

CO₂ Assimilation," by L. Norris and M. Calvin; "The Purification of Pancreatic Lipase and the Estimation of its Activity," by Earl B. Herr, Jr., and James B. Sumner; "Kristallisiertes β -Carbonsäureamid - N⁷-D-xylisido-pyridiniumbromid," by P. Karrer, M. Viscontini and O. Leutenegger; "Nitrogen Fixation by *Aerobacter aerogenes*," by P. B. Hamilton and P. W. Wilson; "Reduktone, ihre Bildung und Stabilität," by Hans von Euler und Hans Hasselquist; "Bacterial Formation of Adenosine—Properties of the Cell-Free Enzyme System in *Escherichia coli*," by John L. Ott and C. H. Werkman; "The pN_2 and the pO_2 Function for Nitrogen Fixation by Excised Soybean Nodules," by R. H. Burris, Wayne E. Magee, and Michael K. Bach; "Synthese eines radioaktiv markierten Kynurenins (¹⁴C)," by Adolf Butenandt and Rüdiger Beckmann; "Reversible Splitting of Homogeneous Horse Myoglobin," by Hugo Theorell and Åke Åkeson; "Étude de quelques transaminations intervenant dans le métabolisme de l'acide cystéinsulfonique chez les animaux supérieurs," by Fernande Chatagner, Bernadette Bergeret, and Claude Fromageot; "Chaconin," by Richard Kuhn and Irmentraut Löw; and "Arsenolysis and Phosphorolysis of Citrulline," by H. A. Krebs and L. V. Eggleston. The other two dozen papers represent, as do these, a high average quality.

Printed critical consideration of four dozen papers would be prohibitively expensive; two will be considered. The paper by Hinshelwood on mutations and adaptations is particularly provocative inasmuch as it represents one more rebuttal in which workers such as Hinshelwood and Virtanen have differed with proponents of more orthodox ideas on these topics. This reviewer has admired the courage of these men in a period when many scientists allow avoidance of a reputation for association with unpopular or controversial concepts to take precedence over more worthy considerations. Unpopular concepts are, however, frequently something less than correct and it is of interest that a more defensive and integrative tone is now evident in Hinshelwood's article. With the unsettled knowledge of the gene-enzyme-reaction relationship it seems probable, however, to this reviewer that at least one basic link is missing from the chain of our understanding of adaptations and mutations, and that radically new insight is required.

The paper by Steward and co-workers presents many R_i coefficients of biochemical substances. These should be of much value to biochemists. It may be noted, however, that the Cornell workers report values to the third place following the decimal point although their standard deviations reveal uncertainties as great as ± 0.06 and in no case less than ± 0.01 .

As a tribute to Artturi L. Virtanen, the names of the authors and the quality of their work and interpretations in this scientific anthology have succeeded admirably. As a source of new seed crystals of knowledge and of perspective for specialists, the book offers value probably superior to that derivable from the same amount of time spent in several symposia. As instruction to the student or more casual reader, acquaintance with a cross-section of the current products of some of the ablest workers in the field is convenient. For this last type of reader, however, the book would have been considerably more valuable if the editorial board had arranged the papers in a more logical sequence.

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"The Nucleic Acids" Chemistry and Biology. Volume 1.

Edited by ERWIN CHARGAFF, Department of Biochemistry, Columbia University, New York, N. Y. and J. N. DAVIDSON, Department of Biochemistry, University of Glasgow, Glasgow, Scotland. Academic Press, Inc. Publishers, 125 East 23rd Street, New York 10, N. Y. 1955. xi + 626 pp. 16 × 23.2 cm. Price \$16.80.

Research in the field of nucleic acids has accumulated increasing evidence implicating nucleic acids as playing an important role in the fundamental processes of life. Over twenty years have elapsed since the appearance of the classic monograph of Levene and Bass, the last comprehensive treatment of this subject.

The first volume of this book builds up the topic logically, starting with a discussion of the chemistry of D-ribose and D-

deoxyribose by W. G. Overend and M. Stacey. This chapter includes tables describing a series of paper chromatographic systems and properties of ribose, deoxyribose and related compounds that will be useful in identifying the pentose components of new samples of nucleic acids.

The chemistry of purines and pyrimidines is discussed by A. Bendich, that of the nucleosides and nucleotides by J. Baddiley, and finally the chemistry of the bonds in the nucleic acids is reviewed by D. M. Brown and A. R. Todd. Methods of preparation, analysis and properties of nucleic acids are described by H. S. Loring, Z. Dische, G. R. Wyatt, E. Chargaff and B. Magasanik. The discussion of electrophoretic separations of nucleic acid derivatives by J. D. Smith is one of the most lucid descriptions of electrophoretic techniques in the literature. A chapter by W. E. Cohn describing ion-exchange chromatography is included as well as discussions of the physical and optical properties of nucleic acids by D. O. Jordan and G. H. Beaven, E. R. Holiday and E. A. Johnson.

