

logical implications). The fourth chapter introduces quantum-mechanical considerations, notably the methods used to enumerate the micro-states of the system, and thus to distinguish between Bose-Einstein, Fermi-Dirac, and Maxwell-Boltzmann statistics. The last two chapters will be of less direct concern to mineralogists, covering the calculation of the entropy of monatomic and diatomic gases respectively. Among the appendices is an overdue critique of the misuse of the entropy concept in information theory, which could usefully have been extended to deal with some of the nonsense that has been written about the entropy of living organisms and biological macromolecules.

The book is well printed and generally free of errors, but for the price the reader is entitled to expect a binding strong enough to withstand the continuous use which this book deserves, rather than the flimsy paper covers provided.

R. G. J. STRENS

WOOSTER (W. A.) and BRETON (A.). *Experimental crystal physics*. 2nd edn., Oxford (Clarendon Press), 1970. ix+150 pp. 71 figs (incl. 12 plates). Price (in U.K. only) £3.

This edition contains 50 % more material than the 1st edition (M.A. 13-685), and must be regarded as a development from it rather than a re-issue. There are additional chapters on dielectric properties, the Hall effect, crystal growing, ferroelectrics, semiconductors, and ferrimagnetics, and a substantial amount of re-writing of the earlier material, with omission of some of the more elementary optics. The plan of the work is the same, most chapters consisting of a succinct account of the theoretical principles, followed by a description of an appropriate apparatus and one or more worked examples incorporating actual experimental results. For a number of the experiments the apparatus described has been changed from 'do it yourself' equipment to instruments produced for the purpose by Crystal Structures Ltd. In general the c.g.s units used in the 1st edition are retained, though two of the new chapters use M.K.S. units. The only obvious error relates to the structure of barium titanate for which the diagrams are incorrect and the description misleading.

E. J. W. WHITTAKER

RATH (R.). *Theoretische Grundlagen der allgemeinen Kristalldiagnose im durchfallenden Licht*. Berlin, Heidelberg, and New York (Springer-Verlag), 1969. viii+133 pp., 109 figs. Price DM 48; \$13.20.

This clearly arranged and superbly illustrated book presents a concise up-to-date survey of theoretical crystal optics. It thus fills a gap frequently noticed by mineralogists and material scientists alike; it also indicates the significance of modern computer techniques for processing complex optical calculations. The author's claim, that no mathematics beyond A-level standards is being used, appears, however, to be an understatement. A year or two of university mathematics would certainly help the reader to deal with Maxwell's equations and vector analysis.