

stituent constants (for example σ^+ , σ^- , σ^* , σ° , σ_I , σ_D , σ_R , σ^n , σ^G) which, on the one hand, extend its practical usefulness and, on the other hand, rob it of its beguiling simplicity and blur its theoretical significance.

It can be argued that the two chief motive forces for the development of science are the establishment of unifying principles (which provide the landmarks in the history of science) and the destruction of these same unifying principles by the experimental falsification of their predictions. Although Dr Johnson would hardly present the issue in those terms, the Hammett equation provides an interesting illustration of the interplay of these forces in the current development of chemistry.

V. GOLD

Quantum mechanics

Principles of Quantum Mechanics: The Non-Relativistic Theory with some Illustrative Applications. By W. V. Houston and G. C. Phillips. Pp. xi+376. (North-Holland: Amsterdam, 1973.) Dfl.110; \$44.

THIS book covers the standard undergraduate course in quantum mechanics. In the introduction it is suggested that students should already have met some of the physical ideas but in fact the book is self contained and would be a suitable textbook for a full year's course for students who have no previous knowledge of the subject. In a field which is already reasonably well populated with good textbooks this volume will not be out of place. It cannot, however, claim to have any significant new features.

It is hard to see how the chapter on classical mechanics fits into the general scheme of the book. Although it is sometimes claimed that Poisson brackets and the Hamilton-Jacobi equation are an aid to an understanding of quantum mechanics these topics do not appear to be used at all in the presentation of quantum mechanics given in this book so their presence in chapter 2 is an unnecessary hurdle for the student. Another slightly unsatisfactory feature is that a reader might be left with the impression that there are two rival 'quantum theories' which happen to give similar results, namely wave mechanics and formal quantum theory. Of course it is clearly stated that these are equivalent but the method of presentation, even involving two separate sets of axioms, is not conducive to making this obvious. The notation used in chapter 8 does not always help.

Several sections of the book, for example the chapter on scattering theory, do not make easy reading but this is

partially due to the fact that more care is taken in presentation than in some similar books.

The many interesting examples in the book will be found useful, as will the brief mathematical appendix.

E. J. SQUIRES

Condensed matter

The Structure and Properties of Solids: The Crystal Structures of Solids. By P. J. Brown and J. B. Forsyth. Pp. 172. (Arnold: London, July 1973.) Boards £4.40; paper £2.20.

THIS book aims to give an understanding, at undergraduate level, of the important elements in the study of the crystal structure of solids. There are chapters on crystallographic geometry and symmetry, the production and properties of X rays, neutrons and electrons, and the theory of diffraction, including the scattering of the different radiations. The experimental study of diffraction is described, and is followed by three chapters describing, and to some extent rationalising, the structures of the elements, ionic compounds and binary alloys.

To attempt to describe all this body of work inside 172 pages is itself a major achievement, and the authors certainly have given the reader a large amount of information at a relatively low price. The book also contains much useful practical information not usually found in physics textbooks. For example, the use of the ASTM index for identifying powder patterns is described in detail, and the 'cross-multiplication' rule for calculating the zone indices of the intersection of two planes is given. Both of these aids are used frequently by crystallographers in practice, and it is good to see them (and many more) in a book of this kind.

It is perhaps not surprising that the authors have had some difficulty in coping adequately with the wide range of subjects in such a slim volume. For the book is really a distillation of three types of book: one on crystal symmetry, like Phillips' *Introduction to Crystallography*; one on diffraction theory and techniques; and one like Evans' *Crystal Chemistry*. Though it would be nice to think that an undergraduate could master all this information quickly because it is presented in a concise way, I must say I am sceptical. Much of the writing is almost in note form, and the level of explanation is often such that I can only understand the point made, because I, like the authors, have studied the subject before in a more leisurely fashion.

The list of topics to leave out is clearly the key decision in a book of this length, and although no two authors

would agree on the list, the choice seems to have been exercised somewhat unevenly. Rather complex examples of non-crystallographic point groups and the idea of magnetic symmetry are introduced in chapter 1, and the complete derivation of the formula for the integrated diffracted intensity is in chapter 3. But space has not been found in chapter 5 for a description of how crystal structures are experimentally determined; after the formal theory, the reader could usefully be rewarded with at least a simple example of a structure determination.

Apart from this inexplicable omission, the book is a very good summary of the various aspects of the study of crystal structures. As such it will be useful for research workers who wish to survey the field quickly. It could also be usefully used as an undergraduate text; however, thought should be given to the speed at which the topics can be mastered, as there is as much material here as in most books of three times the length.

J. A. VENABLES

Dirty air

Fundamentals of Air Pollution. By A. Stern, H. C. Wohlers, R. X. Boubler and W. P. Lowry. Pp. xiv+492. (Academic: New York and London, September 1973.) \$14.50.

THIS book represents a welcome addition to the literature on air pollution and will serve primarily as an introductory book to the field. It is divided into four parts respectively on the elements, effects, meteorology and control of air pollution. The authors intended to introduce the topic in part 1, which together with part 2 defines the problem, and to resolve it in parts 3 and 4. These objectives are not completely met and the book gives the impression of being four short books condensed into one. It is difficult for instance to understand why the sections dealing with sampling and analysis (chapters 14 and 15) have been included under "The Effects of Air Pollution" while the section dealing with isokinetic sampling techniques occurs in part 4.

Much of the analytical work is presented very poorly with undue emphasis on classical procedures. In contrast the meteorology section is well presented and informative. The section which must receive the greatest criticism is that on the control of air pollution. Here the authors go back to consider sources of air pollution and sampling techniques, devoting only twenty pages to the engineering control of emissions from both vehicles and industrial processes. This, in a book of 450 pages, is surely inadequate.

R. PERRY