The concluding chapter in this volume is a treatment of the enzymes attacking the nucleic acids and their components by G. Schmidt. This chapter is characterized by a thorough treatment and keen insight into the problems facing the investigator in this field.

There are several aspects of this book which the reviewer feels could be improved. The elimination of excess verbiage from various chapters was not done uniformly. The chapter dealing with the chemistry of nucleosides and nucleotides has unduly emphasized methods for proof of structure. The inclusion in this chapter of a section dealing with methods of preparing isotopically labeled compounds would be useful to biochemists. Although the significance of isobestic points is discussed in Chapter 3, this material more logically should have been given a thorough treatment in the chapter on optical properties. Although this book is rather expensive for its size, the costly footnote references add to its value. It also appears to have been comparatively slow in publication. The literature is covered thoroughly only through 1953; however, the addition of addenda summarizes the literature into the beginning of 1954.

The second volume of this series will include the more biological aspects of the topic.

Volume I has been well organized and edited so that it is a unit with little duplication, rather than a series of review articles. Cross references are frequent and helpful. There is a wealth of "hand book" data which will make this volume an essential tool in laboratories working in this field. It is highly recommended both for those active in the field as well as for those desiring to learn more about this fascinating subject.

SLOAN-KETTERING LABORATORIES

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Handbuch der mikrochemischen Methoden. Edited by

FRIEDRICH HECHT and MICHAEL K. ZACHERL, Wien, Austria. Volume 1, Part 1. **Preparative Mikromethoden in der organischen Chemie.** By H. LIEB and W. SCHÖENIGER, Graz, Austria. **Mikroskopische Methoden.** By L. and A. KOFLER, Innsbruck, Austria. Springer Verlag, Publishers, Moelkerbastei 5, Wien I, Austria. 1954. vi + 236 pp. 17.2 × 25 cm. Price—Ganzleinen, \$11.30; Subscribers to Handbuch, \$9.05.

The first section of the present volume entitled: "Preparative micromethods in organic chemistry" (88 pp., 139 fig., 6 tables) in nine out of its ten chapters, gives the methods and illustrations of apparatus for most microchemical laboratory operations such as: adsorption, centrifuging, crystallization and recrystallization, dialysis, distillations (ordinary, vacuum and molecular), drying, extraction, filtration, heating and cooling, stirring and sublimation.

The tenth chapter contains six tables, of which the first lists common organic solvents, the next two, heating baths and freezing mixtures, the remaining three are devoted to the evaluation of various microchemical apparatus for extractions, distillations and sublimations.

While the first section of the book is a collection of many, previously published methods by numerous authors, the second, entitled: "Microscopic Methods" (144 pp., 136 fig., 1 table) brings detailed discussions of the optical phenomena that take place, when a melting point or a mixed

melting point of organic compounds is performed under the microscope, or the conoscop, under various optical conditions.

In addition to the foregoing, its eleven chapters contain an extensive treatise on general optical crystallography and then discussions of such items as single-, mixed- and liquid crystals, iso- and polymorphism, eutectics and application of the microscope for the determination of the refractive index (by means of suitable glass powders) and cryoscopic molecular weight determination.

Of particular interest appears to be the chapter entitled: "Thermo-Analysis" featuring the use of three melting points for the identification of an organic compound. Thus in addition to its own melting point, the mixed melting points with acetanilide and separately, with phenacetine, are determined. Some 1200 organic substances have thus been treated and listed and the statement made (on p. 120) that this opens "almost unlimited possibilities for the characterization and identification of organic substances" and that henceforth the usual "preparation of derivatives is unnecessary." Further positive experimental substantiation of these statements, together with the elimination of the microscope, might really revolutionize organic qualitative analysis.

Unfortunately the literature, although extensive in both sections, is only up to about 1950 in the first and only to about 1940 in the second section. Both subject as well as author index are missing.

The first section is undoubtedly useful to the organic synthesis for rapid selection of the tools and method for a given occasional microchemical task, while the second section appears to strictly cater to the specialist, interested in organic crystallography.

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Polarographic Techniques. By LOUIS MEITES, Assistant Professor of Chemistry, Yale University, New Haven, Connecticut. With a foreword by I. M. KOLTHOFF. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1955. xiii + 317 pp. 16 × 23.5 cm. Price, \$6.00.

This is not a book on analytical procedures, nor is it concerned exclusively with the experimental side of polarography. In the preface, it is stated that "It began as a manual of purely experimental techniques, but it soon became evident that these could only be explained rationally by reference to the theory which guides all of our experimental manipulations." In a foreword by I. M. Kolthoff, the aims and objectives are stated to be "to provide a concise practical and theoretical introduction into the field of polarography."

