

Additions and Corrections

Enzymatic Formation of Isochamigrene, a Novel Sesquiterpene, by Alteration of the Aspartate-Rich Region of Trichodiene Synthase [*J. Am. Chem. Soc.* **1996**, *118*, 8499–8500]. DAVID E. CANE,* QUN XUE, JAMES E. VAN EPP, AND YOU LA S. TSANTRIZOS

Pages 8499–8500: Trichodiene synthase mutants D98E, D99E, and D102E should be referred to as D100E, D101E, and D104E, respectively.

JA975410A

Book Reviews

Chemically Modified Surfaces: Recent Developments. By Joseph J. Pesek and Maria T. Matyska (San Jose State University) and Riad R. Abuelafiya (Varian Sample Preparation Products). The Royal Society of Chemistry: Cambridge. 1996. ix + 146 pp. \$89.00. ISBN 0-85404-780-8.

This is a book that is based on *The 6th International Symposium on Chemically Modified Surfaces* held in San Jose, CA, June 19–21, 1995. Due to the fact that this is a proceedings book, the chapters are contributions from the individual presenters at the meeting. A total of 25 contributions are summarized in the form of either proceedings papers (13) or abstracts (12). The areas of study that are reported on vary from the modification of metal oxides for NO_x sensing to modifications of metal and silica surfaces with organic monolayers and polymers. Several nice papers dealing with the characterization of chromatographic phases are included. Preconcentration techniques for trace analysis using silane-based materials are reviewed. The construction of molecular architectures using polymers and monolayers on metals is discussed in several of the contributions. Characterization methods that can be used to probe the chemistry and morphology of modified materials on the micrometer to nanometer scale are demonstrated by several of the contributions. The trend of miniaturization and sensor development is especially prevalent in the book.

Robin L. McCarley, *Louisiana State University*

JA965694J

S0002-7863(96)05694-6

The Structure, Energetics and Dynamics of Organic Ions. Series: Wiley Series in Ion Chemistry & Physics. Edited by Tomas Baer (University of North Carolina), Cheuk-Yiu Ng (Ames Laboratory, Iowa State University), and Ivan Powis (University of Nottingham). Wiley: New York. 1996. xiv + 361 pp. \$175.00. ISBN 0-471-96241-4.

This edited volume is an excellent addition to the Wiley Series on Ion Chemistry and Physics. This volume features chapters by leading researchers in organic ion chemistry with an overall emphasis toward combining cutting edge computational and experimental methods for characterizing small (i.e., triatomic) and large (e.g., substituted aromatic) ions. Indeed, this book makes clear that the complementary use of computational and experimental methods is essential for the characterization of the organic ions implicated as transient intermediates for the preponderance of organic reactions. In particular each chapter provides a review of its author's theoretical (*ab initio* and statistical) and/or experimental (thermodynamic and spectroscopic/metric) results with relatively extensive and current (up to 1996) references.

In general, researchers interested in ion chemistry can expect this text to provide not only results from a variety of computational methods but a practical guide to the appropriate theoretical methods for particular classes of organic ions. Specifically, this volume focuses on the highest level calculations available to accurately model the structure and dynamics of these difficult to characterize systems. The range of theoretical methods includes the use of highly accurate *ab initio* CCSD(T) calculations for the characterization of HOC⁺ in Chapter 1

to the use of statistical RRKM theory to determine the rates of unimolecular decay of toluene ion in Chapter 3. In addition, all of the more experimental chapters also make significant use of *ab initio* calculations to complement their experimental results.

With the exception of Chapter 2, which provides a review of photoelectron-photoion coincidence (PEPICO) with some experimental detail and schematics, the reader will not find a guided tour through the range of current experimental methods used to characterize organic ions. Instead the experimentally based chapters focus on specific experimental results, such as the structural characterization of distonic radical cations (Chapter 5) and the bimolecular reactivity of enolate anions (Chapter 7). Overall, with its emphasis on state-of-the-art computational methods to complement recent experimental results, this text should be a welcome addition to the libraries of researchers in the field of gas phase organic ion chemistry.

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JA965764M

S0002-7863(96)05764-2

Neuropeptide Protocols. Series: Methods in Molecular Biology, Volume 73. Edited by G. Brent Irvine and Carvell H. Williams (The Queen's University of Belfast—Northern Ireland). Humana Press: Totowa, NJ. 1997. xiii + 386 pp. \$69.50. ISBN 0-89603-399-6.

