

dation with 30 ml. of 3 *N* sodium hydroxide and 30 ml. of 30% hydrogen peroxide, there was isolated 9.62 g. (85% yield) of 2-methylcyclohexanol, b.p. 165°, n_D^{20} 1.4643, $[\alpha]_D^{25}$ -0.5°. Analysis by gas chromatography (glycerol column at 75°) showed 92% *cis*-, 8% *trans*-2-methylcyclohexanol.

Similar treatment of 10.0 g., 100 mmoles, of pinacolone yielded 8.6 g. (85%) of pinacolyl alcohol, b.p. 119–120°, n_D^{20} 1.4154, $[\alpha]_D^{20}$ + 2.3°;

acid phthalate m.p. 85–86°, $[\alpha]_D^{20}$ + 18.9° (*c* 3.65 in CHCl_3).⁹

(9) R. H. Pickard and J. Kenyon, *J. Chem. Soc.*, **105**, 1120 (1914), reported b.p. 119–120°, n_D^{20} 1.4146, $[\alpha]_D^{25}$ +7.71°; acid phthalate m.p. 86–87°, $[\alpha]_D$ +63.9° (in CHCl_3).

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BOOK REVIEWS

Cholesterol. By DAVID KRITCHEVSKY, Associate Member, The Wistar Institute, Assistant Professor of Biochemistry in Medicine, The University of Pennsylvania. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1958. xi + 291 pp. 15.5 × 23.5 cm. Price, \$9.75.

Dr. David Kritchevsky's book is a comprehensive review of the chemistry, biosynthesis, biological function and analysis of cholesterol. For the worker in the field it is both a synthesis and a work of reference. For the newcomer, whether he be a chemist or a biologist, it is a stimulating introduction to the knowledge of this important natural substance.

In Chapter 1, Chemistry of Cholesterol, a brief historical review leads to a well presented description of the proof of structure. The evolution and development of chemical reactions now standard and familiar in steroid chemistry are well presented as tools used in nuclear configuration analysis, total synthesis and in methods of preparing cholesterol labeled with the isotopes of hydrogen and carbon. The lability of radioactive cholesterol on storage is described. In Chapter 2, the Biosynthesis of Cholesterol is presented starting with the early balance studies which demonstrated 'in vivo' synthesis and dealing finally with the investigations of enzyme systems obtained from tissue homogenate fractions. The synthesis of cholesterol from acetate *via* squalene, the distribution of acetate carbons in the molecule, the effect of metal ions and dietary factors and the importance of the liver are discussed in an integrated fashion calculated to enhance further research.

Chapter 3 on Absorption and Transport of Cholesterol emphasizes the methods and pitfalls encountered in such studies. The roles of fat, bile acids and cholesterol esterase activity are discussed in relation to absorption of cholesterol into the lymph from the small intestine. The relation of lipoproteins to cholesterol transport in the blood is introduced to lay the foundation for the later discussion (Chapter 5) of their role in cholesterol metabolism in disease states.

Aspects of cholesterol metabolism in relation to body function are discussed in chapter 4. These include its possible role in the transport of fatty acids, as a precursor of steroid hormones and bile acids, as a structural unit in nerve tissue and its antihemolytic properties in plasma. A brief but pertinent discussion on cholesterol balance studies is included. In Chapter 5, Cholesterol in Disease States, the relationship of cholesterol to cancer and to atherosclerosis are discussed in detail. As the layers of complexities are revealed it is obvious that the final answers to the unsolved problems of cancer and circulatory disease can come only through further patient research.

A worker in the field has only to read Chapter 6 on Blood Cholesterol to realize how well Dr. Kritchevsky has summarized and evaluated the pertinent points of the 546 references given at its end. The effects of various diets, of steroid and other hormones and other factors on the equilibria between cholesterol and its esters in blood and in tissues and on their distribution between blood and organs are discussed with special reference to disease states, particularly atherosclerosis. Hypocholesterolemic agents such as 2-phenylbutyric acid, nicotinic acid and plant sterols are considered here.

The last chapter (7), Analysis of Cholesterol, reviews not only the standard and newer analytical methods but also the factors to be evaluated for a given application. The mechanism of sulfuric acid-induced color reactions is discussed. A worthwhile presentation of the merits of column and paper chromatographic methods for cholesterol and its derivatives is included.

An appendix contains physical constants of cholesterol, related sterols and derivatives as well as tables of the cholesterol contents of various foods and tissues. An amazing total of 2092 references covering the literature to 1958 has been used by Dr. Kritchevsky in the compilation of this book which can only be highly recommended.

Some errors, apparently printers', have been noticed. Wislicenus' name is spelled wrong on page 1; on page 11 the structural formula, XXI, for calciferol methyl ether has its C-4 labeled wrong and its double bond missing between C-5 and C-6; on page 40 a double bond should be present between C-5 and C-6 in formula CLXII.

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Comprehensive Analytical Chemistry. Volume IB. Classical Analysis. Edited by CECIL L. WILSON, Ph.D., D.Sc., F.R.I.C., F.I.C.I., Professor of Analytical Chemistry, The Queen's University of Belfast, and DAVID W. WILSON, M.Sc., F.R.I.C., Principal Lecturer, Sir John Cass College, London. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1960. xxii + 878 pp. 16 × 23 cm. Price, \$30.00.

