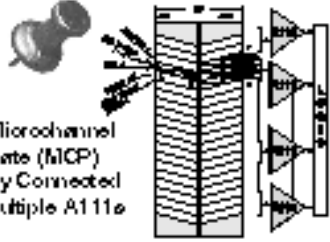
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