The field of neuropeptide research is thirty years old but is still rapidly evolving with new neuropeptides discovered and new structure/function relationships elucidated every year. This book continues the high tradition of the *Methods in Molecular Biology* series with thirty-three chapters written by researchers who are well versed with the methods they employ. *Neuropeptide Protocols* includes chapters on both established and new approaches for identifying and characterizing neuropeptides. Every chapter includes a short summary and step-by-step protocols for each technique. The book is described as a *benchtop* manual that allows individuals to apply each technique in the laboratory. However, at an average length of 11 pages, individual chapters do not contain enough information to actually use a technique; instead, the chapters are excellent overviews of the capabilities of the various methods. Perhaps the only shortcoming of this book is that each chapter only describes a single technique. In general, comparisons of the various methods are not made, and readers are forced to do this on their own.

The book starts with chapters on extracting, purifying, and sequencing the peptides from biological samples. For example, the easy-to-follow discussion of extraction techniques in Chapter 1 describes potential problems with peptide extraction from biological tissues as well as several strategies for avoiding common difficulties. Multiple chapters describe molecular weight based identification methods using size exclusion liquid chromatography, gel electrophoresis, and mass spectrometry with individual chapters on fast atom bombardment, electrospray, and matrix-assisted laser desorption ionization. There is a series of chapters on determining the three-dimensional structure of the peptides, including the use of NMR, circular dichroism, and

modeling. Four chapters cover the synthesis and purification of peptides and peptide analogs. Besides newer techniques, the more conventional methods are well covered. For example, five chapters describe different radionuclide approaches ranging from radioimmunoassays to radioligand binding studies. Of course, multiple chapters describe immuno-techniques in detail.

Neuropeptide Protocols is an excellent source to learn about new methods and to verify that existing laboratory protocols are up-to-date. While several chapters have rather old references (e.g., the chapter on SDS-PAGE has only two references, each more than ten years old), most chapters have at least ten references (~500 for the book) with many from the last three years. Overall, this book covers almost all of the methods used today to isolate, identify, and characterize the composition and structure of neuropeptides. It certainly makes an important (and at \$69.50, a reasonably priced) addition to one's technical library.

Jonathan V. Sweedler, *University of Illinois*

JA965790K

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VUV and Soft X-Ray Photoionization. Series: Physics of Atoms and Molecules. Edited by Uwe Becker (Fritz-Haber Institute, Berlin) and David A. Shirley (Pennsylvania State University). Plenum Press: New York and London. 1996. xvi + 667 pp. \$149.50. ISBN 0-306-45038-0.

The photoionization process has been a key aspect of fundamental research for most of this century. With the recent introduction of third-generation synchrotron radiation sources and advances in VUV and soft X-ray lasers, gas phase photoionization is experiencing significant further developments. The subtleties of complex, high-energy photo-physical processes in atoms and molecules serve as an excellent testing ground for new theoretical and computational methods dealing with many electron dynamics, and provide significant challenges for measurement. This book is a comprehensive and up-to-date overview of photoionization and related studies of atoms and molecules in the VUV and soft X-ray regions. The book focuses on fundamental theoretical and experimental aspects, and as such will be of greatest interest to those who are carrying out advanced research in this field. At the same time, this book provides important background information to those involved in the increasing number of practical applications of high-energy photons in chemistry, physics, and materials science.

The book is a compendium of contributions, all from experts in their individual areas, edited by Becker and Shirley, two of the leaders in this field. The quality of the production is very high, and there are excellent author and subject indices. Both high-level *ab initio* theory (4 chapters) and experiment (13 chapters) are covered in great depth. The majority of the studies described involve synchrotron radiation techniques. Ten of the 13 experimental chapters are almost completely synchrotron based, while only two chapters deal with laser or resonance lamp based measurements. As with many multi-authored books, there is some variation in the degree to which individual chapters are up-to-date. In general, the experimental sections are better than the theoretical contributions in this regard. While the book was written with pedagogic intent rather than as a critical data compilation, most chapters are extensively referenced, and thus the book will be invaluable to workers in the field as an efficient summary of the literature up to ~1995. Subjects covered include many-electron theory (Amusia, Kutzner), core-hole relaxation (Schirmer et al.), partial cross-sections and angular distributions (Becker and Shirley), atomic photoionization (Krause and Caldwell, Connerade, Hayaishi and Zimmermann, and Starace and Mason), ion-pair formation (Berkowitz, Eland, and Schmidt), valence ionization of molecules (Berkowitz, Rühl, and Baumgärtel), inner-shell excitation and ionic fragmentation of molecules (Nenner and Morin), Auger and resonance Auger (Aksela et al.), threshold studies (King and Schartner), photoionization of excited and ionized systems (Wuilleumier and West), spin-polarized studies (Heinzmann and Cherepkov), and circular dichroism (Schönhense and Hormes). The chapter Electronic and nuclear relaxation of core-excited molecules, by Nenner and Morin, is particularly impressive, in terms of both the breadth of coverage (366 references) and the clarity with which selected examples are used to show how high-energy photoionization processes can be used to carry out selective chemistry. The chapter Photoionization of oriented systems and circular dichroism, by