"Comprehensive Analytical Chemistry" eventually will comprise five volumes, some volumes consisting of several parts. The aim of the editors as stated in the preface is "to provide a work which in many instances should be a self-sufficient reference work, but where this is not possible it should at least be a natural starting point for any analytical investigation." This book, which is the second part of Vol. I, "Classical Analysis," deals with classical methods of inorganic titrimetric analysis (visual end-point detection) and with organic quantitative analysis. It is written by sixteen specialists, most of whom are from England.

Nearly 400 pages are devoted to inorganic titrimetric methods, of which a chapter "Theory and Practice" by E. Bishop occupies 180 pages. This consists of a clear and somewhat detailed treatment of *pH* and similar calculations appropriate to titrimetric processes, and includes 33 pages of tables of equilibrium constants and electrode potentials. In general the treatment is excellent, aside from the curious statement (p. 11) *re* the effect of ionic strength on equilibrium calculations: "at the equivalence point of titrimetric reactions the concentrations are usually of the order of 10^{-6} *M* or less, when the activities approach unity." A brief chapter on apparatus describes the common types of volumetric glassware and gives practical suggestions on its use. It is of interest to learn (p. 186) that specifications established for the manufacture of titrimetric glassware en-

sure that "the apparatus will have the requisite accuracy," and no mention is made of testing of such apparatus. There are chapters on practical details of acidimetry and alkalimetry, on argentometric methods, oxidation-reduction methods, and a comprehensive chapter "Titrations with EDTA and Related Compounds" by Flaschka and Barnard. In covering the practical aspects of inorganic titrimetry within a compass of only 210 pages, the authors have made a wise selection of essential material and made use of a concise style of presentation. In most instances, the level is between a modern textbook and a comprehensive treatment such as Kolthoff and Stenger or Kolthoff and Belcher.

The second part of the book on Organic Quantitative Analysis includes practical chapters on weighing and other manipulations, and on the determination of C, H, N, halogens, S, O and metallic elements. It is interesting to learn how some classical procedures, generally taken for granted by the non-specialist, still need improvement in various respects. All these chapters can be read with profit by anyone carrying out such determinations. There is a good discussion of functional group analysis (130 pages) and finally a chapter on organic applications of titrations in non-aqueous solvents. In this chapter, the discussion of methods of end-point detection is not restricted to visual methods.

Altogether, the volume is a useful and practical contribution to the literature of analytical chemistry, and in the reviewer's opinion the aim expressed in the preface has been accomplished.

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Neuere Methoden der Präparativen Organischen Chemie
Band II. Edited by WILHELM FOERST. Verlag Chemie, G.m.b.H., Pappelallee 3, Weinheim/Bergstr., Germany. 1960. 272 pp. 20.5 × 18 cm. Price, kart. DM., 14.50; geb. DM. 18.—.

The development of preparative organic chemistry during the last half century has brought with it a great increase not only in the number of known reactions but also in specific modifications on which success and yield often depend. In a number of cases investigations of reaction mechanisms have led to a degree of understanding which enables the experimenter to vary conditions rationally rather than by intuition. It has, however, become more and more difficult

for the preparative organic chemist to keep up with the original literature and even to consult it exhaustively with respect to a particular problem. The survey and review literature has, therefore, become increasingly necessary. A series of articles published since 1940 in "Die Chemie" occupies an important place in this literature. The papers which had appeared by 1942 were published as Volume I of *Neuere Methoden der Präparativen Organischen Chemie*.

After the war, the publication of the highly successful reviews was resumed by "Angewandte Chemie." Fourteen articles of this second series have been brought up to date by the authors and collected in the present volume. It contains the following contributions: Syntheses with Acetaldehyde (Franke, Kraft and Kosswig); Preparation of Peptides and Ureides by Way of Reactive Amides or Imides (Goldschmidt and Krauss); Preparation of Long-Chain Carboxylic Acids from Cyclohexane-(1.3)-diones (Stetter); Cyclopentanone-*o*-Carboxylic Ester and its Preparative Significance (Mayer); Ketene in Preparative Organic Chemistry (Quadbeck); Preparative and Analytical Significance of Phosphines and Related Compounds (Horner and Hoffmann); Reduction of Carbonyl Compounds by Means of Complex Hydrides (Hörmann); Alkylation of Aromatic Amines (Stroh, Ebersberger, Haberland and Hahn); Chemical Syntheses of Intermediates of the Sugar Metabolism (Fischer); Amidomethylations (Hellmann); Selective Catalytic Oxidation by Means of Noble Metal Catalysts (Heyns and Paulsen); Alkylation of Phenols and Olefins (Stroh, Seydel and Hahn); Continuous Preparation of Phenyl Sodium (Ruschig, Fugmann and Meixner); and Newer Investigations on Oxidations with Lead Tetraacetate (Criegee).

The chapters deal with the principles of the respective syntheses as well as variations, applications and yields. They are addressed to the experimental chemists and contain detailed procedures which can be followed without consultation of the original literature. While no systematic checking of the procedures is in evidence, their acceptance by the expert authors gives confidence in their reliability. Only a few of the articles discuss the reaction mechanisms involved. Although recent publications in English cover in part the same field, the present volume should be highly rewarding for anybody who is conversant with German. A low cost has been made possible by a "paper-back edition," but paper, printing and typographical arrangement are of high quality.

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