

Valency: Classical and Modern. Second Edition. By W. G. PALMER, Sc.D., D.Sc., Fellow of St. John's College, Cambridge University Lecturer in Chemistry. Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1959. ix + 244 pp. 14.5 × 22 cm. Price, \$5.50.

Nowadays, many a student studies atomic and molecular structure in terms of the orbitals of the electrons with little idea of the origins of these ideas or the reasons for rejecting earlier explanations. The reading of Palmer's "Valency" will cure this omission; it begins with a well-written history of valence and an account of the development of the modern ideas of valence and structure.

In later sections, it shows the structures (based largely on diffraction methods) of a great variety of interesting compounds ranging from ionic crystals to the boranes, and reconciles these with modern theory. These sections are a goldmine of information.

Modern ideas about atomic and molecular orbitals and the nature of bonding are presented in enough descriptive detail so that the reader is introduced to the language, but he will be hard put to apply these ideas in extension or criticism of the results presented. This completely non-mathematical book could be a valuable supplement to a more rigorous and quantitative treatment.

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Physik und Chemie der Grenzflächen. Zweiter Band. Die Phänomene in Besonderen. By K. L. WOLF. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. 360 pp. 16.5 × 23.5 cm. Price, DM. 58.

This book is composed of a number of chapters that, like encyclopedia articles, are related only by the common theme of surfaces. The emphasis is physical and mathematical rather than chemical. Many of the subjects discussed at some length can be classed as curiosities, and although not "important" by virtue of the interest manifested in them currently, belong in this kind of work.

This is particularly true of the first section of four chapters which is about such things as the shape of soap films stretched on wires hanging from supports, or touching one another as bubble clusters. This section is full of antique references to Gauss and other great mathematicians. It appears to be one of the specialties of the author, and seems to be authoritative. There are many interesting illustrations that show, among other things, the development of drops in a falling stream of water.

The second group of chapters is about films on liquids, and discusses the usual topics in the fashion of Langmuir, Harkins and others. There are of course many adequate discussions of this sort in English. A definite attempt is made to be historical, here as in other parts of the book; for that reason many of the references and examples are less useful for other purposes.

The longest portion of the book follows; it is about adsorption at the interface. All types are considered, and the treatment includes a version of the thermodynamics of interfaces; one wonders what is in the first or "general" volume, if this fundamental topic spills over into this volume. The treatment of adsorption on solids is essentially pre-war, although it has been sprinkled, at random, with references to most of the modern workers. This section concludes with an inadequate survey of nucleation, epitaxy and rate of solution, and growth of crystals. All these important topics, and others, are dismissed in ten pages. In general, rate processes are sacrificed to thermodynamics in the book.

The last group of chapters continues the encyclopedic survey of a number of odd effects, such as the camphor motor boat, and the mechanism of thixotropy.

There is nothing really chemical in the book, such as catalysis, rate of oxidation of surfaces, or chemisorption. It is the kind of book that a large library should buy, but which probably will be of little interest to the individual chemist.

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Methoden der Organischen Chemie. (Houben-Weyl). Vierte, Völlig Neu Gestaltete Auflage. Band V. Teil 4 Halogenverbindungen. Brom- und Jodverbindungen. Herstellung. Chlor-, Brom- und Jodverbindungen. Reaktivität-Umwandlung. Edited by EUGEN MÜLLER, Tübingen. Georg Thieme Verlag, Herdweg 63, Stuttgart, Germany. 1960. xlvii + 894 pp. 18 × 26 cm. Price, Moleskin DM. 180.00. Vorbestellpreis DM. 162 00.

Volume V of the compendium is devoted to hydrocarbons and halogen compounds. The wealth of material imposed the need for subdivision into four parts, of which No. 4, dealing with the preparation of bromo- and iodocompounds is now at hand. Fluoro- and chlorocompounds are treated in part 3, which also will include a discussion of the reactivity of fluoro-derivatives, whereas the reactivity of the more closely related compounds of chlorine, bromine and iodine is dealt with in an outstanding chapter of the present book. This section, on the one hand, describes the broad classes of transformations of which halogen compounds are capable—elimination of halogen or hydrogen halide, and exchange of halogen, and on the other hand presents a concise discussion of current views on reaction mechanisms that should prove very helpful to the preparative chemist in planning synthetic approaches.

