labeled as to source). A body of admittedly speculative material is included, but in the present state of the art some speculation may be allowed in an effort to produce a coherent work and to stimulate further research. This volume is not intended to constitute a textbook or handbook of the properties of available polymeric materials; rather, it is intended for those readers whose aim is to understand the mechanisms of high polymer behavior.

A. W. NOLLE

University of Texas

Frontiers in chemistry. Vol. V: ***Chemical architecture.*** R. E. Burk and Oliver Grummitt. (Eds.) New York-London: Interscience, 1948. Pp. 202. (Illustrated.) $4.50.

This volume is a continuation of the publication of the annual series of lectures, under the general title "Frontiers in Chemistry," sponsored by the Graduate School of Western Reserve University. Two series of lectures have been given in the spring of each year. Series I and II were given in 1942, and Volumes I and II were published the year following their presentation. Volumes V and VI, however, are appearing nearly four years after the presentation of the lectures, presumably because of the difficult conditions created by the late war. The reviewer earnestly recommends to the editors and publishers of this series that every effort be made to have the volumes appear not later than one year following presentation of the lectures. This will preserve the timeliness of the topics and enhance the importance of the material discussed. Since the beginning of these lectures in 1942, several similar projects have been started at various other universities and institutions. In the words of the editors, this is "both encouraging and flattering, and we hope that the trend will continue. Continued success depends upon the quality of the lectures and on well-organized programs."

In this volume, the several topics are presented by masters in their respective fields, as follows:

In "Application of Molecular Geometry in the Field of Reaction Mechanism," by Hugh S. Taylor, we find a discussion of the concept of activation energy, and the influence and effect of molecular geometry in homogeneous reactions, in heterogeneous reactions, and in homogeneous liquid systems.

"Dipole Moment, Resonance, and Molecular Structure," by Charles P. Smyth, considers the molecule as an electric dipole, experimental determination of dipole moments, use of dipole moment in determining molecular structure, movable dipoles and restricted rotation, and the dipole moment as a measure of resonance.

The subject "Structure of Coordination Compounds" is taken up by W. Conrad Fernelius. In the field of inorganic compounds, Fernelius discusses fundamental definitions, the nature of coordination linkages, and methods for deducing the structure of inorganic molecules.

"X-Ray Studies of Randomness in Various Materials," by Bertram E. Warren, deals with the structures of ideally crystalline materials and randomness in the structure of other materials.

In "Light Scattering in Polymer Solutions," H. Mark discusses a few principles of light scattering, the scattering of light from a pure liquid, from solutions of small molecules, and from solutions containing particles comparable with the wave length of light, the depolarization of scattered light, and experimental methods for measuring turbidity and disymmetry.

Miroslav W. Tamele, in "The Nature of Inorganic Gels," discusses the definition of gel, the formation of inorganic gels, inorganic sols, sol-gel transformation, structural changes on drying of gels, the solid framework of dried gels, and the porosity of gels.

Adequate references are given at the end of each chapter. The reviewer wishes that one additional subject had been included in this volume, namely, "molecular architecture in the statistical calculation of thermodynamic functions."

A copy of this book should be available in the library of every scientific or technical laboratory, so that its chemists and chemical physicists may see how important is the concept of molecular architecture in the analysis of the diverse problems discussed by the authors of this volume.

FREDERICK D. ROSSINI

National Bureau of Standards

Topics in physical chemistry: a supplementary text for students of medicine. W. Mansfield Clark. Baltimore: Williams & Wilkins, 1948. Pp. xv + 738. (Illustrated.) $10.00.

The purpose of this book is best described in the author's own words in the preface: "This book is not designed as a text for a formal course. It is written to meet the diverse needs of medical students and to be drawn upon as the student of elementary biochemistry and the maturing student of medicine may find occasion." The reviewer may add this: the book shows the mark of an experienced teacher of biochemistry in a medical school, whose personal interest is especially inclined to the physicochemical aspects, and whose own line of research is not so much concerned with new discoveries, such as new vitamins or enzymes, which have to wait for a rational understanding, as with the advancement of his science by the application and extension of acknowledged fundamental principles of physics and chemistry under the guidance of both a clear ideology and a scrupulously devised technique.

In order to give the reader a useful presentation of the matter, the author clearly recognizes that there are certain things that must be dealt with from the very bottom, and for which a profound understanding of the fundamental definitions and principles is the most necessary requisite. He recognizes also that there are many other things which are just as important, but of such a nature that the medical student, who, after all, is not a physicist or mathematician, cannot be expected to be sufficiently prepared to follow all the steps of argumentations from what the physicist would consider the bottom. Also, the mathematical part of the exposition, which is, of course, not entirely avoidable in a book on physicochemistry,

shows marks of such a duality: it is very strict in certain aspects; in others, the formulas are merely taken over without any attempts being made to derive them rationally (e.g. Stokes' law of sedimentation, the Debye-Hückel limiting laws, and the whole chapter on the chemical bond and resonance).

