

## Book Reviews

*Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn 1, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.*

**Experimental Crystal Physics.** By W. A. WOOSTER. Pp. viii+115 with 47 figs. Oxford: Clarendon Press. 1957. Price 18s.

This attractive little volume, light in the hand and not too heavy to the mind, is excellently suited to make the subject instructively accessible. Easily performable experiments are explained in their essentials with the minimum of basic theory of crystal physics, a theory whose simple beauty is often obscured for the novice by heavily formulated text-books, but a glimpse of which will encourage him to try to understand it in its entirety. (In a more advanced stage Wooster's other book, 'Crystal Physics' will prove a great help.)

The properties of anisotropic homogeneous matter with values which are continuous functions of direction form the sole subject of this theory, and indeed the main subject of the book. Optical and magnetical properties, thermal conductivity and dilatation, plasticity, piezo- and pyro-electricity and elasticity are dealt with in this somewhat loose order. It seems doubtful whether the inclusion of plastic deformation is justifiable. The curious phenomena of single-crystal wire stretching will not fail to excite interest in crystal-behaviour; however, the reader may find it hard to grasp how these came to be enumerated under second-order tensor properties. The technical devices have been clearly and fully described, with perhaps undue indulgence in circuit diagrams.

Where the study of solids now obliges the student to devote almost all of his time to imperfections, the need for this introduction to perfect crystals—where study naturally should come first—is more keenly felt than ever.

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**Chemical Thermodynamics, A Course of Study.** By FREDERICK T. WALL. Pp. viii+422, with 41 figs. San Francisco: W. H. Freeman & Company. 1958; London: Bailey Bros. & Swinfen, Ltd. Price \$8.00; £3.8.0.

The thermodynamics with which students of Chemistry ought to be equipped can be developed for them in two ways: by a purely energetic treatment, without reference to atoms or molecules at all; or by a statistical treatment, applying the Boltzmann equation in a molecular setting. The former has simplicity and elegance, but is apt to seem dull and remote from the concepts familiar to the chemist; the latter is easier for him to envisage in pictorial terms, but is apt to seem unduly mathematical in its development. In this volume—which belongs to the series of chemical texts edited by Linus Pauling—these two complementary approaches have been skilfully combined by Prof. Wall, of the University of Illinois. As he writes in his Preface, 'the subject is far more interesting if one can talk about molecular motions . . . when discussing thermodynamic properties'. For example, his treatment

of entropy from a strictly thermodynamic angle in Chapter 4, followed in Chapter 5 by a consideration of entropy and probability and the Third Law, is most illuminating. The same is true of many other passages: for instance, the effects of molecular symmetry on the partition function on pp. 271–4, or the statistical mechanics of solutions on pp. 318 and 348.

Simple exercises are included in the text as riders on the principal theorems; and each of the seventeen chapters ends with about a dozen well-chosen problems, usually numerical and often rather advanced. (Answers are not given.) Appendix D, which runs to 13 pages, embodies a great deal of thermodynamic data, systematically set out for the commoner chemical substances at 25 °C. The diagrams, due to Evan Gillespie, have been drawn with unusual care and are generally very effective; such is the one which represents a two-dimensional crystal undergoing random vibrations. (The vapour-pressure diagram on p. 329 is slightly inaccurate in relation to the principles for such diagrams, as they have been correctly explained on p. 325.)

The reviewer knows perhaps four up-to-date texts on thermodynamics which—in their different styles—can be recommended to the honours student in Chemistry. This new book certainly qualifies for inclusion in this select group. It is a pity that, in Europe at any rate, its price makes it the most expensive.

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**Soviet Research in Crystallography.** (Chemistry Collection No. 5, Vol. 1 and 2). New York: Consultants Bureau, Inc. 1958 Price Vol. 1 \$100.00, Vol. 2 \$30.00, Vols. 1 and 2 \$115.00.

Under this title Consultants Bureau, Inc. issues a collection of Russian original papers related to Crystallography. These papers appeared in Russian journals from 1949 to 1955 and have previously been published by Consultants in their complete translation of the journals. The first volume of the present collection (p. 1–388) contains mainly papers on phase diagrams of binary and higher systems, nearly all of them inorganic or metallic, obtained by thermal analysis and only occasionally supplemented by powder diagrams.

The papers in the second volume (p. 389–618) are all dealing with structural crystallography. They fall roughly into four groups: structure determinations, optical properties (glasses, polaroid), growth, and crystal chemistry. To most readers of *Acta Cryst.* this volume will be the more attractive one.

Apart from occasional smudgy pages the reading of the typescript offset is agreeable, and the translation is good throughout. Altogether the volume offers a good, if incomplete, survey which would be much harder to obtain from the original publications.

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