200 references (half as many as King), all of which are lumped together at the back of the book (but thank goodness in alphabetical order—a much clearer format than King's numerical listing). Short contains a series of review questions at the end of each chapter, a godsend for those of us saddled with the task of setting tutorial and examination questions. There is little to choose between the two books but I would recommend Short's. His general approach seems more thorough and he makes much more use of graphs and line drawings. King's book, although excellently produced and illustrated, seems to be a little too full of glossy pictures and large print.

Finally we come to *Frontiers of Astrophysics* (Harvard University: Cambridge, Massachusetts and London, cloth $20; paper $8.95) edited by Eugene H. Avrett. This is a very good book written for second- and third-year astronomy and physics undergraduates. The mathematics is not complex, but is not entirely omitted. Avrett has collected twelve, specially commissioned up-to-date reviews (of about 40 pages each) written by scientists distinguished in their chosen fields. Topics range from the Sun and the origin of the Solar System to star formation, star decay, neutron stars and black holes, infrared astronomy, intersteller medium, active galaxies, cosmology, and intergalactic matter. This book will be an invaluable source of information for many years to come.

David W. Hughes

David Hughes is Lecturer in the Department of Physics, University of Sheffield, UK.

Solid-state physics

THE author of a new textbook on this subject has to exercise ingenuity at the outset in finding a title that distinguishes it from its competitors. *Lectures on Solid-State Physics* (Pergamon: Oxford and London, £17.50) by G. Busch and H. Schade is based on lectures which Professor Busch gave for some years at ETH, Zurich. His students paid him the tribute of urging that the lectures be written up, and he credits his co-author with the actual task. The result is a sound and sensible book covering the topics one expects to find dealt with in the three or four years of an honours course in physics—essentially crystallography, X-ray diffraction, lattice dynamics, imperfections, the free electron model of a metal, electrons in a periodic potential, semiconductors, transport phenomena, and magnetism, in that order. Dielectric properties, and superconductivity have been omitted; in my opinion the latter at least is best left to a postgraduate course. The treatment is thorough; there are a few places where I felt the physics was obscured by the algebra but all-in-all this is a book which students would find very useful.

Quantum Theory of the Solid State (Academic: New York and London, £11.30; $19.50) is a scholarly book by an author (J. Callaway) who has over the years made original contributions to most of the topics included. Although this is described as a Student Edition, the level of mathematical sophistication is decidedly too high for an undergraduate course, except possibly for theoretical physicists. Excellent bibliographies are given at the end of each chapter; they are predominantly to papers published before 1970, but with this book and use of the *Science Citation Index* a beginning research student could bring himself to the frontier of knowledge on any one of half a dozen topics in solid-state theory.

The two remaining books which the Editor sent me as Christmas reading are Numbers 4 and 7, respectively, of a series of monographs with the general title, *The Structures and Properties of Solids. The Electronic Structures of Solids* (Arnold: London; hardback £7; paperback £3.50) by B. R. Coles and A. D. Caplin covers those aspects of electrons in crystals that one finds also in a more comprehensive textbook such as that by Busch and Schade, but with greater emphasis on electrons in atoms and molecules by way of introduction. Students would find this approach helpful.

Electron Microscopy in the Study of Materials (Arnold: London; hardback £8; paperback £3.75) is a first-rate account of the subject by P. A. Grundy and G. A. Jones. Unfortunately there simply is not time for electron microscopy to feature in an undergraduate course in anything like this detail, but the book should be required reading for anyone who lectures on solid-state physics, and enterprising students will find it very interesting.

My experience has been that most undergraduates prefer a comprehensive textbook, and I have yet to be persuaded not to continue to recommend as the best buy C. Kittel's *Introduction to Solid-State Physics* (Wiley, £10.60), now in its fifth edition.

William Cochran

William Cochran is Professor of Natural Philosophy at the University of Edinburgh, UK.

Stimulus for cosmological courses

Principles of Cosmology and Gravitation. By M. Berry. Pp. x×179. (Cambridge University: Cambridge, 1976.) Hardcover £7.00; softcover £2.50.

THIS is a purpose-written book intended to fill a gap in the literature. Cosmology, although one of the most popular and compelling sciences to the layman, is almost completely absent from science department syllabuses. The reason for this is that as general relativity is itself rarely taught, applications of the theory can hardly be expected. Michael Berry has made a laudable attempt at circumventing this problem by introducing as much of the essential ideas of cosmology without recourse to detailed relativistic formalism. Because of this necessarily superficial approach, this book will appeal mainly to physics undergraduates.

The happy circumstance that the universe appears remarkably homogenous and isotropic enables a superficial treatment to grasp the main results of modern cosmology, because the cosmic dynamics consists only of a simple rescaling of distances. The author does make a start at introducing some relativity theory. This is done clearly and directly, but may leave the reader caught between two camps, with insufficient knowledge to appreciate relativistic cosmology fully, but his faith in Newtonian theory and his classical physical intuition sufficiently shaken to cast suspicion on the later simplified ideas. Unfortunately, this is probably inevitable in what is really a disarmingly simple application of an exceedingly difficult theory. Dr Berry manages a careful balance between the two.

A chapter on black holes and massive objects is included, no doubt because of their strong popular appeal, but this is really a diversion. The main treatment concerns the standard cosmological models, and is presented in a straightforward and easy style. Information retrieval is good, the notation and exposition clear and economical.

This is a teaching book written in the tradition and spirit of H. Bondi's classic *Cosmology*, now over twenty years old. The level is slightly more advanced, but the readership substantially the same. I hope the author will succeed in stimulating new courses on cosmology in this country. Many problems and some solutions are included at the back of the book.

Paul Davies

Paul Davies is Lecturer in Mathematics at King's College, University of London, UK.