BOOK REVIEWS

The Electronic Theory of Acids and Bases. Second Revised Edition. By W. F. LUDER, Professor of Chemistry, Northeastern University, and SAVERIO ZUFFANTI, Professor of Chemistry, Northeastern University. Dover Publications, Inc., 180 Varick Street, New York 14, N. Y. 1961. xi + 165 pp. 13.5 × 20.5 cm. Price, $1.50.

This paper-bound edition is substantially a reprint of the earlier edition published by Wiley and Sons in 1946. "Only a few changes have been made and a few additional references have been added." The most noteworthy is a new atomic structure chart (p. 24). The original edition was reviewed in detail in *J. Phys. Chem.*, 51, 887 (1947).

Since the present reviewer agrees with this critical review of Kolthoff, particularly in respect to the "unconciliatory attitude with regard to the Brønsted theory" there is no need to consume space reviewing this book again. He would like only to re-emphasize Kolthoff's remark "There has not been and there is no conflict between the G. N. Lewis and the Lowry–Brønsted theory" as Luder and Zuffanti seem to feel.

The Dover Press have performed a service to chemists by reprinting this monograph for the modest price of $1.50.

DEPARTMENT OF CHEMISTRY
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Writing Guide for Chemists. By WALTER J. GENSLER, Professor of Chemistry, Boston University, and KINERETH D. GENSLER. McGraw–Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1961. xiii + 149 pp. 14 × 21 cm. Price, $4.50; soft cover, $2.95.

In the past decade several "Writer's Manuals to Aid the Chemist" have appeared and one might expect that all of them would be alike and cover the same ground, in the same way. Actually, however, they all differ in content, approach and details of topic coverage. This means that the earnest beneficiary has had to invest in each one, but fortunately these books are not expensive in comparison with the good which they may accomplish if writers will only buy and use them. This little Gensler book gives the user a still different content and treatment compared with its predecessors in the field. It is divided into Part One, General Aspects (six chapters), and Part Two, Specific Aspects (nine chapters), for a total of 140 text pages. Part One develops the life history of a report or article, while Part Two deals with the clinical details of composing the document itself.

Chapter One begins by reminding the writer that the reader is his consuming public and hence deserves first thought and attention at all times, both as to his mentality level and his reasons for interest in the paper. These considerations effectively govern the content, length, arrangement, construction, style and other aspects of the final composition. Since the laboratory notebook is the progenitor of the subsequent paper, Chapter Two has been included to aid the writer in recording his literary roots in such a way as to make them most helpful and usable later. The working outline is considered next in Chapter Three, and this topic leads logically (Chapter Four) into composition of the actual paper: Title Page, Contents, Abstract, Introduction and Background, Results, Experimental Details, References and Appendices (if needed). Chapter Five goes more extensively into the handling of Experimental Details. Chapter Six considers Revision, Proof-reading (checking of transcription), and Mechanics (format and typing details).

Part Two, Specific Aspects, occupies the latter two thirds of the book and provides a wealth of helpful, detailed material on (by chapters): (7) Inappropriate Expressions in Formal Writing, (8) Ambiguous Grammatical Relationships, (9) Punctuation and Italics, (10) Spelling and Capitalization, (11) Chemical Nomenclature, (12) Abbreviations and Symbols, (13) Forms for Physical Data, (14) Tables, Figures and Structural Formulas, (15) Documentation (and Index).

The content of these latter nine chapters is not susceptible to detailed comment or criticism; all the bits of advice given and topics included are well written and very pertinent to the subject, and all are well illustrated with examples of good, bad, and preferred usages. Writers, however, should remember at all times that Gensler's (or any other Guide Author's) recommendations may not accord with the style sheet usages of the Journal which receives his paper.

As has been noted in other reviews of similar books, a mere reading of this Gensler–Gensler "Guide" will not convert a low-grade scribbler into a polished author, but careful study of its content and examples can be of great assistance to any author, amateur or ragged scientific veteran, who sincerely wishes to improve his papers while composing and revising them—and for this end result production editors will be devoutly grateful.

DEPARTMENT OF CHEMISTRY
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Theoretical Inorganic Chemistry. By M. CLYDE DAY, JR., Associate Professor of Chemistry, Louisiana State University, Baton Rouge, Louisiana, and JOEL SELBIN, Associate Professor of Chemistry, Louisiana State University, Baton Rouge, Louisiana. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1962. xiv + 413 pp. 16 × 23.5 cm. Price, $12.00.