Emphasis is placed on principles which by intelligent application can be used to devise procedures for particular purposes. It contains, in addition to a theoretical introduction to the various aspects of the subject, a wealth of details on experimental techniques which should be of enormous value to the new investigator in helping him to avoid the many experimental pitfalls in this field. A major contribution is a comprehensive list of half-wave potentials and diffusion current constants of inorganic substances published prior to December 1954.

In a book of limited scope, it is inevitable that many important subjects are treated very briefly or omitted altogether. The treatment of reversible current voltage curves is excellent, and apart from an erroneous statement (p. 47) concerning the origin of the factor $\sqrt{7/3}$ in the Ilkovic equation, the theory of diffusion currents is adequate. On the other hand, irreversible waves are hardly treated at all, and it is unfortunate that most of the references to this subject are to material which is relatively inaccessible, or out of date. In particular, references to the recent papers of Koutecky and of Kern would have been desirable. Controlled potential coulometry is handled brilliantly, but unfortunately no mention is made of constant current coulometry or transition time measurements in spite of the fact that space is found for lesser topics such as derivative polarography. The treatment of back pressure of mercury, temperature coefficient of diffusion current, and current compensation techniques could have been condensed to give added space. In the opinion of the reviewer, the single reference to an os-

cillographic technique for proof of reversibility was not well chosen. Either the triangular voltage pulse (Sevcik) or the superimposed sine wave technique (Breyer, Ershler, Grahame, Randles) would have been more appropriate.

Chapter VI on Maxima and Their Suppression is theoretically weak, although it contains many valuable practical details. The work of von Stackelberg deserves mention.

Practically no emphasis is placed on instantaneous current-time behavior, no doubt because the treatment generally refers to currents measured by a galvanometer. The theoretical treatment of irreversible waves is more straightforward if the "peak current" is measured, and adsorption waves (p. 82-83) as well as certain waves due to film formation clearly show the expected inverted current-time behavior if a high speed recorder is used. Thus the inference (p. 63) that there is no advantage to the use of high speed recorders is misleading.

In the chapter on Amperometric Titrations the impression is somehow created (p. 198) that the over-all accuracy is limited by the accuracy of determining concentration by measurement of current, rather than by the stoichiometry of the reaction and the sensitivity of detection of a small increment of volume. If a similar criterion were applied to potentiometric titrations an entirely erroneous notion of its accuracy would be given. The absence of charging current with a rotating platinum electrode merits mention as contributing to its useful sensitivity. The need for relatively concentrated solutions of titrant is overemphasized, especially for inverted L shaped curves for which no dilution corrections are necessary before the end-point. Complex formation titrations have been applied, contrary to the statement on p. 193. No mention is made of the Sargent "Ampot," an instrument designed for amperometric titrations.

A few minor points: On p. 8, 9, it is stated that for linearity the resistance of the voltage divider "must be very much smaller than that of the cell circuit." Since the cell circuit does not obey Ohm's Law, this requirement is much too rigid, and would be better stated by requiring that the current through the voltage divider must be very much larger than the current through the cell.

The derivation (p. 98) applies to the cathodic as well as the anodic curve of mercurous ion. The term "homogeneous electrode reaction" (p. 99) is not ideal, inasmuch as all electrode reactions are surface reactions and are therefore heterogeneous. The statement (p. 108), "any appreciable variation of $E_{1/2}$ with concentration is conclusive proof of the irreversibility of the reaction" is not true of unsymmetrical waves, for example the anodic wave of thio-sulfate. The lack of an inflection around the residual current curve (p. 109) is not as rigorous a condition for reversibility as the coincidence of anodic and cathodic half wave potentials. The proper logarithmic slope of the composite curve should be added as a criterion. The half-wave potential of an irreversible curve depends noticeably on drop time, contrary to the statement on p. 123.

Lest the above criticisms create an unfavorable impression, let it be understood that on the whole the objectives of the present volume have been very well achieved. This work should be a valuable aid to the student and to the beginning research worker as an introduction to the field. The book shows evidence of very careful proof-reading and editing, as evidenced by a remarkably small number of typographical errors (an exception is the wrong sign of E^0 on p. 129).

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Enzymologie. Eine Darstellung für Chemiker, Biologen und Mediziner. By OTTO HOFFMANN-OSTENHOF, DR. PHIL., Privatdozent am I. Chemischen Laboratorium der Universität Wien. Springer-Verlag, Mölkerbastei 5, Wien 1, Austria. 1954. xvi + 772 pp. 18 × 25 cm. Price, Ganzleinen, \$26.65.

In these days of increasing specialization it is common practice to publish treatises under joint editorship and with multiple authorship. The authoritative work on enzymes in the English language today is undoubtedly "The Enzymes," edited by James B. Sumner and Karl Myrback