current topics as degenerate gases in optical lattices, quantum gases with large angular momenta, low-dimension Bose gases, condensates in chip traps and waveguides, atom–molecule coherence near Feshbach resonance, or fermion pairing near Feshbach resonance. The authors are not to be blamed for such omissions, because those subjects all appeared within the past year or two. The rapid developments only illustrate why an excellent text such as *Bose–Einstein Condensation in Dilute Gases* is needed in these exciting times.

Tin-Lun Ho
Ohio State University
Columbus

Soft Condensed Matter

R. A. L. Jones
Oxford U. Press, New York, 2002. $65.00, $30.00 paper (195 pp.).
ISBN 0-19-850590-6,
ISBN 0-19-850589-2 paper

Soft condensed matter has had a slow and difficult evolution toward acceptance as a subfield of physics. Even acceptance of the field's name has taken time. What does "soft" mean? And what does soft condensed matter physics include? Liquid crystals and polymer physics are surely parts of it, but the study of those topics has been well established for much longer than soft condensed matter.

Good textbooks are essential in establishing any field; they help broaden interest in the field and ensure that the next generation of physicists can learn it. The classic textbook for soft condensed matter is *Principles of Condensed Matter Physics*, by Paul Chaikin and Tom Lubensky (Cambridge U. Press, 1995), which does not even have "soft" in its title, even though it was the first general text to deal with the subject comprehensively. That book, which has certainly helped stimulate interest, is suitable for advanced graduate students (or for bedtime reading in British sitcoms like "Keeping Up Appearances"). But a need has long existed for texts suitable for an introductory graduate or senior undergraduate course. *Soft Condensed Matter*, by Richard A. L. Jones, is the first textbook to meet that need. Jones, a professor of physics at the University of Sheffield, UK, is an experimentalist whose expertise is polymers at interfaces.

A first critical task for a book on soft condensed matter physics is to define the field's extent. That task is particularly difficult because the field is still so young that it continues to expand its reach; I think many scientists would define it much more broadly today than even five years ago. Jones defines soft condensed matter as "materials in states of matter that are neither simple liquids nor crystalline solids of the type studied in other branches of solid state physics" (p. 1). He adopts the rather traditional approach of focusing primarily on complex fluids, including colloids, surfactant solutions, polymer solutions, and liquid crystals. He also discusses polymer melts, block copolymers, and biomolecules.

A second important decision is how to organize the material. Should the book be organized around concepts that unify the field or around material problems that define it? Jones chooses a mixture of the two. He has several chapters that focus on generic soft materials; these include chapters on colloids, polymers, and biological materials. Other important classes of materials are combined with concepts. Thus gels are discussed in a chapter about gelation; liquid crystals are discussed in a chapter about partial order in soft materials; and amphiphilic molecules, both surfactants and block copolymers, are covered in a chapter on self-assembly. Additional chapters discuss such important conceptual themes as phase transitions. An introductory chapter discusses key concepts that define soft condensed matter, including relevant scales of energy, length, and time. Although such organization is mixed, it works reasonably well to introduce materials and unify concepts.

The book, intended for a one-term introductory course in soft condensed matter, is rather short and agreeably terse in style. However, the brevity required some hard choices among topics, and Jones omits several important ones. For example, he does not mention foams, emulsions, granular materials, or interfacial films. He says little about experimental techniques that have been critical to the field. But given the necessity of selecting, I think Jones has done a good job.

Soft Condensed Matter is well formatted as a modern textbook, with large margins that contain extra information and highlight important points in the text. Each chapter has problem sets and recommendations for related texts and papers. Appendices discuss some basic concepts of statistical physics, but some introduction to statistical physics will still be a highly desirable prerequisite for a course based on this textbook.

Teaching an introductory course in soft condensed matter has been difficult largely because of the lack of a good textbook. Jones's book fills the need admirably. It should make teaching much easier, which in turn should result in many more soft condensed matter courses being offered. That will surely help the field to grow even more.

