

It is in the chapters on biochemical aspects where the most extensive additions have been made, particularly in the detailed presentation of the biosynthesis of cholesterol and the porphyrins. Yet very few new specific references to the original literature have been added to those of the second edition (1951). References through 1955 are chiefly limited to a number of general and review articles; these are appended at the close of each chapter.

In spite of its shortcomings it remains a useful introductory textbook in tracer chemistry, particularly for students of biochemistry.

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**Thermodynamics of One-Component Systems.** By WILLIAM N. LACEY and BRUCE H. SAGE, Chemical Engineering Laboratory, California Institute of Technology, Pasadena, California. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1957. xi + 376 pp. 16 × 23.5 cm. Price, \$8.00.

This book is designed to help students of engineering make the transition "from idealized thermodynamics to the combination of thermodynamics with mechanics needed for the every day problems of the engineer." The subject matter is limited to one-component systems for the authors believe that "a clear understanding of a limited field is more valuable than a superficial acquaintance over a broader front." The units used are the usual engineering units.

The first part (144 pp.) deals with thermodynamic principles. Its special feature is some use of the concept of friction in the development of relations between heat, work and the thermodynamic functions. This concept allows the engineer to differentiate between the applied work and the actual work done on the system. In this section equations are developed and applied to homogeneous systems of gases and liquids of unit weight, heterogeneous systems of unit weight, and systems of variable weight. A chapter on irreversible processes and reactions between systems of constant weight is also included.

The second part deals with flow processes under conditions of steady flow. About 70 pages are devoted to principles and to the development of equations and 70 pages to engines, compression of gases, refrigeration, and liquefaction of gases at low temperature. An appendix of 60 pages includes a 14 page section on the experimental determination of thermodynamic properties.

In view of the experience of the authors, non-engineers should not be surprised to find in this book a detailed treatment of the thermodynamics of one or two-phase one-component systems from the point of view of one who is to make measurements on them or to interpret thermodynamic diagrams of them. The book will also be useful to those who wish to consider the application of thermodynamics to practical situations.

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**Biophysical Chemistry. Volume I. Thermodynamics, Electrostatics, and the Biological Significance of the Properties of Matter.** By JOHN T. EDSALL, Biological Laboratories, Harvard University, Cambridge, Massachusetts, and JEFFRIES WYMAN, Middle East Science Cooperation Office, UNESCO, Cairo, Egypt. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. xv + 699 pp. 16 × 23.5 cm. Price, \$14.00.

The rapidly growing and important field of biology which lies at the juncture of chemistry and physics as well as of biochemistry and biophysics has been given various names such as physical biochemistry and biophysical chemistry. The timely appearance of the first of a projected two volume series by Edsall and Wyman will aid materially in the growing need for suitable texts in the area of physical chemistry of biological systems. The following chapters are included: Biochemistry and Geochemistry (4% of content),

Water and its Biological Significance (3), Problems of Protein Structure (14), Thermodynamics (15), Electrostatics: its Application to Polar Molecules and Ionic Solutions (12), Dielectric Constants and their Significance (9), Conductivity of Electrolytes (3), Acid-Base Equilibria (11), Polybasic Acids, Bases, and Ampholytes, Including Proteins (11), Carbon Dioxide and Carbonic Acid (6), and some General Aspects of Molecular Interaction (12).

The authors have placed the major emphasis on the fundamentals of bio-physical-chemical systems and only a minor attention to techniques. This reflects the strength of this growing field, for as soon as a major discipline concerns itself less with techniques and more with the fundamentals of the subject under study, the contributions from this field become substantial. It has been necessary for the authors to restrict the coverage of material and in doing so they have elected to discuss those topics more "intimately" known. For this reason the authors speak with considerable authority. They will be criticized for the omission of any discussion of polynucleotides and we may hope that in the next volume some consideration can be given to this rapidly growing field of biology.

Throughout the text the "biological significance" of the principles of physical chemistry is stressed. This includes the chapter on thermodynamics which is frequently included in texts of this nature as a matter of routine. In the present instance, however, the approach to this fundamental topic has been oriented to the specific problems of the biochemist. Of considerable value are the contributions made by the authors in their discussions of such systems as the malate-fumarate equilibrium, peptide bond synthesis, and the standard free energy of hydrolysis of adenosine triphosphate. Copious examples of biological systems are used to illustrate their points, but the authors do not err in a tendency of including too much detail. Indeed, it is probably their excellent choice of illustrative material which contributes most successfully to the teaching value of this volume.