This book represents a considerable and, in substantial part, a desirable departure from nearly all inorganic texts available as of April, 1962. As the title would suggest, virtually no descriptive material on any subject treated is included although space is given over in several instances to historical development of certain subjects, notably the quantum theory and the periodic table. Instead, effort is expended toward a semi-mathematical treatment of a number of subjects, nearly all of which should be considered bedrock knowledge for any inorganic chemist.

The book begins at the expected place with a discussion of the origin of the quantum theory followed by a chapter on wave mechanics including a solution of the hydrogen atom. Next is presented a summary of the evolution of the periodic table and a brief treatment of the periodic properties of the elements. These are followed by chapters on chemical bonding, inorganic stereochemistry, electromotive force, acids and bases, coördination chemistry, non-aqueous solvents, and the theory of the nucleus.

The treatment of chemical bonding is conventionally developed, paralleling closely the expositions of the subject in other standard tests. Valence bond and molecular orbital theories are developed for simple systems such as the hydrogen molecule and molecule-ion. The mathematical steps involved are set out in more detail than is usually found as, for example, in the illustration of the calculations of coefficients in certain hybrid bond wave functions. Although the developments of the bonding theories are standard, some readers may welcome their inclusion in a single source.

The largest section of the book, some fifty-five pages, is devoted to coördination chemistry. Included here are discussions of Werner's coördination theory, and the valence bond, crystal field, and molecular orbital theories of complexes. Results of the latter approaches are of course emphasized with discussion of magnetic properties, stereochemical predictions, thermodynamics of complexation, and absorption spectra. The discussion of molecular orbital theory, especially, is too cryptic to be very meaningful to the student reader, who is asked to make the improbable transition in understanding from the hydrogen molecule-ion to an octahedral metal complex. Symmetry notations are introduced in this section with no explanation as are expressions for the σ and π molecular orbitals of an octahedral complex. Similarly, the section dealing with absorption spectra is far too incompletely developed in proportion to its importance. It is perhaps in this chapter that the book

suffers most noticeably from a lack of descriptive material. The uninformed reader will be little impressed by the utility and power of the ligand field theory without specific illustrations of some of the many well established examples of the use of the theory in predicting and correlating electronic properties and structures.

In this time of rapidly multiplying knowledge, a current text in nearly any field will be equally distinguished by what it omits as by what it includes. The authors state in the preface that "we have treated those [topics] which seemed to us most relevant to the modern inorganic chemists," and acknowledge that "there will be disagreement concerning the emphasis placed on various topics as well as the omission of others." The reviewer strongly concurs with the latter statement and feels that the most serious deficiency of this otherwise essentially sound text lies in the choice of some topics and the complete omission of others. Amongst those topics which could be considered "theoretical" in the sense of this book, no mention whatever is made of bonding and structure in electron deficient compounds or in organometallics—metal cyclopentadienyl, arene and olefin complexes. Further, there is no discussion of the use of physical methods, such as nuclear and electron resonance and infrared spectroscopy, in establishing structures and elucidating chemical bonding. Included are chapters on acids and bases, electromotive force, and non-aqueous solvents which, while capably presented, are perhaps best placed in a source bearing a different title. The chapter on the theory of the nucleus appears too brief and introductory compared to other textual sources to be very useful, and a subject development of the type attempted here (including α and β decay theories) seems out of place in a chemistry text, however theoretical. These views are admittedly personal ones and undoubtedly some readers will find the choice of topics completely satisfactory.

On the whole the book is quite clearly written and the subject matter rather well developed. It is a welcome change from nearly all current inorganic texts which too often consist of encyclopedic recitations of chemical facts with little attempt to interweave principles. Development of topical subjects from a mathematical or semi-quantitative quantum mechanical point of view is long overdue in an inorganic text and this book represents a healthy stride in that direction.

DEPARTMENT OF CHEMISTRY
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Determination of Organic Structures by Physical Methods. Volume 2. BY F. C. NACHOD, Sterling-Winthrop Research Institute, Rensselaer, New York, and W. D. PHILLIPS, Central Research Department, E. I. du Pont de Nemours and Co., Wilmington, Delaware. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1962. xiii + 771 pp. 16 × 23.5 cm. Price, $16.00.

