

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