The subject matter is presented in a concise and straightforward manner, beginning in many instances with first principles. A knowledge of calculus, organic and physical chemistry is assumed. As a guide for the student a list of problems is included at the end of several chapters. The final chapter provides an excellent review of the phenomena associated with molecular interactions and of the experimental problems they present. The style of the authors provides a readable text which should give the student little difficulty. It should become a standard in classrooms, despite the over-emphasis of certain subjects and omission of others. In addition it will find a useful place in any reference library. A generous bibliography is included with each topic. As with any first edition a few typographical errors have made their way to the final copy, but these are readily recognized. A twenty page subject index is included.

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**Modern Electroanalytical Methods.** Proceedings of the International Symposium on Modern Electrochemical Methods of Analysis, Paris, 1957. Sponsored by the I.U.P.A.C.'s Sections of Analytical and Physical Chemistry (C.I.T.C.E.). Edited by G. CHARLOT, Professeur à l'École de Physique et de Chimie industrielles de Paris. D. Van Nostrand Company, Inc., 126 Alexander Street, Princeton, N. J. 1958. 186 pp. 17 × 24.5 cm. Price, \$4.95.

This volume contains in a convenient form the papers published in "Analytica Chimica Acta" (Nos. 1 and 2, Vol. 18, 1958). These 22 papers in English, German or French were presented at the symposium organized by Professor Charlot in Paris in July, 1957. The meeting was well attended by delegates from Western Europe, the United States, the U.S.S.R., Yugoslavia, Poland, Czechoslovakia, Japan, India, Australia, etc.

The general purposes of C.I.T.C.E. are set forth in the inaugural address of T. P. Hoar. Kolthoff, in his introductory remarks, points out the significance of electroanalytical methods in the teaching of analytical chemistry.

Papers cover a great variety of electroanalytical methods. Two trends, however, can be distinguished: methods for

trace analysis and development of new methods. Several approaches to trace analysis by electrochemical methods are discussed: (a) increase of the rate of mass transfer by convection and use of the rotated dropping mercury electrode (Kolthoff, Tanaka); (b) anodic stripping methods for mercury electrodes (Delahay, Kemula); and (c) square wave polarography (Barker). Development and application of new methods are covered in several papers: chromopotentiometry in fused salts (Laitinen), current scanning polarography (Ishibashi), current-potential curves for ion exchangers (Coursier). Less recent developments are covered in reviews and original papers: constant current potentiometry (Gauguin), dead-stop titrations (Kies), coulometry (Cuta), oscillographic polarography (Kalvoda, Pleticha), adsorption processes (Delahay), high frequency methods (Oehme, Conseiller), etc. Discussions—often quite stimulating and interesting—are included.

This volume gives a good idea of some recent trends in electroanalytical chemistry and is recommended to electrochemists and analytical chemists. Professor Charlot is to be congratulated for the organization of this meeting and the rapid publication of its proceedings.

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**Korrosionstabellen metallischer Werkstoffe geordnet nach angreifenden Stoffen.** Vierte, erweiterte Auflage. By DR. TECHN. FRANZ RITTER, Leoben-Linz. Springer-Verlag, Molkerbastei 5, Wien I, Austria. 1958. 290 pp. 17 × 24.5 cm. Ganzleinen, \$11.65.

This is the fourth edition since this compilation was first put out about twenty years ago. There has, of course, been a considerable amount of new information obtained in the course of that time and the author has done a reasonably good job in bringing the tabulated material generally up to date. Since much of this information lies scattered throughout journal literature, books, pamphlets, periodicals and the like, a reasonably critical compilation is helpful. Dr. Ritter has done a satisfactory job in this regard.

After a brief introductory section on how to use the tables, there is a section of about twenty pages listing 867 different metals and alloys with their compositions. This brings together in one place available metals from a number of countries. The next section describes the corrosion behavior of these metals in tables and graphs in a variety of media. The tables are arranged in alphabetical order of the corrosive agents. In so far as possible, quantitative information is given and where none is available qualitative descriptions of the effects are provided.

