Book Reviews

Les Dislocations et la Croissance des Cristaux. Willy Dekeyser and Severin Amelinckx. Masson, Paris, 1955. 184 pp. Illus. F. 2000.

This book is a simple and excellent account of the recent fundamental advances in the field of crystal growth, since the recognition by F. C. Frank of the preponderant role of dislocations in it. The beginning of this development occurred nearly 10 years ago at the University of Bristol, in England. I had the privilege to watch and become associated with the nucleation and growth of this idea, today so simple that it appears obvious, although it was clearly not so at the time. The further contributions to the field of solid state from its author, F. C. Frank, are certainly of paramount importance, but his foresight and bold imagination are nowhere as apparent as in his prediction that dislocations should control the growth of crystals.

The theory of dislocations, as well as their role in most of the aspects of solid-state physics, has been covered recently in several books and reviews. Among the books one should mention are those by Read, where the geometric aspects of dislocations are developed, and the book by Cottrell, where their importance in the plastic flow of crystals is emphasized. The review by Seeger, in the *Encyclopedia of Physics,* treats the more recent developments of the general theory of dislocations.

None of these, however, covers properly the application of dislocation theory to crystal growth. There exist reviews by Frank and Forty, and also the book by Verma, but no attempt had previously been made to put together the entire field. This is very properly done by the work under review, in a very simple style particularly suitable for beginners. The book, no doubt, will help in filling the gap separating crystallographers from solid-state physicists.

The experimental development of the work has been carried out mainly by two groups, one working in England under the guidance of Frank himself and including Forty and Verma. The book under review was written by the second group, working at the University of Gand, Belgium, under the direction of W. Dekeyser and S. Amelinckx. Their contributions have been outstanding, and it is therefore entirely proper that they should have written a book on the entire subject.

The first chapter in the book concerns itself with an elementary introduction to dislocation theory. This chapter does not compare, of course, with Read's account, the intention being to give the necessary background to understand the role of dislocations in crystal growth.

In the initial sections of Chapter II, an account is given of the multiple attempts to interpret the form of crystals in terms of a more or less empirical theory of their growth. It is astonishing what a tremendous amount of work has been done on this apparently simple question, without a simple answer having been found. This part of the book is useful in that it gives most of the earlier references pertaining to the subject; it is, however, disappointing in not giving a critical account of them. It is true that, even today, the question is still a puzzling one; however, it is so, not because we are missing some fundamental idea, but because it is an exceedingly complicated question. The other sections of this chapter give a lucid and short account of the paper by Burton, Cabrera, and Frank, where the theory was first presented.

Chapter III is very useful to anybody interested in this type of work, because it gives a résumé of the modern optical methods (phase contrast, and so forth) that have contributed so much to the testing of the predictions of dislocation theory.

The four following chapters form the core of the book. They describe the two more outstanding contributions of dislocation theory in relation to the growth of crystals: the explanation of the detailed spiraling configuration of steps on growing crystal faces, and the understanding of the phenomenon of polytypism. The authors have made considerable contributions to both of these questions, so it is not surprising that their discussion is excellent. These chapters are very welcome, for there is no other general account of this part.

In the final two chapters, VIII and IX, a description is given of the formation of etch pits at dislocations and of the growth of whiskers, and finally a discussion of the possible ways for dislocations to be produced in a crystal during its growth. There is considerable work going on in the former problems, and a lot of speculation is being advanced to account for the latter; hence, the book could not be expected to give a complete picture of both of these subjects.

On the whole, this book is a very valuable contribution to the field; its clarity and simple presentation will appeal to young workers who might become interested in this field. The only general criticism one might advance is that, although they discuss and criticize thoroughly their own work, the authors seem to have a tendency to limit themselves to a detailed description of that of other people without a severe criticism. It is very unfortunate that there was so much delay in the publication of this book. It would have been much more helpful if it had become available in the English-speaking countries a couple of years ago.

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Advances in Food Research. vol. VI. E. M. Mrak and G. F. Stewart, Eds. Academic Press, New York, 1955. xii + 398 pp. $9.

This volume, like the preceding volumes in the series, reviews and discusses timely and significant scientific and technologic aspects of foods. There are seven articles, and they range in length from 22 to 76 pages. These cover five commodities and three functional areas—namely, applications of research to problems of candy manufacture; bacterial spoilage of wines with special reference to California conditions; microbiological implications in the handling, slaughtering, and dressing of meat animals; microbiological problems of frozen food products; potato granules, development and technology of manufacture; the thermal destruction of vitamin B_1 in foods; and tunnel dehydrators for fruits and vegetables. Each article is well organized, accurately written, and accompanied by a comprehensive bibliography. There are approximately 1800 references, and the titles are included in six of the reviews. The effective use of the volume is enhanced by the inclusion of an author index. The subject index is rather incomplete.

There are ten authors, and six of them are connected with two of the regional research laboratories of the U.S. Department of Agriculture. Only one is employed by a food-manufacturing com-