Schönhense and Hormes, is noteworthy as an excellent introduction and overview of this area.

Given that the third-generation light sources (ALS and APS in the U.S.; ESRF and Trieste in Europe) are only now starting to produce fascinating novel results, it is not surprising that some new aspects of atomic and molecular photoionization are not included or are under-represented in this book; examples of this include "hollow atoms" (states in which all core electrons are excited or ionized), "beating the Heisenberg uncertainty principle" with resonant Raman Auger detection of absorption, and ultra-high-resolution studies above 50 eV. However, these points simply reinforce the appropriateness of this book, both as a useful summary of an important area of chemical physics as it moves into a new era and as a useful tool for young scientists just entering this fast-growing field. I strongly recommend this book to the intended audience.

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JA965781B

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Classics in Total Synthesis: Targets, Strategies, Methods. By K. C. Nicolaou and E. J. Sorenson. VCH: Weinheim. 1996. xxii + 798 pp. DM128.00. ISBN 3-527-29284-5.

Nicolaou and Sorenson's *Classics in Total Synthesis* is a volume that is destined to become a classic itself, and one which any chemist with an interest in synthetic organic chemistry will wish to acquire. The authors have painstakingly chronicled many of the most remarkable achievements in the field within the past fifty years and have done so in such a manner that the end product can serve both as a text for students new to the field and as a valuable reference work for the experts. Each of the 36 synthetic routes that comprise the chapters of the volume is presented in commendable detail, rich with elaborate structural drawings. The format of each chapter is to begin with an introductory section that provides background information on each synthetic target and, particularly valuable for the student readers, fundamental and often extensive discussions of key reaction types exemplified in the featured synthetic route, e.g., the Diels-Alder cycloaddition, 2 + 2 photocycloadditions, the Claisen rearrangement, the Heck reaction, and radical cyclization reactions, to name just a few. The introduction section is followed by a detailed retrosynthetic scheme using the principles of logical analysis set forth by Corey, and the synthetic route is then presented in the forward direction with the authors' characteristic attention to detail. Certainly not an enviable task, the authors have done an exceptional job of selecting exemplary synthetic routes from among the hundreds of candidates in the literature so as to provide thorough coverage of the important bond constructions and strategies in synthesis.

Following an introductory chapter, the volume is structured chronologically, beginning with Woodward's synthesis of strychnine (1954) and concluding with Nicolaou's synthesis of brevetoxin B (1995). Thirty-four "classics" span the decades between penicillin (Sheehan), reserpine (Woodward), prostaglandins F_{2α} and E₂, erythronolide B, ginkgolide B, paeoniflorin (Corey), progesterone (Johnson), carpanone (Chapman), vitamin B₁₂ (Woodward and Eschenmoser), Prostaglandins A₂ and F_{2α} (Stork), estrone (Vollhardt), monensin, palytoxin (Kishi), periplanone B, monensin, (Still), isocomene (Pirrung), thienamycin (Merck), endiandric acids, amphotericin, calicheamicin, rapamycin, taxol, zaragozic acid (Nicolaou), biotin (Hoffman-LaRoche), the hexoses (Masamune, Sharpless), asteltoxin, periplanone B (Schreiber), menthol (Takasago), hirsutene, capnellene (Curran), methyl homosecodyphniphyllate (Heathcock), indolizomycin (Danishefsky), cytovaricin (Evans), gilvocarcins (Suzuki), and strychnine (Overman).

Nicolaou and Sorenson are to be commended for their craftsmanship in what was clearly a massive undertaking. The authors' passion for their field is evident in every page of a work that is both engaging and thorough. I am particularly impressed by their ability to present the material in a manner that is comprehensible to the novice without sacrificing the detail sought by an aficionado. In so doing, they have produced a volume that will serve as an outstanding companion text to both graduate and undergraduate courses in synthesis, particularly when accompanied by Corey and Cheng's *The Logic of Chemical*

Synthesis. I highly recommend *Classics in Total Synthesis* both as a textbook and as a valuable and interesting reference work.

