

BOOK REVIEWS

ASTRONOMY IN A NUTSHELL

Astronomy Old and New

By Ernest Agar Beet. Pp. x+189+16 plates. (London: G. Bell and Sons, Ltd., 1967.) 25s. net.

ASTRONOMY is probably the only major science in which the number of books for the tiro, the dedicated amateur and the layman with a passing interest exceeds the number written for the professional. The general standard is correspondingly good, and the difficulty of saying anything new is correspondingly great. Mr Beet's new book, continuing a personal tradition begun by his *The Sky and its Mysteries* (1952), is nothing if not up to date. This applies to the plates, which include among several of the old favourites some of the Ranger 9 pictures.

The book is not only new in the sense of cramming in last-minute information. It is unusual in the attention given to the astronomer's equipment, which must now be taken to include satellites and space probes. It is unusual in its good bibliographical supplements to individual chapters. All told, it will be found useful for sixth form teaching, and for supplementing courses in astronomy in such institutions as our colleges of technology. It is essentially a book requiring its own supplementation, however. It is short, and yet the new has not so much squeezed out the old as compressed it, to the point of mild obscurity in places. Thus the second chapter, nineteen pages long, is a rapid conspectus of four thousand years of astronomical history. The relevance to the book of this chapter would have been suspect even had it not contained many small errors of fact. (The most misleading is perhaps that relating to the period of Mars in its epicycle, on page 15 wrongly stated to be equal to the period in the deferent. Babylonian and Egyptian astronomy are, moreover, sadly confused.) The accuracy of the work is not so much in question as the need for such excessive brevity. The last seven pages, for example, covering modern cosmology, are like a mirage to a man lost in a desert of understanding. His temperament is what will determine whether he should give up in despair, or turn to more substantial works on the same subject. On the whole, the second reaction seems the more probable, and this is ample justification for a work of this kind.

J. D. NORTH

CHANCE CHANGES LITTLE

The Doctrine of Chances

Or A Method of Calculating the Probabilities of Events in Play. By A. de Moivre. Pp. xxvi+257. (London: Frank Cass and Co., Ltd., 1967. First published 1718.) 105s.

IT is perhaps not usual for this journal to review a reprint of the second edition of a work which has already proceeded to its third edition, but none of the three editions were reviewed here when they came out, for unavoidable reasons, and so some notice seems deserved. De Moivre's famous work was first published in 1718. This is an exact reproduction of the second (1738) edition, with an index and table of contents added. The third edition appeared in 1756; I do not know to what extent it differed from the second.

Two hundred years have dated the book very little, and it makes most refreshing reading. For historians of science its re-issue must be a great blessing, but statisticians even without an historical sense could not fail to find it of great interest. This is because, whether de Moivre is writing about the "meaning" of a "chance", or about the interpretation of data, he is concerned with old questions still full of perplexity and still liable to arouse controversy. The applications discussed in the book are, as might be expected, to gambling and to actuarial science. Those who wish to compare this book with a review of the present state of those two applications may wish to refer to L. E. Dubins and L. J. Savage, *How to Gamble if You Must* (McGraw-Hill, 1965), and to K. Borch's article "The Theory of Risk" and the accompanying discussion in the *Journal of the Royal Statistical Society, Series B* (29, 432; 1967). For modern developments of de Moivre's limit theorem a good reference would be the second edition of W. Feller's *Introduction to Probability* (Volume 1, Wiley, 1957), and for the latest developments of the combinatorial approach to which de Moivre made great contributions a useful reference is L. Takács, *Combinatorial Methods in the Theory of Stochastic Processes* (Wiley, 1967).

The general editor (Dr. L. L. Laudan) and the publishers of the Cass Library of Science Classics are very much to be congratulated on making this important work once more generally available. D. G. KENDALL

METAL STRUCTURE

Structure of Metals

Crystallographic Methods, Principles, and Data. Third edition. By Charles S. Barrett and T. B. Massalski. (McGraw-Hill Series in Materials Science and Engineering.) Pp. xvii+654. (London and New York: McGraw-Hill Publishing Company, 1966.) 126s.; \$15.75.

THIS book presents a new edition of the original classic text first published by C. S. Barrett in 1943 and revised in 1952. Now under dual authorship the contents remain, nevertheless, in general, much as before without any noticeable change in philosophy or presentation.

The first four chapters discuss the fundamentals of crystal lattices, crystal nomenclature and standard projections, together with the basic principles of the reciprocal lattice and diffraction of X-rays by crystals. Then follows, in Chapters 5 to 9, a descriptive treatment of the various experimental X-ray methods, that is, Laue, rotating crystal, powder method, crystal structure determination and texture methods. The other common experimental methods of studying the structure of metals and alloys are treated later in the book with X-ray and electron microscopy in the fifteenth chapter, stress measurement by X-rays in Chapter 17, ending with electron and neutron diffraction in Chapters 22 and 23. Between the two treatments of methods, the authors present the crystal, electronic and defect structure of metals and alloys including superlattices together with the relevant modern theories (Chapters 10 to 14). The remainder of the book is taken up in discussing some selected research results where X-ray methods seem to have been of value, such as Fourier analysis of particle size, strain or stacking fault broadening in Chapter 16, solid state phase transformations in Chapter 18 and preferred orientations after various treatments in Chapters 19, 20 and 21.

The material and coverage of topics in this text remain as broad as in the previous editions with much revision, expansion and modernization. This has been possible only at the expense of the more elementary sections, which the authors justify on the grounds that such elementary material is adequately covered in other books and is already familiar to most readers. The book therefore presents a strange mixture of the elementary, inter-