with drawings and photographs. Astronomers will like it and celestial mechanicians will love it, but scientists in other fields may find it a little too specialized for their tastes.

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The Construction of Stars

Structure and Evolution of Single and Binary Stars. C. W. H. DE LOORE and C. DOOM. Kluwer, Norwell, MA, 1992. xvi, 458 pp., illus. Paper, $69. Astrophysics and Space Science Library, vol. 179.

Our current understanding of stellar evolution is one of theoretical astronomy's greatest achievements. The ability to derive the general properties of known stars—including the sun—from basic physical laws has enabled astronomers to establish the age of our galaxy, the origins of all elements heavier than helium, and (indirectly) the size of the observable universe. Current unsolved problems in this field affect our understanding of theoretical physics (the solar neutrino problem) and of the evolution of life on earth (star and planet formation; solar irradiance variations and the greenhouse effect).

In *Structure and Evolution of Single and Binary Stars*, de Loore and Doom set out to introduce the physical principles and results of stellar structure and evolution at a level accessible to advanced physics and astronomy undergraduate students. After a brief introduction of observed stellar properties, the authors develop the basic building blocks and describe the numerical techniques needed to construct a model star on a modern computer. They then delve into our current understanding of the evolution of single and double stars as a function of their mass and describe how present theory explains the wonderful variety of single and binary stars we observe in the universe today. They conclude their account with many tables summarizing the structural properties of model stars.

For the most part, de Loore and Doom present a clear picture of the tools and results of modern stellar evolutionary theory. The description of the main physical ingredients for a model star—the thermodynamic properties of the gas, nuclear reaction rates, and opacities—provides an excellent introduction for a student and a good review for any practicing astronomer. The problems in these chapters help to develop the important results or aid the beginner in acquiring an intuitive understanding of how stellar interiors work. The chapters on the evolution of low-, intermediate-, and high-mass single stars are reasonably complete and note both the main successes and some of the remaining uncertainties of standard models. The chapter on the evolution of massive binary stars—the primary interest of both authors—is very good, and the tabular material in the last chapter should be useful for astronomers trying to confront observations of stars with theoretical predictions.

In spite of these general strengths, the book is not an ideal introduction to modern stellar evolution theory. For example, simple derivations of the mass-luminosity relation for main-sequence stars and the thin-shell instability for red giant stars would give students and researchers alike a better appreciation for the behavior of detailed

Vignettes: Conversational Gambits

New Year's Day 1988 found me seated in a lounge at Los Angeles International Airport, waiting for an incoming passenger. Academic that I am, I had brought along some research to pass the time: a paperback entitled *How to Recognize the Antichrist.* At the bar a middle-aged man and woman laughed and talked, seemingly oblivious to my presence. But as the man left, he stopped at my table and demanded, "Well, do you think you'll recognize him?" Caught off guard, I mumbled that I wasn't sure, since I hadn't yet finished the book. "I think he exists now," said the man earnestly. "Actually, I'm kind of pleased, because the sooner the better."

—*Paul Boyer*, in *When Time Shall Be No More: Prophecy Belief in Modern American Culture* (Harvard University Press)

Once a graduate student offered to explain why MIT types tended to hang together at parties. If you just wander around at random, he said, "People come up and ask questions like 'How do you like Boston?' . . . What does *that* mean? How am I supposed to answer a question like *that*?"

—*Fred Hapgood*, in *Up the Infinite Corridor: MIT and the Technical Imagination* (Addison-Wesley)

theoretical computations. The material on star formation—one of the most active fields in astronomy today—is not current, and the description of the evolution of low-mass binary stars is incomplete. Finally, a discussion of solar neutrino measurements—the most controversial test of standard evolutionary models for the sun—would have illustrated the uncertainties in the elementary physics used in modern calculations.

I think this volume would be a reasonable choice as the main textbook for an introductory graduate course on stellar structure and evolution. It presents the main aspects of the theory very nicely, but it does not provide students with a good picture of the most active areas of current research.

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