Andrew G. Myers, *California Institute of Technology*

JA965773V

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Advances in Medicinal Chemistry, Vol. 3. Edited by Bruce E. Maryanoff and Cynthia A. Maryanoff (R. W. Johnson Pharmaceutical Research Institute). JAI Press: Greenwich, CT, 1995. x + 187 pp. \$97.50. ISBN 1-55938-798-X.

When the *Advances in Medicinal Chemistry Series* was launched in 1992, the editors stated that each book would provide a forum to give "personalized accounts of drug research and drug development" and would involve researchers from diverse fields who pursue the discipline of medicinal chemistry. Volume 3 continues in this tradition with accounts of four different areas of medicinal chemistry. Reitz and Scott provide a detailed account of the research and development of the antipsychotic drug mazapertine with selectivity for the D₂/5-HT_{1A}/α₁ receptors. Their chapter would provide an interesting "case study" as a topic for a graduate course in drug design. Although the emphasis of the chapter is on chemical synthesis and development of structure-activity relationships (SAR), there is sufficient biological testing data to follow the decision-making steps that led to selection of mazapertine from the total of 227 tabulated analogues.

The chapter on antiplatelet and antithrombotic agents by Barker and Webb is structured as a mini-review of the authors' work and an overview of the field including compounds from many other companies and focusing on agents that interfere with the step in blood clotting where platelets, via the glycoprotein IIb/IIIa, bind to fibrinogen. Compounds reviewed range from proteins in viper venoms, to peptides and peptidomimetics, to small organic molecules.

Welch has provided an interesting account of the discovery and development of the antidepressant sertraline, a selective 5-HT reuptake inhibitor. This chapter could also be used as a case study in a graduate course. It begins with a synthetic program to define SAR, leads to selection of sertraline from 61 listed derivatives, and summarizes important pharmacological studies with the compound. Another interesting segment concerns design and synthesis of radiolabeled compounds for metabolism and pharmacokinetic studies.

The fourth chapter is a review of dipeptidylpeptidase IV (DPPIV) inhibition by Snow and Bachovchin. Emphasis is placed on work from the authors' laboratories on the synthesis and chemical properties of proline boronic acid dipeptides and their ability to inhibit DPPIV and to act as immunosuppressants.

In summary the third volume of this series continues to offer well-written, interesting accounts of topics important to the discipline of medicinal chemistry and with up-to-date references. Some of the chapters seem well suited as special topics in graduate courses. This series should appeal to a broad audience of researchers, teachers, and students.

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JA965521U

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Advances in Electron Transfer Chemistry, Volume 5. Edited by Patrick S. Mariano (University of Maryland—College Park). JAI Press: Greenwich, CT, 1996. ix + 202pp. \$109.50. ISBN 0-76230-062-0.

All four reviews in Volume V of the series *Advances in Electron Transfer Chemistry* are devoted to photoinduced electron transfer in organic systems, in which the application of light promotes the desired electron transfer between weak electron donors and acceptors. F. D. Lewis focuses on photoaddition reactions of amines with aryl olefins and arenes. To effect efficient electron transfer from secondary and tertiary amines, the stilbene and styrene acceptors require photoexcitation to their excited singlet states, and to achieve reactions of primary amines, a photosensitizer is employed to first generate the olefinic or aromatic cation radical, which subsequently forms an adduct with the amine. Once the initial electron-transfer activation is achieved, the followup reactions usually occur spontaneously, and—as the review

