

**Free Radicals: An Introduction.** By A. F. TROTMAN-DICKENSON, Lecturer in Physical Chemistry in the University of Edinburgh. John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1959. 142 pp. 11 × 17 cm. Price, \$2.50.

This work is chiefly distinguished from earlier books on free radical chemistry in its unified treatment of both the gas and liquid phase. Attention is given to methods of production of free radicals and their properties. Included is a short section on spin resonance techniques for the measurement of free radical concentrations. A systematic survey of reactions of chlorine atom, hydrogen atom, sodium atom, alkyl and alkoxy radical reactions is presented. A very illuminating discussion of the kinetics and thermodynamics of the association of triarylmethyl radicals and other resonance stabilized radicals is well worth digesting. Polymer chemists will be interested in the author's treatment of the kinetics of elementary polymerization reactions. The Evans-Polanyi theory has come back into vogue after a long sleep and the author again defends it although not nearly as strongly or in as much detail as Semenov's recent volume. Finally, the recent work on insertion reactions of methylene radicals is discussed. Notable omissions are the kinetics of the reactions of oxygen atoms, nitrogen atoms and hydroxyl radicals. It is, nevertheless, an accomplishment for the author to have said so much with so few words.

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**The Physical Properties of Polymers.** Comprising papers read at the Silver Jubilee Symposium organized by the Plastics and Polymers Group held in the University of London, April 15-17, 1958. S.C.I. Monograph No. 5. By the Plastics and Polymer Group. The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1959. iv + 293 pp. 14.5 × 21.5 cm. Price, \$6.00.

This collection of papers is a valuable one, especially for those concerned with industrial applications of polymeric plastics. Most of the papers deal with applications of various experimental techniques to specific polymer problems; many are concerned with viscoelastic and electrical properties.

As is now well known, the existence, type and degree of crystallinity in a polymer greatly affect its macroscopic properties. This subject is ably dealt with in a general way by C. W. Bunn and further treated by P. W. O. Wijga in a paper on "Structure and Properties of Polypropylene" and in one by A. E. Woodward and J. A. Sauer on "Dynamic Mechanical Behavior of Partially Crystalline Polymers."

Also of special interest to the reviewer are a paper on "Optical Properties of Strained Amorphous Polymers" and one by A. R. Payne on "The Mechanical and Dielectric Temperature/Frequency Equivalence of Polymers: GR-S." In the latter the author shows how beautifully the frequency and temperature dependence of the response of polymeric materials can be represented by master curves, according to the method developed by J. D. Ferry and co-workers.

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**Polymer Reviews. Volume 2. Linear and Stereoregular Addition Polymers: Polymerization with Controlled Propagation.** By NORMAN G. GAYLORD, Interchemical Corporation, New York, and HERMAN F. MARK, Institute of Polymer Research, Polytechnic Institute of Brooklyn. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 1959. x + 571 pp. 16 × 23.5 cm. Price \$17.50.

In a foreword to this book Professor G. Natta states that "It is perhaps for the first time in the history of macromolecular chemistry that a scientific discovery has been followed so rapidly by such a vast amount of research in scientific and industrial laboratories." The discovery referred to is the discovery of stereoregular polymers such as isotactic polypropylene. The scientific and industrial importance of this field provided the motivation for the book.

The initial discoveries of Natta (based on the Ziegler catalyst) which made a profound impact on the chemical world occurred in 1954, although significant work in this field by Schildknecht and Huggins had been published even prior to this. The book attempts to include references to all articles which appeared on this subject before February, 1959.

By collecting and collating the tremendous flood of information, much of it in relatively inaccessible patents, the authors have performed a most valuable service for the industrial and academic research worker. However, it is impossible at this time to present a truly unified discussion of all the diverse scientific and technical discoveries in this area since, at least in the field of mechanisms, few papers of genuine perspicuity and scope have appeared. In their effort to achieve timeliness and comprehensiveness the authors have necessarily had to sacrifice, at least in part, elegance, unity and discrimination.

The authors describe in their preface the problems of dealing with an ever increasing avalanche of new data and new papers which kept appearing throughout the preparation of the book. They are to be commended for their ability to confine this avalanche between the covers of a book and make it available to a most interested chemical public.

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ARTHUR TOBOLSKY

**Analytical and Canonical Formalism in Physics.** By ANDRÉ MERCIER, Head of the Department of Theoretical Physics and Professor of Philosophy of Science, University of Berne. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. viii + 222 pp. 16 × 23 cm. Price, \$6.75.

This book, as its title would imply, is hardly a text for the beginner in theoretical physics, nor a source for the classical chemist seeking more information about the nature of recent advances in physics. However, it is also not, as one might fear from the title, a pure exercise in mathematical abstractions, devoid of physical contact with reality. Although the author does actually "start at the beginning and proceed to the end" a considerable acquaintance with analytical mathematical methods is expected of the reader.

The author starts with the formal methods of the treatment of mechanics developed in the nineteenth century through the work of Lagrange and Hamilton. The description, although formal, is by no means devoid of reference to simple physical examples and the text is interspersed with problems for solution by the reader. Early in the book the electrodynamic field is introduced as an example. Thus the parallelism of the methods of particle dynamics and of field dynamics is kept in constant view throughout the treatment. Although quantum mechanics as such is not treated (Quantum Theory is the title of the last one page half of the last section of the last chapter) the text is clearly oriented in such a manner that the transition from the classical to the quantum treatments is made as naturally as possible. Many references made in the text to this transition do occur earlier. Clearly the author is writing for an audience that he expects to be acquainted with the formalism of quantum mechanics.

The book is an excellent text for the purpose for which it was written, to show the great breadth of the nineteenth century formalism, and how readily it can be adapted to new physical theories.

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JOSEPH E. MAYER

**Gmelin's Handbuch der Anorganischen Chemie.** Achte Völlig Neu Bearbeitete Auflage. Magnetische Werkstoffe. Magnetische und Elektrische Eigenschaften. Zugleich 2. Ergänzungsband zu Eisen Teil D. System-Nummer 59. E. H. ERICH PIETSCH, Editor. Verlag Chemie, G.m.b.H., (17a) Weinheim/Bergstr., Pappelallee 3, Germany. 1959. xxxviii + 580 pp. 17.5 × 25.5 cm. Price, Kart. DM 321.--; Geb. DM 326.--.

It may startle some to learn that Gmelin, a veritable citadel of inorganic chemistry, sees fit to devote over 500 pages