Astrotexts updated

THERE are an enormous number of astronomy textbooks in print at the present time. However, if this number is divided up according to the age group and ability level to be served, we find that nearly half are aimed at university students with considerable knowledge and ability in associated subjects like mathematics, physics, chemistry and geology; and nearly half are aimed at the same 18–24 yr age group but this time assuming that the group has extremely limited knowledge of the advantages that mathematical expertise bestow on a person exploring the sciences and also scant knowledge of the experimental and observing techniques fundamental to all scientific enquiries. The remaining small percentage are aimed at that enormous group of younger, less academically minded scholars that fill our schools and don't go on to university afterwards.

An extremely valuable addition to this small percentage is *A Universe to Explore* (Holt-Saunders: Eastbourne, UK, £3.50) by Ralph O. Ewers and Lynda M. Ewers. This Canadian school-booklet consists mainly of a series of 'activities', some designed for use in the classroom with pencil and paper (for example, making a model to help understand the Ptolemaic and Copernican theories of planetary motion and to predict the phases of Venus, investigating how Cepheid luminosity is related to period), some in the class laboratory using simple equipment (constructing a simple telescope with two convex lens, using a diffraction grating as a spectroscope, observing the phenomena of parallax for nearby objects and using this to measure distance) and some outside looking at the sky with the eye, telescope or camera (constructing and using a visual magnitude scale, observing planetary movement, sunspots and galaxies, and so on). The book abounds with activities, the main emphasis being on the scholars finding out for themselves. It has a fund of excellent ideas and will be an absolute godsend to school teachers entrusted with science education. The book is beautifully produced and colourfully illustrated and can be recommended most strongly. Even though it is firmly intended for young schoolchildren (under fifteen), university teachers will find many interesting ideas there, ideas that can be easily expanded to provide excellent practical experiments.

Staying with our young explorers of the universe and their teachers let me say a few words about *Astronomy: A Dictionary of Space and the Universe* by Iain Nicolson (Arrow Books: London, paperback £1.75). Publishers are always keen to jump on bandwagons and astronomical

dictionaries seem to be the bandwagon of the moment. Nicolson's has one definite advantage over many of the others, its price, but this is far from all that can be said of it. The author has included over 600 entries which explain clearly and succinctly the terms being discussed. There is an excellent system of cross referencing so that statements need not be repeated. The figures are a joy and receive a rightful and prominent place. Terms such as transit, culmination, spectroscopic binary, aberration of light and eclipse are illustrated with telling clarity. The book has 16 pages of plates and a most useful list of articles in a guide to further reading. No school teacher has an excuse now for astronomical ignorance, all he needs is this book in his pocket.

Moving now to our large fraction of innumerate students we have *Astronomy: The Structure of the Universe* by William J. Kaufmann III (Collier-Macmillan: London, £9.75). This book is designed for the one-semester general astronomy course taken by American liberal arts students, as are many other similar books. Kaufmann's has one interesting and refreshing change of emphasis, summed up by his statement that "Modern astronomy begins at distances greater than 1 light year from the Earth". So much for the Sun and planets I thought. Well not quite, but Kaufmann only spends 9% of his book on our celestial neighbours. What remains is a fascinating account of stellar and galactic astronomy with a special emphasis on topics of major interest to the amateur astronomer and interested students: pulsars, quasars, black holes, stellar evolution and cosmology. Instead of skirting round the topics of the special theory of relativity and the general theory of relativity, Kaufmann tackles them head on and devotes whole chapters to each. This book is a worthy addition to the groaning shelf of books aimed at this market; in fact it is more than just worthy addition, its different approach puts it ahead of many. Variety, the spice of life, will make many teachers pick this one if only to get away from the all too familiar plod through the normal list of planetary, stellar and galactic objects.

Focus on the Stars (Heinemann Educational: London, £4.80) is a collection of lectures, edited by H. Messel and S. T. Butler, and given at the sixteenth International Science School for High School Students at the University of Sydney. Bart J. Bok probes our Galaxy, and J. P. Wild has a close look at the Sun, concentrating mainly on its radio image. Carl Sagan views Mars with Mariner 9, R. Hanbury Brown introduces astrophysics and stellar interferometers, R. D. Brown looks at molecules in space, Peter Goldreich the evolution of the Universe and Frank D. Drake the radio reach for intelligent extraterrestrial life. This is a

most interesting set of lectures geared mainly for scholars with a scientific background. Its main drawback is that the lectures are old, most having been written in late 1972, early 1973. It's a great pity those responsible couldn't have sprung into action about four years sooner.

Let us end with two new editions of old favourites. *Textbook on Spherical Astronomy* by W. M. Smart (Cambridge University: London and New York, hardback £11.50; paperback £5.50) has been revised by R. M. Green and now comes out in its sixth edition. The first edition was published in 1931. Few astronomers would wish to find themselves too far away from a copy of this book, but it must also be said that few would regard it as light bedside reading matter. It is still a superb repository of the wonders and complexities of spherical astronomy with chapters on such topics as refraction, meridian circles, planetary motion, time, aberration, parallax, proper motions, precession, binary star orbits and eclipses. Green has revised the book so that its terminology is compatible with that of the *Astronomical Ephemeris* and the *Explanatory Supplement to the Astronomical Ephemeris* and the *American Ephemeris* and *Nautical Almanac*. There seems to be little in this new edition which will make owners of old editions throw them away and rush eagerly to the bookshop clasp £11.50.

Essentials of Astronomy by Lloyd Motz and Anneta Duveen (Columbia University Press: New York, \$21.90) reaches its second edition eleven years after the first. Much has changed in this time: lunar and planetary surfaces have been scanned; studies of stellar evolution, interstellar medium and interstellar molecules have progressed; neutron stars, pulsars, X-ray sources, black holes and quasars have all become big talking points. Most of the new material has been discussed in a 52-page section at the end of the book entitled "Developments in Astronomy Since 1966". This method of revision completely breaks up the continuity of the book, the reader continually having to dodge backwards and forwards to ensure he's not missing any new developments. Considering the price of the new book, the enormous popularity of the first edition and the obvious large sales that this new edition will have, I think the least the authors and publishers could have done was to revise it properly by incorporating the revisions into the text. However, putting this criticism to one side 'Motz and Duveen' still remains the cornerstone of many university first-year science courses in astronomy; it still retains its position as the best textbook in its class.

David W. Hughes

David W. Hughes is Lecturer in the Department of Astronomy and Physics at the University of Sheffield, UK.