The preparative sections begin with surveys of brominating and iodinating agents, their preparation and applicability, together with practical hints as to their use. The halogen compounds are classed according to their mode of synthesis: by addition of halogen, by exchange against hydrogen or the other atoms or groups, and by special methods of degradation or synthesis, as, e.g., the brominating decarboxylation of silver carboxylates developed by the Hunsdieckers, or the haloform reactions.

Selection of proper examples must have been a particularly vexing problem to the authors of the present volume, because many fields, like steroids, polyisoprenoid compounds, terpenes, have given rise to special methods for making bromides and iodides. In my opinion, this problem has, again, been wisely and adequately solved and volume V/4 is to be welcomed as another valuable addition to the series.

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Non-Benzenoid Aromatic Compounds. Edited by DAVID GINSBURG. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. xii + 543 pp. 16 × 23.5 cm. Price, \$18.00.

This book constitutes a valuable addition to the literature of organic chemistry. A brief foreword by Sir Robert Robinson adds interest to this work since his early contributions were important to the development of our present day concept of an aromatic compound. The first chapter by D. P. Craig of University College (London) describes the meaning of the term "Aromaticity" from the viewpoint of the theoretical chemist, and π -electron theories are applied to benzenoid and non-benzenoid aromatic compounds. The second chapter deals with cyclobutadiene and related compounds and was written by Wilson Baker and J. F. W. McOmie of Bristol University. Attempts to prepare cyclobutadiene, the work of Roberts and his students on phenylcyclobutenone, Cava and Napier's work in the benzocyclobutene series and a description of the chemistry of diphenylene, the interesting hydrocarbon first prepared by Lothrop, are the chief topics considered in this carefully prepared chapter. The third chapter deals with compounds whose aromaticity resides in a ring of five carbon atoms and especially with metal compounds containing such a system. The chemistry of ferrocene and related compounds constitutes the major portion of this chapter, which was written by P. L. Pauson of Sheffield University. An admirable feature of this book is the attempt which has been made to include the most recent literature. In accordance with this policy, addenda describing work which appeared after the chapters were written are included. Pentalene and Heptalene and related compounds are considered in the fourth chapter which was prepared by Ernst D. Bergmann (Hebrew University, Jerusalem). One cannot fail to admire the

considerable degree of ingenuity displayed in the syntheses attempted.

The Azulenes are the subject of the following two chapters. Work in this area is appropriately and expertly presented by E. Heilbronner and W. Keller-Schierlein of the E. T. H. of Zurich. The LCAO-MO model of Azulene, its electronic ground state and its electronic excited state form the chief topics of discussion of one chapter, while the pathways to the azulenes are described in the second.

Tetsuo Nozoe (Tohoku University, Sendai, Japan) discusses the seven-membered aromatic compounds. Recognition by Hückel, as early as 1931, of the theoretical similarity of the $C_7H_7^+$ ring and the benzene ring, Dewar's assignment of the seven-membered aromatic system to colchicine and stiptic acid and the work of Dauben and Doering and their respective co-workers dealing with the synthesis of tropone focused attention on this non-benzenoid aromatic ring system. The citation of over five hundred references is indicative of the attention which this topic has received by Dr. Nozoe. This material is well organized. The last portion of this book is devoted to Cyclooctatetraene (R. A. Raphael, Glasgow University) and to the Cyclopolyolefins (Wilson Baker and J. F. W. McOmie).

There is a fifty page index—author and subject. This book was edited by David Ginsburg of the Israel Institute of Technology of Haifa, and organic chemists are indebted to the editor, authors and publishers for this scholarly contribution.

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Gas-Chromatographie. By DR. RUDOLF KAISER, Deutsche Akademie der Wissenschaften zu Berlin, Forschungsgemeinschaft der Naturwissenschaftlichen, Technischen und Medizinischen Institut, Institut für Verfahrenstechnik der Organischen Chemie, Leipzig. Akademische Verlagsgesellschaft Geest und Portig, K.-G., Sternwartenstrasse 8, Leipzig, C 1, Germany. 1960. X + 223 pp. 17 × 23.5 cm. Price, DM., 32. —.

The literature on gas chromatography is enriched by the publication of this brief monograph. The author has set himself practical objectives in the writing of this book instead of following a more or less balanced treatment of the subject, which is already available in other monographs.

Without omitting the essential theoretical principles and without giving a collection of recipes, emphasis is placed on the experimental technique. This is done in a logical and systematic manner and it is complemented with excellent graphical illustrations.