David A. Weitz
Harvard University
Cambridge, Massachusetts

The Science of Soccer

John Wesson
IOP, Philadelphia, 2002.
$24.00 paper (199 pp.).
ISBN 0-7503-0813-3

The Science of Soccer is a pleasant addition to a long line of sports-related books by English authors, each of whom wants to explain the sound physical reasons why things happen in a particular game. Many of these books are about golf, such as Alistair Cochran and John Stobbs's *The Search for the Perfect Swing* (Lippincott, 1968). They encompass, however, a wide range of other sports. The present book compares in spirit with Geoffrey Dyson's *The Mechanics of Athletics* (U. of London Press, 1973), but is at once more rigorous and less complete than that book. Similar efforts are popular in the US. Most of those are considerably longer than their English cousins; one thinks, for example, of James Counsilman's *The Science of Swimming* (Prentice-Hall, 1968), or Robert Adair's *The Physics of Baseball* (3rd ed., Perennial, 2002).

Wesson's efforts are not as ambitious as those last two are, at least in the parts in which he discusses the physics involved in the game. He devotes only the first third of the book to that discussion, and there he mostly concentrates on the behavior of the ball. He briefly considers the mechanics of the body during the kick, but that subject is better treated in other books—in Dyson's, for example. For the rest of the book, Wesson reaches into territory that few such books have explored before, including some thoughts on rudimentary game theory, on strategy, and on the economics of the game today. Those parts make interesting reading.

It is sometimes a little hard to tell what audience Wesson writes for. In discussing the physics in the first third of the book, he gives a mostly qualitative account. Except for an extraordinary incorrect paragraph on why balls bounce, fortunately preceded by a correct one, the discussions are insightful and offer the general reader a feeling for the mechanics of the flight of the ball. The treatment suggests that Wesson has made some calculations to buttress his statements, but the suggestions are not obtrusive and do not dominate the discussion. In the second section, in which he branches into other subjects, the arguments are still more or less qualitative, but the presence of model calculations underlying the discussion is more evident. He devises, for instance, a sort of handicapping algorithm, based on team records, that he uses to predict probable game outcomes. In the tradition of good science, he then tests his algorithm against actual play—with good results. In contrast to that excursion, most of the calculations in the section are based on the statistical probabilities of random events. Perhaps the most interesting is a model of the two-dimensional position that the ball traverses across the field during play. The model amounts to a sort of Brownian motion calculation. It's clever, but the notion that the ball's motion in a game is simply random might provoke, if not offend, the average fan.

In the last chapter, Wesson summarizes the models he has used for the calculations in the earlier sections. As one would expect from someone with his credentials (he has played competitive soccer and holds a PhD in physics), the models are free of mathematical foolishness. Unfortunately, the commentary explaining them is often opaque. The mathematics in the chapter ranges from the sort of Galilean trajectory analysis common to most introductory physics courses, through a quick introduction to Newtonian mechanics using calculus, to a curious mention of the Fokker–Planck equation. The large spread in levels of sophistication makes much of the chapter mysterious in the eyes of a general audience, for whom he seems to be writing the first part of the book.

I have used books like *The Science of Soccer* in reading lists for courses about science and sports for a general audience. For the most part Wesson's book is a rather nice one, but I would not be tempted to include it in such a list because the last chapter would intimidate that audience.

John D. McCullen
University of Arizona
Tucson

New Books

Acoustics

Acoustical Imaging. Vol. 26. R. Gr. Maev, ed. Proc. symp., Windsor, Ontario, Canada, Sept. 2001. Kluwer Academic/Plenum, New York, 2002. $195.00 (516 pp.). ISBN 0-306-47340-2

Astronomy and Astrophysics

2001: A Spacetime Odyssey. M. J. Duff, J. T. Liu, eds. Proc. conf., Ann Arbor,