convincingly shows—the formation of C–N *versus* C–C adducts is controlled by solvent-cage effects, exciplex formation, and, most importantly, the ion-pair dynamics of the intermediate cation and anion radicals. Many of the intermolecular addition reactions between amines and aryl olefins have been reviewed before by the same author. However, his more recent work on intramolecular reactions relevant for the synthesis of nitrogen-containing heterocycles of various ring sizes is summarized here for the first time, and the review carefully explains the differences between the intra- and intermolecular reaction patterns by considering the lack of cage escape and the formation of stable, but unreactive exciplexes. L. J. Johnston and N. P. Schepp discuss the reactivity of alkene cation radicals. Since all data are obtained with phenyl-substituted alkenes (such as styrene and stilbene derivatives), the conclusions drawn in this review may or may not be generally applicable to all (including alkyl-substituted) alkenes. This detailed review is the first of its kind to summarize the reaction patterns of alkene cation radicals, and it clearly points out the competition between electron transfer and nucleophilic attack that is generally observed when cation radicals encounter nucleophilic substrates. Interestingly, most aryl alkene cation radicals are unselective in their reactivity with negatively charged nucleophiles, whereas the reaction rates with neutral substrates vary substantially. The authors draw an interesting parallel between the reactivity of cation radicals and carbocations, and point out the lack of theoretical treatments to analyze such a comparison. The second part covers the reactivity of styrene cation radicals toward neutral alkenes in inter- and intramolecular cycloadditions and dimerizations. In all these studies, pulsed-laser irradiation is applied to generate the cation radicals, and to monitor their fast reactions by time-resolved spectroscopy. A. Albin, E. Fasani, and M. Freccero review the photoreactions of cyanoarenes with benzylic donors. Benzylolation results from photoinduced electron transfer followed by fragmentation of the benzylic cation radical at either an acidic C–H bond (i.e., deprotonation) or the fragile α C–C bond to afford a benzylic radical or a carbocation/radical pair, respectively. The authors emphasize the importance of ion pairing within the solvent cage (including its steric implications) for the control of the final outcome of the organic transformation, and they contrast ion-pair mechanisms with reaction paths involving free radical ions. Their results and conclusions strongly support those discussed in Lewis' contribution, but most of the findings have been reviewed before by the same authors (a few new results from more recent work are added). J. Cossy and J.-P. Pete summarize what is known about the photoreduction of sulfonates, sulfonamides, esters, aldehydes, and ketones and their subsequent dark reactions, such as cleavage, coupling, and intramolecular cyclization. A review of recent advances in this area of photoinduced electron transfer is long overdue, and the focus on synthetic (as opposed to mechanistic) problems is a welcome change. Thus, the authors demonstrate for a wide spectrum of organic transformations how photoinduced electron transfer can be exploited to improve the regio- and/or stereoselectivity or to design new syntheses under mild conditions. The various photochemical approaches to the efficient synthesis of natural products (such as alkaloids, iridoids, etc.) is noteworthy. All four reviews illustrate the power of photoinduced electron transfer and are thus useful to organic chemists who are interested in either the mechanistic aspects or the synthetic applications of electron transfer.

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JA965759I

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Nitrocarbons. By Arnold T. Nielsen (Naval Air Warfare Center, Weapons Division California). VCH: New York, 1995. x + 190 pp. \$110.00. ISBN 1-56081-681-3.

Nitrocarbons by Arnold Nielsen is a speciality book for specialists. Given that there are only five nitrocarbons C_x(NO₂)_y, of which only tetranitromethane (TNM) is readily prepared, it is not surprising that this is a niche book. For each of the five compounds TNM, hexanitroethane, tetranitroethylene, hexanitrobenzene, and decanitro-biphenyl, Nielsen details preparation, reactions, and physical properties. The discussion of TNM, which makes up over half the 120-page volume, also includes information on analytical methods, toxicity, and applications. Of the other four nitrocarbons, only hexanitroethane rates as much as nine pages of discussion. The last section of the volume

discusses nitrocarbons that might exist and related highly nitrated compounds. With the exception of TNM, the principal interest in these materials is for use in explosive and propellant formulations. TNM has also found use as a nitration reagent and as a polymerization catalyst.

Nielsen is the right person to author this book. He had co-authored an earlier book in the Organic Nitro Chemistry series and until his retirement from the Navy lab at China Lake, was one of the premier chemists in energetic materials.

For those interested in the subject, this is an invaluable source compiling data from over 1000 references, many of which are hard to find Russian publications.

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JA955348M

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Total Reflection X-Ray Fluorescence Analysis. Chemical Analysis, Vol. 140. By Reinhold Klockenkamper (Institut für Spektrochemie und Angewandte Spektroskopie-Dortmund, Germany). John Wiley: New York. 1997. xvii + 245 pp. \$69.95. ISBN 0-471-30524-3.

