establishment clung to its favourites, thousands died in shipwrecks; but once Harrison's achievement was accepted, Britain began to rule the waves, and profits boomed.

This book would not make a whole course, naturally. But with the timekeeping problem solved, there was a greater requirement for accurate astronomical tables. So the next step in the course might encompass how Thomas Young (he of the modulus of elasticity, the slits, the theory of three-colour vision, and the deciphering of the Rosetta Stone) was hounded to death in the 1820's due to the many errors printed in the Nautical Almanac, of which he was Superintendent. After that, fill in the developments driven by physics over 160 years - radar, for example - until the 1990's when many bushwalkers take hand-held GPS receivers with them. Of course, they wouldn't work unless the chronometers on the satellites allowed for time-dilation as they orbit the Earth at seven or eight kilometres per second. It's all physics, folks.

Duncan Steel
Spaceguard Australia
Adelaide

Supersymmetric Methods in Quantum and Statistical Physics

Georg Junker
Springer-Verlag, Berlin 1996
xiii + 172pp., DM58 (hardcover)
ISBN 3-540-61591-1

Ths is a serious book for scientists and students who wish to learn the basic methods of supersymmetry (SUSY). The first chapter provides a brief introduction and history of the concepts of symmetry and the motivation behind the development of SUSY, and subsequent chapters define and develop SUSY Quantum Mechanics as well as SUSY classical mechanics and SUSY statistical mechanics. Some applications of SUSY are treated including the Pauli and Dirac Hamiltonians and two- and three- dimensional electron gases. This book is suitable for the reader who has had a good working knowledge of nonrelativistic quantum mechanics and preferably some understanding of relativistic quantum theory.

Junker begins with a definition of SUSY quantum mechanics allowing for N self-adjoint supercharge operators but focusses the reader's attention on the $N = 1$ and $N = 2$ cases. It is interesting that the electron gyromagnetic factor $g = 2$ arises naturally in the construction of a SUSY Pauli Hamiltonian ($N = 1$) without needing to derive this factor from the relativistic Dirac Hamiltonian. The important Witten model ($N = 2$) is developed in detail, in its quantum as well as in its classical versions. The Witten model is also used to study classical stochastic dynamics by rewriting the one-dimensional Fokker-Planck equation as a SUSY Schrödinger equation with imaginary time.

For me the book has been an eye opener. I recall learning SUSY in the context of (yet to be observed) transformations between fermionic and bosonic states, but Junker develops SUSY in a much broader context and demonstrates the importance of using SUSY. I have been aware of the symmetries inherent in the quantum systems I study, but now I can investigate and exploit the supersymmetry of these systems as well!

Barry C Sanders
School of Mathematics, Physics
Computing and Electronics
Macquarie University

Quantum Theory of Real Materials

JR Chelikowsky & SG Louie (eds)
Kluwer Academic Publishers
Dordrecht 1996
vii + 549pp., U$195.00 (hardcover)

For at least 40 years, in studies of solid state physics understanding has been gained on the basis of quantum mechanics. In the last 20 years, however quantum mechanics, combined with computer power, has also got to the point where it is extremely useful for material science and novel materials. This hook reflects the worldwide interest in basic and applied solid state physics, seen today as an area of research that spans quantum mechanics to material and computational sciences.

The book focuses on the electronic properties of materials and covers the following topics: Electronic Structure and Quantum Dynamics; Semiconductors, Insulators and Metals; Surfaces, Interfaces and Clusters; Materials under Pressure, Superconductivity; and Fullerens, Superhard Materials and Other Novel Materials. The character and style of this book ts adequate to the hot topics it covers. The text brings together the writing of a group of solid state physicists, experts in the field, and, a clear attempt is made to reveal the latest theoretical and computational results and provide markers and signposts for interesting new research possibilities. Although this is not a textbook, the specific are as discussed also include fundamentals. The main text is supplemented by an index giving guidance on some specific aspects. With its focus on new concepts, methods of calculation, and new systems, this volume should benefit solid state physicists, material scientists and postgraduate as well as graduate students. The book is dedicated by the editors (J Chelikowsky and S Louie) to Prof ML Cohen on his 60th birthday.

MW Radny
Physics Department
University of Newcastle

The MATHEMATICA Book *Third Edition (Mathematica Version 3)*

Stephen Wolfram
Cambridge University Press
Cambridge 1996
xxiv + 1403 pp, $69.95 (paperback)
$95.00 (hardcover)
ISBN 0-521-58888-X (paperback)
ISBN 0-521-58889-8 (hardcover)

Mathematica is one of the best software products ever developed. It can perform symbolic computation, numerical computation, programming, graphical manipulation, and word processing within a single system. *The Mathematica Book* is a comprehensive description of Version 3 of this software. A review of **Mathematica** Version 2 appeared in this journal Vol 32 (1995), pp 201-202.

There have been two outstanding developments in computing over the past five years since **Mathematica** Version 2 first appeared. Firstly, desktop computers have become capable of solving signigicant problems in computational science. The speed of today's desktop Pentium Pro PC is between that of the early supercomputers, the Cray 1 and the Cray X-MP, which were largley responsible for the birth of computational science (see Physics Today, October 1996 p24). Secondly, the World Wide Web with browsers and search engines has emerged to enable networked computers to share databases and information across the globe almost instantaneously. Version 3 of **Mathematica** is alive to both of these developments.

The computing requirements for **Mathematica** Version 3 are substantially more demanding than Version 2. The allocation of about 100MB hard disk, 16MB RAM or more and a clock speed better than 100MHz are recommended. Most post 1995 ▷