The book is divided into four main chapters preceded by a brief introduction. The first chapter, 20 pages, deals with the theory of the separation process. A succinct exposition of the theory of capillary columns is included for the first time in monographs of this type. The second chapter which accounts for more than 50% of the book, 125 pages, deals with the gas chromatograph as such and it is concerned with the description, construction and function of all the essential and secondary parts of the instrument. Instructions for coating capillary columns as well as for the building of ionization detectors are included. An exclusive section is devoted to special gas chromatographs where high temperature, low pressure and automatic sampling devices are described among other special-purpose instruments.

The third chapter, 34 pages, treats briefly but critically the presentation and interpretation of the analytical results. A few specific applications of the gas chromatographic method to the determination of thermodynamic constants is also given. The last chapter of the book is a useful appendix of 25 pages of tables. Liquid stationary phases and adsorbents used for certain separations, retention volumes of aliphatic and aromatic compounds and Bayer's selectivity coefficients are listed.

The coverage of original papers, conferences and symposia is comprehensive and up-to-date, considering that the book was written in 1959. In addition to Russian and other European publications, a significant amount of unpublished information coming from Dr. Kaiser's own laboratory and his associates is made available. As a whole, the author's own objectives seem to be well accomplished: A practical

introduction to gas chromatography for students of this subject and a useful guide for professionals concerned with problems of instrument design, construction and specific applications.

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Chromatographie en Chimie Organique et Biologique. Volume I. Généralités. Applications en Chimie Organique. By E. LEDERER, Professeur à la Faculté des Sciences de Paris. Masson et Cie., 120, Boulevard Saint-Germain, Paris 6, France. 1959. xi + 672 pp. 17.5 × 25 cm. Price, broché, 9.000 fr.; cartonné toile, 10.000 fr.

This volume is the first of two which deal, in this series of monographs on organic chemistry, with the rapidly advancing uses of chromatography of all kinds. The present volume is concerned with general principles, techniques and applications to organic chemistry, while the second will be concerned more in the applications to biological chemistry, *i.e.*, the area from which the subject has derived most of its stimulus.

The main idea of this work is "to give to any chemist a complete text which would allow him to effect most of the chromatographic separations, without consulting the original works." To achieve this objective, the editor, E. Lederer, has called upon specialists (19 contributors) who, with him, drew up the 16 chapters of 671 pp. which compose this work. The 19 authors and their addresses are cited at the beginning of the work, which allows the reader, if not satisfied upon any point, to apply directly to the authors in question.

The first part of this work consists of four general chapters which deal with theories of adsorption, ion exchange, partition and gas chromatography, respectively. Another chapter deals with applications of radioisotope techniques in chromatography.

In the second part of the book each chapter deals with the applications of chromatography to some specified class of compounds, namely, hydrocarbons, mono- and polyhydric alcohols, aldehydes and ketones, acids, nitrogen compounds, volatile amines, alkaloids, halogen compounds and synthetic dyes. Finally a chapter deals with the separation of stereoisomers. Since the entire second volume will deal with the classes of physiologically important substances (sugars, phosphate esters, sterols, amino acids, proteins, purines and pyrimidines, pigments, vitamins, hormones, antibiotics, etc.), the classes of compounds dealt with in this volume seem somewhat arbitrarily chosen.

An extensive bibliography consists of references placed at the end of each chapter, and there is both an author index, a subject index, and a table of contents.

The treatment in the chapters which comprise the first part of the book is somewhat uneven. In the chapter on adsorption chromatography, after a brief historical account and a treatment of the theory governing these separations, some technical problems are considered. Factors which influence the separations are dealt with, and an account is given of the main adsorbents used and the solvents. A comprehensive table presents the reagents which may be used to reveal colorless compounds on the chromatographic columns, and for each such reagent there is a bibliography. A table emphasizes the secondary effects that may occur during absorption chromatography. In this chapter one misses a list showing the manufacturers, or sources, of the different adsorbents which is given in a later chapter that deals with ion exchange materials. For example, one is at a loss to know the identity of "Floridin XXF" or where this naturally occurring silicate may be obtained. The possible effect of resins on the substances chromatographed is mentioned, though somewhat briefly and superficially. Even so, the treatment of partition chromatography dwells on some inconsequential minutiae, *e.g.*, ascending chromatography in tubes is described only to conclude its main use is for demonstration purposes. Similarly, the author dwells somewhat unduly upon the circular chromatographic method which is of relatively little application.

The chapter on gas chromatography will be read with interest. This technique is attractive by its accuracy and by the range of its use. The authors claim that all gases or