

## BOOK REVIEWS

**Infra-Red Spectroscopy and Molecular Structure. An Outline of the Principles.** Edited by MANSEL DAVIES, University Reader in Chemistry, The Edward Davies Chemical Laboratories, University College of Wales, Aberystwyth, Wales. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York 17, N. Y. 1963. xiii + 468 pp. 17.5 × 25 cm. Price, \$13.50.

This book, after a short general introductory chapter by the editor, contains eleven chapters written by experts on various aspects of infrared spectroscopy. There is also one chapter on Raman spectroscopy which might well have been left out, since it is elementary, contains only token comparison with infrared results, and consists of material readily available elsewhere.

The avowed intent of this book is stated in the preface to be the provision of "an introduction to the principles and practice of those aspects of infrared spectroscopy which are of major interest in the study of molecular structure and molecular behavior." On the dust jacket, the aim of the book is said to be "to provide a systematic introduction to the principles. . . ." In the opinion of this reviewer, no systematic introduction to the principles has been achieved. If such had indeed been the object, Dr. Davies might have been wiser to write a good deal of the text himself, since it is probably impossible to be systematic and introductory with thirteen authors.

If one looks into this book, however, he will find some rather good, though necessarily brief, sections revealing up-to-date attitudes and methods in the fields of the authors, which do span a large area of infrared spectroscopy devoted to the study of molecular structure. It strikes this reviewer that Dr. Davies has in part achieved a survey of modern ideas, if not of recent advances (the preface disclaims any intent to make a survey of recent advances). That some of these modern ideas also represent fundamental principles which are perhaps not at all new does not make the book a systematic introduction to the field; nor does it detract from the ideas presented.

Two chapters, on instrumentation (A. E. Martin) and on spectra of simple molecules (W. Jeremy Jones), are truly introductory in nature. Although each has its points, both would seem to miss giving a basic understanding of the subject matter. Jones' chapter is obviously limited by space considerations, and leaves one with the feeling of coming away from a lecture by an expert with an outline guide to the field. Reference to another source, such as Herzberg's book, would be necessary before one could actually understand the principles.

The remaining three quarters of the book holds more of real interest. Four chapters of fundamental meaning are quite well written, including valuable examples. The chapter by I. M. Mills presents a lucid coverage of modern ideas of normal coordinate analysis and molecular force fields, and should be required reading for chemists trying to perform or find meaning in simple valence force constant analyses. J. Overend's chapter on absolute intensities is welcome, and puts the field in a good perspective. W. C. Price has served to remind us that emission spectroscopy can be quite a valuable adjunct to absorption studies, and can sometimes be the only way to obtain data on certain molecules or energy states. J. Fahrenfort has written of the basic theory and of his (and others) recent revival of reflection spectroscopy, as well as presenting clearly the ideas of dispersion studies. No spectroscopist should be without a basic understanding of the methods and limitations of these four subjects, and the authors do an admirable job in presenting the material. In each case, except perhaps the last, a slightly longer discussion of the literature, with more extensive references, would have been worthwhile.

Two chapters are primarily devoted to discussion of characteristic frequencies in organic (Dušan Hadži) and inorganic (E. A. V. Ebsworth) substances. Hadži has included a clear discussion (and references) of the principles behind group frequencies and their variations. In the space allotted to them, both authors give a large amount of practical data. H. Hallam has discussed hydrogen bonding and solvent effects on spectra, and has done so very creditably. He has included an understandable discussion of the bases of the various theories of solvent shifts. However, to a certain extent this chapter, and even more definitely the pre-

ceding two on characteristic frequencies, represent material that is already available elsewhere in similar and more extensive form.

Two further chapters are included, on rather specialized topics of recent development. One, by S. Krimm, considers polymer spectra. It also devotes token attention to the general ideas of crystal spectroscopy. The methods of studying dichroism are emphasized, and examples of such studies show their importance in applications to polymer systems. The remaining chapter, clearly written by G. R. Wilkinson, considers far infrared spectroscopy, including mention of some interferometric methods and a discussion of solids.

This book, somewhat uncertain of direction, thus contains much of interest as well as some things which might well have dispensed with. Few people could find all of it exciting, and it certainly could not be used as a text. But many spectroscopists and particularly users of spectroscopy who do not claim the title "spectroscopist" will find parts of it valuable and stimulating. The index is adequate, though not overly large, and it is virtually impossible to find typographical errors. Unfortunately, a few errors on the part of the authors are to be found. The editor has somehow accomplished a large amount of valuable cross-referencing between the chapters.

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**Comprehensive Biochemistry. Volume 1. Atomic and Molecular Structure.** Edited by MARCEL FLORKIN, University of Liege (Belgium) and ELMER H. STOTZ, University of Rochester, School of Medicine, Rochester, N. Y. American Elsevier Publishing Co., 52 Vanderbilt Ave., New York 17, N. Y. 1962. xi + 256 pp. 15.5 × 23 cm. Price, \$11.50, single copy; \$9.50, series.

This is the first volume of a very ambitious, encyclopedic work on biochemistry in five sections, eleven volumes of which have already been scheduled. The editors are very competent biochemists, and they have an Advisory Board of some of the world's most distinguished and cosmopolitan biochemists to advise them in their selection of topics and authors.

The first chapter consists mainly of a presentation of the development of quantum mechanics in the interpretation of the structure of the hydrogen atom and the hydrogen molecule. The second chapter carries the quantum mechanics further to the explanation of the electronic structure of organic molecules by the traditional molecular-orbital and valence-bond theories. Chapter 3 is largely devoted to an exposition of the molecular structure of natural materials—from simple molecules to the structure of such cellular components as muscle fibers, cilia, and mitochondria. The interpretation is largely derived from X-ray diffraction data. The last chapter is devoted to the subject of stereoisomerism.

The authors are each very competent in their special subjects; and the book is free from typographical errors, printed in an easy-to-read type, and adequately illustrated.

However, the defect in this work, from the viewpoint of the reviewer, is that the subject matter is generally treated in breadth, but not in depth.

The material is not presented in such a manner as to enable the student to readily apply the theories and methods presented to his own work. Furthermore, in view of the many excellent treatises already available on each of the topics, why add to the existing plethora and to the over-all cost of the series? The editors might well have asked themselves: Is this volume necessary or even desirable? A few pertinent references in the other volumes of this work—which really could be labeled biochemistry—would suffice. Authors and publishers are not doing a service to science by promoting repetitive works that only add to the already very badly strained budgets of libraries.

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