tics is well conceived, well written and nicely organized. It represents a valuable addition to the collection of undergraduate texts available today in laser physics.

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Newton's *Principia*: The Central Argument

Dana Densmore
Green Lion P., Santa Fe, N.M., 1995. 465 pp. $45.00 hc ($26.95 pb) ISBN 1-888009-01-02 hc (1-888009-00-4 pb)

Dana Densmore of St. John's College in Santa Fe, New Mexico, clearly identifies in her *Newton's* Principia*: The Central Argument* what she considers to be the *Principia's* core concern: "Buried within this heap of brilliant propositions," she writes, "is a central jewel, the establishment of universal gravitation and its use to demonstrate the elliptical orbits of the planets, which constitutes the main argument of the *Principia*." There is much more to the *Principia* as a work of rational mechanics than this selection, however central, but it certainly is a sufficient introduction to the *Principia* for any student.

The strength of this text as a guidebook to these selected portions of Newton's *Principia* lies in the teaching tradition from which it stems: St. John's College, founded in 1696, just nine years after the publication of the first edition of Newton's *Principia*, and its distinctive curriculum centered on "great books." The college's flyer on the World Wide Web (http://www.sjca.edu) sets out the institution's pedagogical goal: "Through the reading of original texts, students reflect on the great questions of the Western tradition from ancient Greece to modern times."

The intent of Densmore's guidebook is to involve the student actively in Newton's analysis; Newton's tendency to omit intermediate steps in the analysis offers ample opportunity for such involvement. To that end, the guidebook is designed on three levels: The first consists of the translation, by W. H. Donahue, from Newton's Latin text itself, and it is distinct from the author's notes and expanded proofs. The student can thus attempt to follow Newton without intervention. The second level offers minimal help in the form of notes that alert the student to possible omissions and potential pitfalls in Newton's presentation and then challenge the student to fill in any steps that are missing. The third level provides an expansion of Newton's sketch of the demonstration and offers a step-by-step demonstration of what Densmore thinks "Newton would have given as a complete proof."

Throughout the guidebook, the student is urged to attempt the demonstration before reading these extended notes, but the notes are always there as a safety net when needed. The challenge to understand Newton's analysis excites the author, and she has written the guidebook to communicate that excitement to the student.

On what level and in what time frame is such a communication possible? Densmore appears to gear the guidebook toward an upper-division undergraduate course, when she notes that "the Muses of this guidebook have been the students in my junior mathematics tutorials [at St John's]." Moreover, it is evident that some knowledge of Euclid's *Elements* is assumed, in both technique and substance. Specific references to the *Elements* are given, however, for those less familiar with Euclid. The time span for the course is a semester, although the author notes that "those who have more than a semester to spend on Newton can profitably work . . . out some of the intriguing side paths [not covered in the guidebook]." I can only look with envy at an institution such as St. John's that is willing to offer a semester to the *Principia*, and with absolute admiration at those that offer more.

There is much more that could be said about the many strengths (and some weaknesses) of this work. It is a scholarly work, but the mind of Newton offers a challenge even to the most dedicated of scholars. In an attempt to avoid a modern reading, Densmore may well have imposed a Euclidean view that is more stringent than is consistent with Newton's thought. But that is a side of Newton often neglected and thus one that deserves attention.

Although the strength of the guidebook is the author's demand for attention to detail, this demand provokes another problem, which is exacerbated by her choice of the much expanded third edition of the *Principia* in place of the first edition. The reader must excavate a vast amount of material to uncover "the jewel buried within this heap of brilliant propositions" that she argues is located in Book Three. It is not a journey for the weak in heart. It will be an education, however, for the brave instructor as well as the courageous student. I strongly encourage interested faculty to generate a seminar that will devote a semester to this challenge.

Use Densmore's challenging guidebook, but also get a copy of the entire *Principia* (a new translation by I. Bernard Cohen is soon to be published by the University of California Press). Hold Densmore's analysis of Newton's opening lemmas up to your knowledge of the calculus that has evolved. Follow her insights into and criticisms of Newton's demonstrations. Look with care at the curvature lemma (lemma 11) and at the "alternate" demonstrations, which she has deleted. Form for yourself a view of the wonderful world of Newton's thoughts on dynamics—a world far removed from that which most physicists now present in their lectures on Newtonian mechanics. Densmore has provided a guide to that world, but you must make the journey yourself.

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Understanding Relativity: A Simplified Approach to Einstein's Theories

Leo Sartori
U. of Calif. P., Berkeley, Calif., 1996. 367 pp. $50.00 hc ($19.95 pb) ISBN 0-520-07986-8 hc (0-520-20029-2 pb)

Leo Sartori's *Understanding Relativity* is a treatment of relativity at an undergraduate level. It uses some math—mainly algebra with a slight amount of calculus—and is aimed at a freshman or sophomore course. Sartori's text is competent, it has merit, but it is simply one that I personally do not like overly much.

A text should inspire, teach, be a reference, supply problems. It should be attractive to both student and professor. It is to be used, possibly with other references, in a course, and the course should have well-defined prerequisites, methods and goals or objectives, all of which should be reflected in the text. (I contrast Sartori's book with the second edition of *Spacetime Physics: Introduction to Special Relativity* by Edwin F. Taylor and John Archibald Wheeler [Freeman, 1992], which I prefer.)

Sartori covers a fairly standard list of special-relativity topics, although not in what I would call a simplified manner. There are some oddities: He uses Loedel diagrams, in which orthogonal axes represent ct in one inertial frame and x' in another. I feel these diagrams confuse more than teach; I feel, for example, that they