Most chemists know that the basis of classical X-ray fluorescence (XRF) spectroscopy is the fact that a suitably-excited atom exhibits a characteristic X-ray spectrum. Total reflection (T) of X-rays (which occurs when the glancing angle of the incident beam is less than a critical angle) was first discovered by Compton in 1923, but was not applied to XRF until the early 1970s. Over the past 20 years, concomitant with the advances in solid-state detector sensitivity and X-ray source intensity, TXRF has been developed into an important analytical tool. The low sample detection limit (10^{-12} g), the minimal surface penetration of the incident beam (1–500 nm), and the near elimination of spectral background and matrix effects combine to make this a recommended method for both microquantitative analysis and surface analysis. However, TXRF differs fundamentally from classical XRF since the totally reflected X-ray beam (glancing angle $<0.1^\circ$) interferes with the incident primary beam to form standing waves above the sample surface and within near-surface layers. Consequently, the instrumentation requirements and data analysis methodology are unique to TXRF and are not simply extensions of classical XRF methods. Currently, in atomic spectroscopy TXRF competes with instrumental neutron activation analysis (INAA), while in surface and thin-layer studies it compares favorably with Rutherford back-scattering (RBS) and secondary ion mass spectrometry (SIMS).

This volume, written by a well-known expert in the field, is the first book solely dedicated to TXRF. It is clearly written with excellent coverage of theory, instrumentation, sample preparation, data collection and interpretation, and a wide range of applications (chemical analysis, environmental studies, medicine, industrial materials, and forensics). The book closes with a discussion of future prospects in this exciting and developing field.

Total Reflection X-Ray Fluorescence Analysis, which contains introductory background material along with detailed practical experimental hints, is an excellent survey of the current status of TXRF for both specialists and nonspecialists (including instructors of analytical chemistry). The bibliography is thoroughly representative and reasonably current; in future years it can be kept up-to-date by reference to the biennial reviews of X-ray spectroscopy which appear in *Analytical Chemistry* (e.g., 1996, 68, 467R).

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JA975500F

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Deciphering the Chemical Code: Bonding Across the Periodic Table. By Nicolaos D. Epiotis (University of Washington). VCH: New York. 1996. xlvii + 933 pp. \$89.95. ISBN 1-56081-946-4.

This work describes a new theoretical framework for describing chemical bonding. A prime motivation is to overcome shortcomings in “popular” theories used to explain chemical phenomena. To do so requires a blizzard of abbreviations unlike anything this reviewer has seen since the section of my college history textbook covering the New Deal. To some extent, this problem is unavoidable given the focus of the work. The author includes a pictorial glossary of new terms at the beginning of the book to help deal with this daunting “alphabet soup”, an excellent idea and one authors of related monographs would do well to consider.

The book is, at over 900 pages, not a “quick read”. In places the reading is slow going although this is expected since many concepts are unlike those employed in bonding theories familiar to chemists. In other areas the writing is in a style one could almost classify as colloquial; you get the impression the author is speaking directly to you, attempting to convince you of his arguments. There are also many intriguing chapter titles including *The Skeleton in the Closet of Inorganic Chemistry*, *How Theoretical Inorganic Chemistry Went Astray*, and *Computational Chemistry: Curse or Panacea?* to pique the curiosity.

The central thesis behind much of this book is that previous attempts at codifying electronic structure theory fail to focus on an important chemical concept, i.e., the importance of electron–electron repulsion. If one considers the simple orbital-driven arguments typically used to explain observations (e.g., the preference for one isomer over another, the stereo- and regiochemistry of a reaction, etc.) then there is much to support the hypothesis that modern electronic structure theory focuses primarily on the one-electron portion of the energy to the neglect of the two-electron portion. Given this, any work that seeks to expand this view is valuable.

Another primary goal of this work is, as the title suggests, to develop a theoretical framework that is applicable across the entire periodic table as opposed to developing specific theories for specific families of elements. Fundamental problems in the electronic structure of organic, main group, and transition metal compounds are treated. Perhaps more importantly, the emphasis is on developing qualitative (and semiquantitative) concepts that can be used not only to rationalize the results of experiments and high-level calculations but also as a tool for predicting new chemistry.

Another central thesis of this work is that despite recent advances in computational chemistry many of the fundamental theories used to rationalize numerical results are those developed many years ago by Lewis, Pauling, etc. Epiotis develops new concepts such as the interstitial and exchange bond. Will it revolutionize our ways of thinking about bonding in chemistry? The pessimistic view suggests that such an effort will fail given the chemist’s inertia toward new bonding models. On the other hand, concepts are couched in the language of valence bond theory, which, despite the fact that the overwhelming majority of computational chemistry studies reported in journals such as this employ the molecular orbital formalism, is near and dear to the hearts of chemists, experimentalists, and theorists alike. In summary, this book may be of interest to anyone with an interest in theories of chemical valence.

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JA965712X

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