The 30 chapters cover the following topics: limiting laws; review of certain indispensable conventions; the standard chemical balance; measurements of volume; density and some of its clinical uses; sedimentation in gravitational and centrifugal fields; limiting laws of gases; colligative properties of solutions; distribution between phases; diffusion; impressionistic sketches of phenomena associated with semipermeable membranes; mass action law; rates of reaction; equilibrium in systems containing hemoglobin; conductance; proton exchange, pH; certain properties of protein solutions; equilibrium of blood electrolytes; thermochemistry; free energy; oxidation-reduction; glass electrode; polarography; a picture of atomic structure; isotopes; refraction and polarization of light; stereoisomerism; emission and absorption spectra; luminescence; and a few topics of colloid chemistry. There are several appendices. Each of the 30 chapters is seasoned by a motto, a quotation from authors ranging from an ancient emperor of Hindustan to the heroes of modern science.

It will indeed be a good investment of leisure hours for a medical student, not only while at medical school but even more so thereafter, to study this book chapter by chapter—for study, he must; it is no easy reading matter. He will learn something both from those chapters which try to inculcate the fundamentals and from those representing just impressionistic sketches, and he will find the satisfaction, from his standpoint as a medical man, that at all times the application of the particular topic to physiological and clinical problems is emphasized.

L. MICHAELIS

The Rockefeller Institute for Medical Research

Selected values of properties of hydrocarbons. Frederick D. Rossini, *et al.* (Circular of the National Bureau of Standards C461; prepared as part of the work of the American Petroleum Institute Research Project 44.) Washington, D. C.: U. S. Government Printing Office, 1947. Pp. xiii + 483. $2.75.

Twenty years ago no one was particularly concerned with the physical properties of hydrocarbons. At that time, with the exception of aromatics, the hydrocarbons were used mainly as a convenient starting basis for the study of organic chemistry. Since then, the widespread use of hydrocarbons in production of high-octane motor fuel, synthetic rubber, and chemicals has necessitated a critical evaluation of their physical properties. This book is therefore extremely appropriate and timely, representing, as it does, a fundamental study of this fundamental subject.

This volume is the result of a special project sponsored by the government and enthusiastically supported by the American Petroleum Institute and the petroleum industry as a whole. A special staff, under the expert direction of noted specialists, devoted their entire work of at least *six* years to collection, selection, critical evaluation, and calculation of numerous properties of hydrocarbons. With such an approach to the subject, naturally the most valuable and successful results were obtained.

To illustrate the completeness and thoroughness of this project, it is sufficient to enumerate the basic properties presented in the volume: boiling point and its relation to pressure, refractive index, density, freezing point, molecular volume, molecular refraction, specific refraction, refractivity intercept, specific dispersion, viscosity (absolute and kinematic), heat of vaporization, entropy of vaporization, heat of combustion, heat of formation, free energy of formation, entropy, heat content, heat capacity, and heat of fusion.

Most of the properties are given for all classes of hydrocarbons up to compounds containing 10 carbon atoms in the molecule. Viscosity and thermodynamic data are prescribed for hydrocarbons up to compounds containing 20 carbon atoms in the molecule.

Every worker in the field of hydrocarbons, chemist and engineer alike, will be elated to have at last these valuable data collected in one volume.

Some criticism can be made on the appearance of the book and particularly on the cumbersome method employed in indexing the table of contents. Such a valuable book merits also a better paper and print.

V. I. KOMAREWSKY

Illinois Institute of Technology

The systematic identification of organic compounds: a laboratory manual. (3rd ed.) Ralph L. Shriner and Reynold C. Fuson. New York: John Wiley; London: Chapman & Hall, 1948. Pp. ix + 370. (Illustrated.) $4.00.

"In this edition," according to the author, "recognition is given to the fact that the primary feature of the student's assignment and the wellspring of his interest is the identification of unknown compounds. He is no longer directed to perform numerous practice experiments on solubility and in the use of classification reagents but is advised to carry out such control and practice experiments as are needed, in view of his previous training."

Additional classification reagents are introduced as well as additional procedures for the preparation of derivatives. The melting points of solids and the boiling points of liquid have been included, in parenthesis, in the index, thus saving a considerable amount of time on the part of the student.

The chapter headings are: "Introduction," "The Identification of Unknowns," "Preliminary Examination," "The Determination of Physical Properties," "Qualitative Analysis for the Elements," "The Solubility Classes," "Application of Classification Tests," "The Preparation of Derivatives," "Tables of Derivatives," "The Separation of Mixtures," "The Interpretation of Experimental Data," and "Problems."

The chapters have been both enlarged and rearranged