The reviewer is disappointed at the author's decision to terminate his efforts with the present book. A companion volume of similar style and aims entitled "Catalysis by Metal Oxides" is desperately needed.

A well organized author index (17 pages) and subject index (7 pages) provide a reference system to the contents.

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Progress in Polarography. Volume I. Edited by P. ZUMAN, Polarographic Institute, Czechoslovak Academy of Science, Prague, with the collaboration of I. M. KOLTHOFF, Department of Chemistry, University of Minnesota, Minneapolis. Interscience Division, John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1962. xiv + 355 pp. 16 × 23.5 cm. Price, $12.00.

Progress in Polarography. Volume II. Edited by P. ZUMAN, Polarographic Institute, Czechoslovak Academy of Science, Prague, with the collaboration of I. M. KOLTHOFF, Department of Chemistry, University of Minnesota, Minneapolis. Interscience Division, John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. x + 451 pp. 15.5 × 23.5 cm. Price, $15.00.

The award of the Nobel Prize to Professor Jaroslav Heyrovský in 1959, almost coincident with the seventieth anniversary of his birth, has provided an appropriate occasion to summarize recent progress in polarography. As the Editors of these two volumes have noted, with 900 papers appearing annually, it is almost impossible for a single person to treat the entire field in an authoritative way. A total of 43 authors from all over the world have contributed the 35 papers in these volumes, which resemble a collection of symposium papers rather than a coördinated effort to cover the field. However, for the most part, the quality is high.

After an opening chapter on polarographic literature, Volume I presents several chapters on theoretical developments in conventional polarography. These include modifications of the diffusion current equation, instantaneous current at a single drop, double layer structure, electrode reaction kinetics, kinetic currents, complex compounds, and outstanding chapters by Reilley and Stumm on adsorption effects, and by Vlček on mechanism of electrode processes with a correlation between polarographic behavior and structure of inorganic complexes utilizing ligand field theory.

Other chapters cover a variety of topics: reduction of anions, chronopotentiometry, inorganic applications, influence of structure, and other trends in organic polarography and the use of non-aqueous solutions.

Volume II contains excellent brief reviews of square-wave and pulse techniques by Barker, the single-sweep method by Vogel, oscillographic polarography by Kalvoda, and AC methods by Breyer. At a more practical level, Kolthoff and Okinaka review modifications of the dropping mercury electrode, Riha discusses the hanging mercury drop, Adams describes applications of solid electrodes and Kemula reviews chromato-polarography. Except for Elving's excellent discussion of organic analysis, the remainder of this volume consists of rather routine reviews of instrumentation and applications in a number of special fields. An extensive and carefully prepared index for both volumes completes the book.

There is more than the usual variation in depth and scope of coverage among the various authors, and the reviewer would prefer a single volume of carefully selected contributions. Also considering the high cost of books, the editors might have at least grouped all of the theoretical papers in one volume, and the practical papers in the other.

Those workers who want a compact and critical review of progress during 1950–1959 will find these volumes indispensable. As a tribute to Heyrovský, it is very fitting that the contributions have been dedicated to him.

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Thermodynamics of Solids. By RICHARD A. SWALIN, Professor of Metallurgy, Institute of Technology, University of Minnesota, Minneapolis, Minnesota. John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1962. ix + 343 pp. 15.5 × 23.5 cm. Price, $12.50.

This book is designed for use as a text in the field of material science which has been the domain primarily of physicists and metallurgists. A proper evaluation undoubtedly will be made by them in appropriate journals; however, since chemists are becoming more interested in this field where both the theoretical and experimental approaches can be extended on the basis of physical chemical experience, at least the principal features should be noted here.

Of the fourteen chapters, seven cover the usual basic thermodynamic relationships. One chapter is given to each of the three laws and other separate chapters cover the statistical interpretation of entropy, the relation between thermodynamic and physical properties, the free energy of heterogeneous reactions and the thermodynamic relations in solutions of solids. The development of the equations is nicely detailed and, where possible, numerical illustrations involving the solid state are included. Although the treatment in these chapters is standard, the student in the field of material science would almost certainly benefit if some selected references to well-known texts on chemical thermodynamics were provided; without such references the unwary students might conclude that thermodynamics had been developed solely to deal with the solid state and the inclusion of references would broaden their scientific outlook.

The quasi-chemical approach to ideal and regular solutions and its application to order–disorder reactions and to short range order in solids is covered in a separate chapter. This may prove to be one of the most interesting to chemists; however, the reader is left to infer, from the sources of the figures, the references to which he might turn to extend his understanding of this topic. A list of specific references to papers on the subject and to some of the standard books on statistical mechanics would be helpful.

There then follow three chapters on the thermodynamics of phase equilibria. The first of these discusses equilibria between phases of variable composition; there is no general treatment of the phase rule but, rather, emphasis is placed on the interpretation of binary diagrams to illustrate how quantitative thermodynamic data can be extracted from diagrams. There is also a chapter on the free energy of binary systems in which the problem of equilibria of coexisting phases is treated more generally; some discussion of composition fluctuations is included. The third chapter in this group covers the general theory of the thermodynamics of interfaces, of specific types of external surfaces, of crystal boundaries and of interfaces between phases of different composition or structure. Adequate references are cited in this rather highly condensed chapter, some of which will be required reading for a comprehension of the figures of grain boundaries since the symbols have not been explained in some of the diagrams.

The remaining three chapters are on crystal defects; the first describes the various types of defects and disorders, the second covers defects in elemental crystals and the third, defects in compounds. These three chapters are believed to be unique in U. S. texts. As the author has stated, the basic approach is the use of the law of mass action in treating interactions between defects in metallic and in non-metallic crystals. Because of the dependence of the properties of crystals on the concentration of various defects, these chapters should be of considerable general interest to chemists. In the last two chapters particularly, there is an excellent use of material from recent publications; some two dozen sources within the past ten years are used to relate theory and experiment to make the reader aware of the current situation.

There are finally included about one hundred thirty problems, somewhat more than half of which are numerical.

Very few typographical errors were noted. The printing and the figures are uniformly excellent.

This book appears to be a skillful and unusually well-organized statistical-thermodynamic exposition, much of which is an extension of chemical theories to the macroscopic and microscopic properties of solids. Although the physicists' approach has been dominant in the past in this field