

A listing of a few of the fifteen chapters by heading will be illustrative of the subjects treated by the author. Molecular Orbitals and Microsymmetry, The Interelectronic Repulsion in M.O. Configurations, The Nephelauxetic Series, Electron Transfer Spectra, Molecular Orbitals Distinctly Lacking Spherical Symmetry (following a chapter devoted to complexes with spherical symmetry), Determination of Complex Species in Solution and Their Formation Constants, Survey of the Chemistry of Heavy, Metallic Elements. The last-mentioned chapter is a succinct treatment of oxidation states, general nature, complexes and important chemistry of the transition elements.

On the subject of identifying and interpreting the bands of *new* species of complexes the author in the concluding paragraph states that he "is willing, as far as he can, to comment on identifications made by other chemists and physicists and will be glad to see attempts at an early stage, before they are published in the public literature."

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Introduction to Nuclear Physics and Chemistry. By BERNARD G. HARVEY, Lawrence Radiation Laboratory, Berkeley, California. Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1962. x + 370 pp. 16 × 23.5 cm. Price, \$9.00 (text); \$12.00 (trade).

One of the principal aims of this book, as indicated in its preface, is to give an account of nuclear structure and nuclear reactions "in a nearly nonmathematical way," and with a minimum use of quantum mechanics. The book does this, and in a quite reasonable fashion. The first eleven chapters give an account of just about all the subjects which one would expect to see in a modern treatment of nuclear structure physics; nuclear binding energies, radioactive decay and nuclear transitions, direct and compound nucleus reactions, and fission, are all discussed and there is some account given about nuclear models and nuclear forces. The final five chapters are given over to a treatment of experimental equipment and procedures. The writing is clear, there are many useful tables and figures, and each chapter has an associated set of problems.

So far so good; taken on its own terms the book does a good job and the student who reads carefully through it will become generally acquainted with the nuclear structure field. But the reviewer is left wondering whether the qualitative approach adopted here can really produce, besides an acquaintance with, any real understanding of the subject. To take only one example, the properties of angular momentum determine to a large extent the characteristics of nuclear reactions, the selection rules in nuclear transitions and many of the general features of nuclear models. A book which does not give an adequate treatment, or assume an adequate understanding, of angular momentum (and this book does neither) must reduce in many instances to a simple listing of facts concerning nuclei and must ignore the real unity which exists between many topics. And the same criticism could be made on other points as well. There are some outstanding examples of books which, by clever physical arguments without much recourse to formal mathematical apparatus, do impart an understanding of a complicated subject; but that would be hopelessly difficult in such a large field as nuclear structure physics and this book makes no such attempt. It seems then to the reviewer that the book will be of considerable use to the student who wants a descriptive treatment of the subject but for the beginnings of a real understanding he must look elsewhere.

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Chemistry of Organic Fluorine Compounds. By MILOŠ HUDLICKÝ. The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1962. 536 pp. 17 × 24.5 cm. Price, \$9.50.

Books on fluorinated organic compounds have been few, sketchy or restricted to specific groups. All have treated the fluorides as highly specialized, not to say anomalous compounds, a tendency easily explained by the spectacular, overpublicized success of some commercial applications.

This book offers an up-to-date (1960 included) review of small-scale preparations and factual descriptions of the known compounds, with excellent indexing. In its treatment of the subject, it can be likened to the 1953 "Aliphatic Fluorine Compounds" of Lovelace, Postelneck and Rausch; it has the same thoroughness, good selectivity and dependability, but its range is not as restricted and it has the advantage of including a judicious coverage of the east-European literature. It specifies simple, effective preparations for most of the chemical functions.

Like its predecessors, this book is written primarily from the standpoint of compound preparation and description of their behavior in conventional reactions. It does not try to include general theoretical considerations and remains frankly descriptive, but as such it is complete, well organized, up-to-date, selective and trustworthy. If it were to be supplemented by periodical additions, it could become for a long time a handbook for the fluorine chemist, not to be needlessly duplicated or imitated.

As I see it, there is now at hand enough clearly classified factual information to require a shift of emphasis to integration of the subject, or more specifically to proper re-integration of that information into general organic chemistry. Intuitive mistakes have been made which will be hard to correct, even when understood. Fluorine is one of the halogens, but a carbon-to-fluorine bond is privileged as it is built at the same quantum level from both sides; the resemblance to a carbon-oxygen bond is insufficiently grasped; fluorinated clusters have pronounced double bond character; the balance between induction and mesomerism

in vinylic fluorides is not clear; $F_3C-C=C-A$ cannot be treated as a vinylog of F_3C-A , and the latter does not tend to undergo heterolysis as $F_3C^- + A^+$, but homolysis as $F_3C\cdot + A\cdot$.

In conclusion, I adopt Hudlický's book as my desk copy holding complete descriptive information in concise, clear, convenient form, and I wait hopefully for an entirely different, complementing approach in any future book.

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Clathrate Inclusion Compounds. By SISTER MARTINETTE HAGAN, Department of Chemistry, Mundelein College, Chicago. Reinhold Publishing Corporation, 432 Park Avenue, New York 22, N. Y. 1962. xiii + 189 pp. 13.5 × 19.5 cm. Price, \$6.50.

There has been a considerable development of interest in the chemistry of *inclusion compounds* during the past decade and this is a timely monograph dealing particularly with the class of these compounds known as the clathrates. The first chapter surveys the broad range of the inclusion compounds, giving much of the historical background and the attempts at classification, mainly from the structural point of view. The following six chapters then describe in much more detail the status of knowledge, up to about 1960, concerning the crystalline compounds formed by clathration. The literature coverage is good and the arrangement, style and presentation is excellent. There is throughout a strong emphasis on the structures, which provides a unifying theme. Indeed the reason for the existence of the clathrate compounds was quite mysterious until some of their crystal structures were determined by Powell in 1948. The more thermodynamically oriented chemist might possibly find some aspects of this presentation a little unsatisfactory. However, there is a wealth of chemical and structural information very compactly contained in this little book. The problem of relocating it, when half-remembered from a previous reading, would have been made easier had the usual index been supplemented with a formula index. Especially it is a pity not to have such an index in a book on clathrates, where part of the fun comes from their chemically unpredictable stoichiometry. Who could not help being curious about $Br_2 \cdot 8.6H_2O$?

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Supplement to Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry. Volume II. Supplement II. The Alkali Metals. Part 1. H. V. A. BRISCOE, D.Sc. A.R.C.S., D.I.C. F.R.I.C.; A. A. ELDRIDGE, B.Sc., F.R.I.C.; G. M. DYSON, M.A., D.Sc., F.R.I.C., M.I.Chem.E., F. Inst. Pet.; and A. J. E. WELCH, Ph.D., D.I.C., Editorial Board. John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1961. xxxix + 1458 pp. 17 × 25 cm. Price, \$55.00.

This volume, the second supplement to "Mellor's Comprehensive Treatise on Inorganic Chemistry," covers lithium and sodium and follows the supplement which was devoted to the halogens. One or more supplements on the alkali metals are to follow. Throughout this volume, the conventions adopted for the original volume have been followed; thus under the general heading of the metals only the hydrides, oxides, hydroxides, halides, sulfides, sulfates, carbonates, nitrates and phosphates are discussed. All the other salts are described under the non-metallic element of the acid.

Each of the two elements is discussed in one chapter, with sections devoted to the various topics. Four of the first five