The second volume of the "Determination of Organic Structures by Physical Methods" devotes nearly half its pages to resonance spectroscopy, in an expansion of this subject consistent with the major advances of the period since 1955, when the first volume was published. The well-referenced chapter on Optical Rotatory Dispersion, covering 92 pages and the research contributions of the last seven years, provides a striking contrast to the two-page mention of this subject in the first volume. The examples of rotatory dispersion are prudently selected and the principles clearly stated; moreover, the number of curves has been kept to a useful minimum. The chapter on Mass Spectrometry is fairly comprehensive. It presents the general possibilities and difficulties of using mass spectrometers for structure determination, along with a qualitative view of what goes on inside the instrument and inside a molecule which has been hit by an electron. The sections on rearrangements, functional group effects and special techniques provide information sufficient to excite the imagination. One can easily foresee that this subject will be greatly expanded in a third volume of the series.

Infrared and Raman Spectroscopy are combined in a chapter concentrating on the theoretical background of vibrational spectra and introducing the subject of absolute intensities. The treatment of Electronic Spectra of Polyatomic Molecules and the Configurations of Molecules in Excited Electronic States is highly theoretical. It will stimulate those who seek information concerning the geometry of excited states but will completely satisfy only those who are willing to classify ethylene among the "larger molecules." The chapter entitled Far and Vacuum Ultraviolet Spectroscopy may be regarded in part as a continuation of the chapter on Ultraviolet and Visible Light Absorption in Volume I. Ionization potentials are tabulated for aliphatic, alicylic, unsaturated and aromatic hydrocarbons. Solution spectra run under special conditions and data culled from technical reports and private communications as well as the normal journal references have been used to assemble the N → V transitions in olefins, the absorption maxima of aromatic compounds in the region 1720–2000 Å., and the short wave-length maxima for ketones, amides and imides.

The second portion of the volume is devoted to resonance spectroscopy, starting with a chapter on High Resolution H^1 and F^{19} Magnetic Resonance Spectra of Organic Molecules which is a good review of theory and types of applications. It moves too fast to be considered as an introduction for a reader not familiar with quantum mechanics and it is not a guide for empirical application of n.m.r., but it is complementary to the excellent books on the subject. Particular attention is paid to applications of n.m.r. in kinetic studies of fast reactions including isomeric and conformational equilibration. The review on Nuclear Magnetic Resonance Spectra of Elements Other than Hydrogen and Fluorine serves to inform the reader of the progress which has been made in a very valuable but, in many cases, experimentally more difficult form of n.m.r. Chemical shift tables are included for C^{13}, B^{11}, N^{14}, O^{17}, Si^{29}, P^{31}, Sn^{119} and other nuclei, which give an indication of the value of the technique in analysis and in structure determination. The brief treatment of Nuclear Magnetic Resonance Spectra of Organic Solids shows how the F^{19} and H^1 spectra can be used to determine structure in a limited number of cases and to derive information concerning free or hindered molecular motion.

The contributor of the Chapter on Electron Paramagnetic Resonance of Organic Molecules gives a lucid introduction to the qualitative theory of e.p.r. and illustrates the theoretical considerations with a review of selected problems in which e.p.r. spectroscopy has produced evidence concerning structure and bonding in organic free radicals. The chapter on Electron Paramagnetic Resonance of the Organometallics is more mathematical and perhaps of less general interest. The final chapter provides a satisfactory coverage of Nuclear Quadrupole Resonance Spectroscopy.

In criticism of the book as a whole, this reviewer finds that the individual chapters are aimed at different kinds of readers, so that it becomes more a collection of monographs. The experts who have contributed these monographs are: Gloria G. and Robert E. Lyle, F. W. McLafferty, M. Kent Wilson, D. A. Ramsay, D. W. Turner, W. D. Phillips, Paul C. Lauterbur, R. E. Richards, Richard Bersohn, Richard E. Robertson and Chester T. O'Konski.

DEPARTMENT OF CHEMISTRY AND CHEMICAL ENGINEERING
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Cours de Cristallographie. Livre III. Première Partie. Radiocristallographie Théorique. Deuxième Partie. Methodes de Cristal Tournant. Determination des Structures Cristallines. Troisième Partie. Methodes de Poudres. By R. GAY, Professeur à la Faculté des Sciences de Bordeaux. Gauthiers-Villars et Cie., 55, Quai des Grands-Augustins, Paris 6, France. 1961. 278 pp. 16 × 25 cm. Price, 38 NF.

This is the third of a series of three volumes giving an account of a course in crystallography taught by the author. The first two volumes, on geometrical crystallography and physicochemical crystallography, provide the background for the volume under review; but the latter is easily readable by those familiar, from other sources, with the material contained in the first two volumes.

The third volume is divided into three parts. The first part treats of two subjects. In the first two chapters a very brief but readable account is given of the nature of X-rays and the means by which they are produced. The