Book Reviews

Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn 2, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.

Crystal Growth and Dislocations. By A. R. VERMA. Pp. viii+182 with 76 figs. London: Butterworths. 1953. Price 30*s*.

This is a fascinating little book. One obtains the impression of looking into a corner of Nature's workshop and of taking part in the actual building of crystals. That has been made possible by F. C. Frank's extremely fruitful suggestion concerning screw dislocations as furnishing a device for continuously assembling molecules, and by the beautiful experimental work carried out by the author of the book and by a number of other physicists on the spiral patterns to be observed on crystal faces. The feeling of being introduced into some of Nature's intimate secrets is enhanced by the clever arrangement of the chapters, which alternate between theoretical explanations and information on experimental research in a way leading to the gradual revelation of more and more details.

It is true that not all is yet revealed: one would like to know in what form the material arrives at the crystal face—as complete molecules, or as radicals, or as single atoms? Probably various ways are possible, but this is a matter falling outside the scope of Dr Verma's book.

After a concise survey of the atomic theory of crystal growth (winding up with the now well known paradox that the formation of 'island complexes' on perfect crystal faces requires a degree of supersaturation—at least for crystallization from vapour—much larger than is found to be necessary in practice), the role of screw dislocations in facilitating the growth is explained. It is made clear why this will lead to the appearance of growth spirals and which relations govern their forms.

After a description of some of the techniques of observation there follow two chapters discussing the most important experimental findings, both by other physicists and by the author himself (an extensive list of references to the literature is given at the end of the book). These chapters contain a rich collection of beautiful illustrations, presenting smooth spirals, triangular and hexangular forms, and still other types; and many pictures of the various arrangements resulting from groups of spirals. Further photographs are presented in later chapters, and it is a welcome feature that the magnification is indicated with every photograph. Clear descriptions and short theoretical explanations are given; the treatment includes: interaction of growth spirals; closed loops formed by the cooperation of opposite dislocations of equal strength; spirals originating from dislocations of multiple strength; imperfect dislocations, fault surfaces, interlaced spirals; and data on the density of dislocations.

In a special chapter the 'polytypism' of carborundum crystals is treated with much clarity; some data concerning CdI_2 and organic molecules are added.

Then comes a chapter on the measurement of step height, with a summary of data for various crystals; and finally a chapter on the origin of polytypism; the origin and movement of dislocations; oriented overgrowths; etch phenomena; holes in crystals, and hollow dislocations. Very striking are the results obtained concerning the movement of dislocations and concerning their probable origin from the buckling of a thin crystal, with the possibility that afterwards the dislocations move out of the crystal. A short summary reviews the present position of experimental observations.

The book, which is well produced, will be welcomed by anybody who is interested in crystal structures. It is a convenient and useful milestone in a domain which undoubtedly will continue to develop rapidly.

J. M. BURGERS

Laboratorium voor Aero- en Hydrodynamica der Technische Hogeschool, Delft, Holland

Books Received

The undermentioned works have been received by the Editors. Mention here does not preclude review at a later date.

Crystal Structures. Section III and Supplement II. By R. W. G. WYCKOFF. New York; London: Interscience Publishers. 1953. Price: Section III $14·50, Supplement II $4·00.

Introduction to Solid-State Physics. By C. KITTEL. Pp. xiii + 396 with many figs. New York: Wiley; London: Chapman and Hall. 1953. Price $7; 56*s*.

Spezielle Mineralogie auf geochemischer Grundlage. By F. MACHATSCHKI. Pp. vii + 378 with 228 figs. Vienna: Springer. 1953. Price S. 215; DM. 36·00; $8·60; S.fr. 37·00; 61*s*. 6*d*.

Verfärbung und Lumineszenz. Beiträge zur Mineralphysik. By K. PRZIBRAM. Pp. xiii + 275 with 69 figs. Vienna: Springer. 1953. Price S. 210; DM. 34·70; $8·25; S.fr. 35·50; 59*s*.

Anleitung zu optischen Untersuchungen mit dem Polarisationsmikroskop. By M. BEREK. Pp. xiii + 366 with 285 figs. and 21 tables. Stuttgart: Schweizerbart'sche Verlagsbuchhandlung. 2nd completely revised ed. 1953. Price DM. 29·00.

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