Since tables of data of this sort are quickly out of date, and because it is almost always necessary to have full detail, books of this sort cannot be an extremely valuable source of information. However, within these limits, this is a worthwhile book.

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**Papierchromatographie.** Vierte, stark erweiterte Auflage. By DR. FRIEDRICH CRAMER. Verlag Chemie, G.m.b.H., Weinheim/Bergstr., Germany. 1958. 215 pp. 17 × 24 cm. DM 21.

This book, now in its 4th edition, appears to be the standard reference source available in the German language and, as such, it is convenient for reference to some of the more obscure continental works. In English speaking countries, however, other sources usually will be more convenient and certainly as authoritative.

Since the English translation of the 2nd German edition was reviewed (*THIS JOURNAL*, 77, 1078 (1955)) the book has approximately doubled in size, while bringing virtually the same range of material up to date. The sections on experimental technique have been expanded. There is a notable but, in the reviewer's opinion, not particularly helpful inclusion of eight pages of illustrations in color, depicting

paper chromatograms. A useful section on alkaloids has been added, and a section of porphyrins deleted. The current edition no longer contains a separate complete bibliography for the whole work, but citations appear at the foot of each page with an author index to the work. While the author clearly attempts to cite original papers for recent advances made by the use of paper chromatography, the results may be very misleading. Although the richest returns from this technique in new amino acids identified come from the study of plants, this field is represented by a very few casual citations and brief references. Most of the new substances and many of the prominent works never appear. Reference to one or more of the several authoritative reviews would have been much more informative. Making due allowance for the obvious emphasis on technique, and upon tables of information of known compounds, it is still true to say that often the best way to show the usefulness of the chromatographic methods is to show how they have been used successfully to extend the range of our knowledge.

In short, Dr. Cramer's book still covers material largely available in other sources in English, some of which will be found to be more convenient and more complete.

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**Colloques Internationaux du Centre National de la Recherche Scientifique.** LXIV. Les Hétérocycles Oxygénés. Lyon, 5-10 Septembre, 1955. Organized by C. MENTZER. Centre National de la Recherche Scientifique, Service des Publications, 13 Quai Anatole France, Paris 7, France. 1957. 390 pp. 16.5 × 24.5 cm. Price, 2,500 Francs.

This volume records the papers and discussions which formed the substance of a symposium held at Lyon in 1955, on the general subject of oxygen heterocycles. The participants were distinguished organic chemists from many countries, and the topics discussed cover a wide range; some papers deal with the chemistry of the simpler oxygen heterocycles, such as epoxides, furans and pyrans, a considerable number are devoted to the organic or physical chemistry of flavones and other plant constituents, some papers describe studies on the distribution of various types of oxygen heterocycles in various species of plants or in different parts of the same plant with discussion of the biogenetic implications, and some contributions describe synthetic procedures in the oxygen heterocycle field.

The papers vary widely in character. A considerable number describe in detail a relatively limited piece of experimental work by the authors, in some cases with complete experimental details, so that they are in effect journal articles. Other papers present a scholarly and valuable review of a field, with extensive references; in this group should be mentioned the review of furan and pyran chemistry by Paul, the discussion of rearrangements in the flavone series by Wheeler and Philbin, Erdtman's discussion of flavone distribution in conifers, Schmid's review on unsaturated lactones derived from higher plants, and Molho's review of methods of degradation in the pyrone field. The application of ultraviolet "difference curves" to flavone chemistry is discussed by Mme. Aulin-Erdtman, and Henry and Molho describe infrared studies on hydroxylated flavones. A number of the contributions, in particular those by King, Whalley, Geissman, Schmid, and Mme. Polonsky, describe elegant structural work on various natural products containing oxygen heterocycles.

Other papers discuss methods of isolation and separation of flavones and related compounds from natural sources.

The book as a whole will be of particular value to workers in the flavone field. It also will be useful reading for research workers in any branch of the oxygen heterocycle field.

The organization of the original symposium and the publication of this volume indicate the active research interest in organic chemistry in France; the reviewer hopes that the Centre National de la Recherche Scientifique will be encouraged to hold similar international symposia in the future, and to publish the proceedings in equally useful fashion.

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