

BOOK REVIEWS

Chemical Applications of Spectroscopy. Editor: W. WEST. Authors: A. B. F. DUNCAN, WALTER GORDY, R. NORMAN JONES, F. A. MATSEN, C. SANDORFY and W. WEST. **Technique of Organic Chemistry.** Volume IX. Editor: ARNOLD WEISSBERGER, Research Laboratories, Eastman Kodak Company, Rochester, N. Y. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. xxiv + 787 pp. 16.5 × 23.5 cm. Price, \$15.00.

In recent years many an organic chemist has had thrust upon him the obligation of becoming at least an empirical spectroscopist, often with little preparation for some of the possible pitfalls he may encounter. In general he has arisen to the occasion, frequently with conspicuous success. Very often he has had the desire to go beyond the purely empirical stage but without convenient facilities for acquiring the background. The present volume may be expected to rectify this situation to a considerable extent and may well be expected to raise the general level of performance in many respects.

An essentially complete coverage of molecular spectroscopy has been attempted as is evident from the table of contents: Chap. I, Introductory Survey of Molecular Spectra, 115 pages (W. West); Chap. II, Microwave and Radiofrequency Spectroscopy, 115 pages (Walter Gordy); Chap. III, Theory of Infrared and Raman Spectra, 59 pages (A. B. F. Duncan); Chap. IV, The Application of Infrared and Raman Spectroscopy to the Elucidation of Molecular Structure, 334 pages (R. Norman Jones and Camille Sandorfy); Chap. V, Electronic Spectra in the Visible and Ultraviolet Regions, 126 pages (Part I, A. B. F. Duncan; Part II, F. A. Matsen); Chap. VI, Fluorescence and Phosphorescence, 52 pages (W. West). Very wisely no space has been sacrificed to the discussion of instrumentation although chapters in previous volumes of this series covering this subject are already somewhat out of date.

Nearly one-half the book is devoted to Chap. IV, a presentation of the more empirical methods and material which the organic chemist finds useful in the identification of compounds and in the determination of structure. Several collections of infrared and Raman data have appeared recently but the present collection is characterized by systematic organization of material for ready reference, completeness in regard to the phases covered (75 pages of hydrocarbon frequencies, 16 pages of CO frequencies) and by more than usual attention to the physical basis for experimental observation which will assist in raising present procedures above the purely empirical level. There is strong emphasis on the utility of precise intensity measurements and an excellent discussion of the requirements for making accurate measurements, which should help organic chemists to avoid errors which have commonly been made in the past.

This reviewer has found the purely theoretical sections of the book somewhat uneven in that it was not always clear just what background was expected of the reader, and this indeed varies from one point to another. Since the book is a collection of monographs rather than a completely coordinated text, there is naturally some loss in economy in the repetition of more elementary concepts, necessitating the presentation of more difficult material without quite adequate preparation. It is quite clear that the reader will be disappointed who expects to start from scratch and to become competent with the theory. In general an intermediate level is maintained and the reader should be expected to possess a reasonable background in mathematics and quantum mechanics and in particular a familiarity with the terminology employed. Without this it is doubtful whether he will make much contact with large portions of Chap. V. With such background he will find this chapter extremely useful in putting him in touch with the literature he must study to acquire real competence. Chapter II should be mentioned as particularly well written and as presupposing a quite definite and reasonable background of the reader. It is very unfortunate that the section on nuclear magnetic resonance, which is of the greatest current interest to the organic chemist, could not have been more fully illustrated by examples of applications.

On the whole one may say that the authors have attempted a task which was virtually impossible in the space allotted, and have succeeded commendably with it.

GATES AND CRELLIN LABORATORIES OF CHEMISTRY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIF. RICHARD M. BADGER

The Chemistry and Reactivity of Collagen. By K. H. GUSTAVSON, Garverinäringsens Forskningsinstitut, Stockholm, Sweden. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1956. ix + 342 pp. 16 × 23.5 cm. Price, \$8.00.

Gustavson deals with his subject matter authoritatively from both the fundamental viewpoint of the protein chemist and the applied one of the scientific tanner. The author also blends very successfully the available information on the chemical reactivity and on the physical properties of collagen. Most recent work directly pertaining to collagen is clearly though not always critically reviewed. Naturally of greatest interest, to writer as well as reader, are the sections pertaining to the author's current work. Thus the correlation between hydroxyproline content and hydrothermal stability of the collagens of various species is quite intriguing. Gustavson's hypothesis that the stability of the collagen structure is largely dependent upon interchain hydrogen bonding between the -OH of hydroxyproline and the carbonyl oxygen of the peptide linkage appears very significant. Other possibilities, such as the presence of ester bonds, are also pointed out by him.

The monograph is well printed and handsomely illustrated. It is equipped with an extensive bibliography and thoroughly indexed. It is highly recommended to any one interested in the specific subject matter, as well as in the more general one of protein structure and function.

VIRUS LABORATORY
UNIVERSITY OF CALIFORNIA H. FRAENKEL-CONRAT
BERKELEY 4, CALIFORNIA

Molecular Flow of Gases. By G. N. PATTERSON, Director, Institute of Aerophysics; Chairman, Department of Aeronautical Engineering and Aerophysics, School of Graduate Studies, University of Toronto. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. x + 217 pp. 15.5 × 23.5 cm. Price, \$7.50.

"Recent developments in supersonic aerodynamics have emphasized the importance of a molecular approach to the subject of gas dynamics. When only the macroscopic part of the motion of the gas is largely significant, the contribution made by the unseen internal motions of the molecules can be adequately taken into account by a phenomenological "or continuum" analysis. However, when the characteristics of a flow depend more essentially on the random motion of the molecules as in the slip flow of a highly rarified gas, or on the internal structure of the molecules as indicated by the relaxation effects associated with a strong shock wave, then the theory of gas flow must be developed in which much more attention is given to the role played by the molecules." So writes the author in the preface to this book. This recalls to the reviewer an occasion in 1946 when he was asked to conduct a series of lectures on low pressure kinetic theory to an aerodynamical research group undertaking the experimental study of problems in this field. There was then little material connecting these two fields and the jump from the physical principles to aerodynamics was great. Progress in recent years has been steady and rapid. The information acquired has appeared in a considerable number of individual contributions both in theory and experiment from a wide diversity of sources scattered through the literature of aerodynamics and physics. Sadly lacking has been any systematic formulation of the various aspects of the subject as a unified development in terms of modern kinetic theory in such forms that the various problems can be analyzed and extended as occasion demands.