BOOK REVIEWS

Physical Chemistry. By A. J. RUTGERS, University of Ghent. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York. 1954. xviii + 804 pp. 16 × 23.5 cm. Price, $8.50.

In many respects, this book is scholarly, interesting and appealing. Its style is clear and readable. The author has successfully lightened abstract discussions by introducing amusing and informal analogies. The basic concepts of theoretical chemistry are covered as thoroughly as space permits. A few sections, such as chapter 5, are outstanding for their clarity and completeness. In spite of its many virtues, the reviewer believes that this book will not be generally useful to American students of Physical Chemistry.

A number of aspects of Physical Chemistry of great practical importance are either omitted or are dealt with briefly and casually. Ionic equilibria are scarcely mentioned. The concept and use of transport numbers of ions is omitted. The treatment of galvanic cells is brief and unconvincing. Subjects such as chromatography and polarography are not presented.

The treatment of classical thermodynamics, which occupies about two hundred pages, is basically sound and readable, but it is not elegant, nor practical (in the sense of being readily applicable to real problems), nor especially rigorous. Cycles and hypothetical engines are used frequently in derivations. The terms and symbols used resemble, but in important respects differ from, Guggenheim's system.

The chapter on reaction velocity is somewhat disappointing. The presentation is largely historical; a full page is devoted to the long-since discredited radiation hypothesis and only two and a half pages to Eyring's transition-state theory. Many of the experimental results which are introduced into this section appear to have been selected at random without regard for their intrinsic interest or importance.

The last two chapters, on The Atomic Nucleus and The Physical Chemistry of High Polymers, are largely descriptive outlines and appear out of place in this theoretical volume.

The binding, paper and typography are good. However, the index leaves much to be desired. There are too few subheadings following major entries; frequently an item is followed by eight or ten undifferentiated page references. The lack of cross references is particularly troublesome, since the terms used often diverge from American conventional usage.

SCHOOL OF CHEMISTRY
UNIVERSITY OF MINNESOTA
MINNEAPOLIS 14, MINNESOTA
ROBERT LIVINGSTON

The Theory of the Photographic Process, revised edition. By C. E. KENNETH MEES, D.Sc., F.R.S., Vice President in Charge of Research, Eastman Kodak Company. Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1954. x + 1133 pp. 16.5 × 23.5 cm. Price, $21.50.

The first paragraph of the preface to this book provides a concise review of the purpose of the book—"During the last fifty years, scientific workers interested in the study of the photographic process have built up a fund of knowledge which is scattered through the literature in several languages and in a great diversity of journals. The purpose of this book is to provide a general handbook of the subject as a guide to the literature and as a summary of its conclusions."

For one not intimately familiar with the photographic process it would be difficult to imagine how so much could have been written on one specialized subject. There are 1087 pages in the book, five parts and twenty-five separate chapters. Each chapter has an extensive list of references—a short chapter will have approximately twenty-five references and some of the longer chapters as many as one hundred and fifty.

The book was in part written or edited by several members of the Research Department of the Eastman Kodak Company. It is a completely revised and largely rewritten 2nd edition of the book published in 1942 under the same title. The five sections and their "editors" are

Part I.	The Photographic Material J. A. Leermakers
Part II.	The Action of Radiation J. H. Webb
Part III.	Optical Sensitizing B. H. Carroll and L. G. S. Brooker
Part IV.	Development and the After-Processes T. H. James and A. Weissberger
Part V.	The Physics of the Photographic Process L. A. Jones

The book is no book for a casual reader. Each section is written by an expert who has spent a large share of his professional life on the problem about which he writes. Each chapter contains such a mass of detail that for the casual reader it would be dull reading. On the other hand, for those vitally interested in a subject covered by the book, it will be delightful to find such complete coverage.

Each topic is summarized sufficiently in the text so that a reader can get oriented. Usually, however, it will be necessary to consult the original papers for complete understanding.

There are many sections of this book that should provide a valuable source of information for chemists. There are chapters on Gelatin, Sensitizing, and Desensitizing Dyes, Mechanism of Development, Developing Agents and Their Reactions, Kinetics of Development, Electrochemistry of Developers. Anyone using photographic films for photometry can find a detailed discussion of the relation between Exposure and Density, Reciprocity and Intermittency Effects. There is also a chapter on the Action of Charged Particles on the Photographic Emulsion.

This book presents a good object lesson to persons concerned with the "overproduction" of scientific personnel. Here we see what a vast amount of work has gone into one subject, Photographic Theory. And yet, detailed investigation reveals that in almost every field discussed in this book there are vast areas not yet understood. This book will serve as a priceless reference for the army of investigators that will be needed in the future before the subject is fully understood.

INSTITUTE OF OPTICS
UNIVERSITY OF ROCHESTER
ROCHESTER, NEW YORK
ROBERT E. HOPKINS

X-Ray Diffraction Procedures for Polycrystalline and Amorphous Materials. By HAROLD P. KLUG, Head of the Department of Research in Chemical Physics, and LEROY E. ALEXANDER, Senior Fellow in X-Ray Diffraction, Mellon Institute. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. xiii + 716 pp. 16 × 23.5 cm. Price, $15.00.

The ever increasing application of X-ray diffraction analysis in industrial research and control has encouraged the two authors to prepare this comprehensive and valuable book on the diffraction of X-rays by polycrystalline and amorphous materials. They omit from consideration the discussion of single crystal analysis except as background for their special interest.

The needs of the complete beginner in the field are catered to by the first three chapters which contain clear and well written summaries of the elements of crystallography, the physics and engineering of X-ray production and the principles of X-ray diffraction.

The next five chapters give a complete and very detailed account of the available powder techniques using both the photographic and Geiger counter spectrometer methods for collecting data. These chapters cover more than three hundred pages and form the backbone of the book. Many hundreds of X-ray workers, technicians and their bosses,