The problems are attacked by the techniques of successive approximations and of expanding solutions in series of eigenfunctions that span the space of solutions to the reduced equation, when known.

The last chapter of each part is concerned with a discussion of what the author classifies as singular integral equations—that is, those in which the kernel, K, can be represented as $K(s,t) = \frac{A(s,t)}{|s-t|}$, where A is analytic.

The bibliography seems to contain a fairly extensive sample of Russian work on the applications of integral equations.

The author does a great service by bringing together in one volume more applications than are available in any other work, but this does mean that the problems cannot be intensely examined. Anyone who plans to use this book should have a knowledge of complex variables, and if he does not have a grounding in integral equations he should have at hand something like Courant and Hilbert's book.

Some things are puzzling. The author introduces the concepts of inner product and norm, and also operator, then uses them very sparingly. Furthermore he fails even to mention the powerful generalizations that can be made when one uses the Stieltjes integral.

JAMES T. DARWIN, JR.
Department of Mathematics,
Auburn University, Auburn, Alabama

Crystal Dislocation

The Direct Observations of Dislocations. S. Amelinckx. Academic Press, New York, 1964. x + 487 pp. Illus. $17.

This book provides beautiful and ample evidence that all of the curious kinds of behavior devised by imaginative geometrical theorists before anyone ever "saw" a crystal dislocation do in fact exist. During the first 15 or 20 years after the dislocation theory was developed, a small group of theorists devoted themselves to exploring the geometrical configuration and the elastic stress fields of dislocations in various crystal structures. This first stage culminated in books that emphasized the theoretical developments [W. T. Read's *Dislocations in Crystals* (McGraw-Hill, 1953); A. H. Cottrell's *Dislocations and Plastic Flow in Crystals* (Oxford University Press, 1953); and J. Friedel's *Dislocations* (Gauthier-Villars, 1956, and Addison-Wesley, ed. 2, 1964)].

After the theory was developed experimental research workers began their attempts to find methods of observations that would give direct evidence concerning the behavior of dislocations. The extent of their success can be seen in this book in which a prominent scientist who has done much excellent work in the field describes many of the observations. The book is filled with many pictures that form a graphic record of the various ways in which dislocations reveal themselves. Amelinckx begins by describing crystal growth, the first phenomenon in which single dislocations or a few dislocations play a decisive role. Observations using low resolution are discussed first; they are made with an ordinary optical microscope. The author then describes evaporation methods using replicas which have recently become a high resolution method. He then discusses and considers the etch pit methods for ionic crystals, semiconductors, and metals and considers techniques for decorating the dislocations with impurities. Amelinckx himself has done excellent research in this area. The various x-ray methods are then described.

Most of the above discussion deals with low resolution research—that is, distances smaller than 5×10^{-5} centimeters are not usually resolved. That discussion precedes a very complete coverage of the research involving transmission electron microscopy where the resolution can be 15Å. The theory is examined, and the kinematical and the dynamical theory are given. Applications in which all of the strange things that dislocations do in thin films of pure metals, alloys, and ionic crystals are described and illustrated in beautiful pictures. Finally, direct resolution of crystal lattices and the moire patterns of two thin crystals are described, and the influence of dislocations in such experiments is shown.

On the whole, the emphasis is geometrical and descriptive, although quantitative calculations are given where they provide useful information and can be made. This emphasis on the geometrical and the descriptive is a valid reflection of the state of the art. Thus far only about 20 percent of the observations are quantitative. In the future, with much hard work, more accurate numerical measurements will be made.

This excellent book has been published at the right time. It is well worth the attention of anyone interested in dislocations.

J. S. KOEHLER
Department of Physics,
University of Illinois

A World Stratigraphy

Les Temps Fossilifères. vol. 1, *Paléozoïque Inférieur*. Henri Termier and Geneviève Termier. Masson, Paris, 1964. vi + 689 pp. Illus. F. 270 ($54).

A well-known and widely used American text in a certain field of geology was condescendingly dismissed as a "masterful compilation," but one cannot thus slightingly refer to the genuinely masterful works we have come to expect from the Termiers. The present work, gorgeous in its scarlet and gold binding, weighing in at $8 per pound, and the two volumes yet to come will constitute the "Traité de Stratigraphie et de Paléogéographie" (the second volume, *Paléozoïque Supèrieur,* is in preparation), a work foreshadowed by the same authors' previously published books—*Evolution de la Lithosphère* (1956-1957), *Erosion et Sedimentation* (1960), *Paléontologie Stratigraphique* (1960–), and *Histoire Biologique de la Biosphère* (1952). The Termiers refer to the *Traité* as a more systematic and more detailed form of the last, a considerable understatement.

This volume can be compared to only one other work of this century—Haug's *Traité de Géologie* (II. *Les Périodes Géologiques*), published in 1911. For years the working geologist has kept Haug at his elbow so that he can turn to it first when searching for an entering wedge to the stratigraphy of practically any part of the world.

The plan of *Les Temps Fossilifères* is logical and easy to follow. After pointing out that this treatise is essentially for readers who are acquainted with the principles of stratigraphy, the Termiers content themselves with reviewing certain ideas about the relations of strata to each other and relevant questions: unconformity as indication of relative movements of land and sea; initiation of sedimentary cycles; paleontologic