*Book Reviews**

NMR of Proteins and Nucleic Acids. By Kurt Wüthrich (Swiss Federal Institute of Technology). John Wiley and Sons: New York. 1986. xv + 292 pp. $49.95. ISBN 0-471-82893-9

During the past several years the application of 2D NMR techniques has vastly improved the analysis of biopolymer structure and conformation. The author, who along with his collaborators is responsible for many of the innovative techniques and applications developed during this time, furnishes in this volume a comprehensive account of the underlying principles and procedures for NMR studies of proteins and nucleic acids with the major emphasis placed upon methods for obtaining sequence specific NMR assignments and conformational information.

The book is divided into four sections. Part I provides background descriptions of the NMR experiment and NMR features of amino acids mononucleotides, proteins, and nucleic acids. Also included in Part I is a chapter that presents a phenomenological description of 2D NMR techniques which provide through-bond and through-space connectivities and experimental procedures for optimization of 2D experiments. A very brief account of heteronuclear 2D NMR experiments is provided: however, the emphasis throughout the book is on ^1H–^1H 2D NMR experiments. Accordingly, the final chapter in Part I is devoted to the nuclear Overhauser effect (NOE), its measurement in 1D and 2D (NOESY) experiments, and its use for determining interproton distances in biopolymers.

Part II of this book consists of four chapters applying the 2D techniques presented in Part I for resonance assignments and structure determination in proteins. Heavily weighted here is the use of ^1H–^1H NOESY for sequence specific assignments and the determination of secondary structure. Also provided is a chapter describing the use of computer based distance geometry methods, which utilize NOE derived interproton distances to generate three-dimensional conformations consistent with these experimentally determined distance constraints.

Resonance assignments and structure determination in nucleic acids comprise Part III of this book. Presented here are one chapter devoted to resonance assignments that make use of scalar (through-bond) couplings, including the use of ^1H–^{31}P couplings for sequential assignments, and two chapters describing the use of ^1H–^1H NOE derived interproton distances for sequence-specific assignments and conformational analysis.

Part IV, the final section of this volume, consists of two short chapters. One chapter provides guidelines for the choice of proteins and nucleic acids likely to be good candidates for conformational analysis and a brief protocol for structural determination. The last chapter briefly discusses NMR studies of intermolecular interactions with biopolymers.

This book is very well written with clear explanations throughout and contains many useful and illustrative figures and tables. In the Preface the author states that this book is aimed at "practicing scientists and students of biochemistry, chemistry, biophysics, and molecular biology who are concerned in their daily work with the structure and function of proteins and nucleic acids". Members of this audience should find this book to be an invaluable resource.

Henry I. **Mosberg,** *University of Michigan*

Atmospheric Chemical Compounds. Sources, Occurrence and Bioassay. By T. E. Graedel, D. T. Hawkins, and L. D. Claxton. Academic Press: New York, NY. 1986. xii + 732 pp. $55.00. ISBN 0-12-294485-2

This is a reference book on the occurrence, source, and genetic toxicology of ALL (the authors claim ≈2500) of the chemical compounds reported in the atmosphere and public indoor situations (it excludes the workplace environment).

There is a 55-p introductory chapter that briefly discusses the physical structure and properties of the atmosphere and the gases and particles in it; the causes of mutations and the bioassays used to test for them; and a brief outline of the content and organization of the tables. A 74-p summary chapter discusses the chemical reactions that take place in the indoor and outdoor atmosphere, in precipitation, and on environmental surfaces. It also summarizes the bioassay information.

The major part of the book, Chapters 2–14, is the tables that list references to the compounds detected, their sources, and the bioassay results on them. There is a chapter on inorganic compounds, one on organometallic compounds, and twelve on organic compounds. The organic chapters are organized by functional group, including chapters on sulfur-, nitrogen-, and halogen-containing compounds. Each of these chapters has a brief introduction on the sources and reactions of that group of compounds. The toxicity references are only to data that have been reviewed and evaluated.

A book of this type needs good indices to be useful, and this book has four of them: (1) an author index; (2) a chemical species index that refers to the entry in the proper table; (3) a CAS Registry Number index to the tables; and (4) an index by the source-type of compounds to the atmosphere. The authors seemed to have taken great care to correctly identify and list all of the compounds by their IUPAC name and CAS Registry Number. Structures are shown for a number of the compounds. There are 1334 references, some from 1985, to the emissions and the detection of the compounds. At least one reference for each compound is listed if available, but the list is not complete. Some of the compounds, the PAHs for instance, would probably need their own volume. However, some references are there to serve as a starting point. There are 70 references to the bioassay literature and studies, also through 1985.

This book should serve as a useful reference book on the identity and the source of compounds present in the atmosphere because of its complete coverage. It should also be most useful to those involved in making measurements on compounds in the atmosphere in getting into the toxicological literature on the compounds of interest.

Thomas J. Murphy, *DePaul University*

Multiple-Photon Excitation and Dissociation of Polyatomic Molecules. Edited by C. D. Cantrell (University of Texas, Dallas). Springer-Verlag: New York. 1986. xiii + 288 pp. $60.50. ISBN 0-387-13492-1

This book is Volume 35 in Springer's *Topics in Current Physics* series designed to provide the interested reader perspective on a rapidly developing research field by gathering together review articles by major players. The editor has accurately highlighted the major results of the multiple-photon excitation (MPE) shock wave of research activity that propagated through the gas-phase chemical physics community during the 1970's. Throughout this period three questions intrigued the photochemists: (1) How is it possible that virtually any polyatomic molecule can efficiently absorb scores of infrared photons from a pulsed CO_2 TEA laser to achieve bond fission? (2) Can insight into the dissociation dynamic be gained from this process, and in particular can bonds be made to break selectively? (3) Could MPE be used to separate heavy isotopes? The answers to the first two questions are thoroughly examined and answered in the excellent review by Y. T. Lee et al., which itself is worth the price of the book. The question of isotope separation is discussed in two articles, one by Ambartzumian and the other by Cantrell. However, the recent glut of cheap uranium on world energy markets and the decision of DOE to develop atomic multiphoton ionization as the process of choice have resulted in a rapid deflation of interest in MPE separation schemes.

Although the copyright date is 1986, the book suffers from a distinctly musty odor of the passé. Reference lists at the end of chapters rarely cite articles appearing after 1980. In fact, new tools, especially the excimer laser, have supplanted the CO_2 TEA laser in studies of dissociation dynamics and bond-selective chemistry. In essence, the time required for a molecule to gather in the energy of thirty or more IR photons permits internal vibration-mode coupling to redistribute the energy statistically prior to dissociation. The UV photons from excimer lasers, however, can dissociate molecules before the internal energy has a chance to redistribute and bond selectivity is more commonly observed.

The last article, Three Level Superfluorescene by Mattar, Berman, et al., a treatise on applied quantum optics, appears curiously out of place in this volume on the multiple photon absorption of polyatomic molecules. The insouciant suggestion that photoabsorption of polyatomic molecules, with their thousands of nearly degenerate intersal states, might be usefully modeled by a three-level system is not, however, without its charm.

John Weiner, *University of Maryland*

Structure and Bonding. Volume 63. Bond and Structure Models. With contributions by J. C. A. Boeyens (University of the Witwaterstrand), S. N. Bose (Indian Association for the Cultivation of Science), J. C. Hawes (University of Oxford), D. M. P. Mingos (Oxford), K. Nag (Indian Association for the Cultivation of Science), S.-C. Tam (Oxford), and R. J. P. Williams (Oxford). Spinger-Verlag: Berlin, Heidelberg, New York, and Tokyo. 1985. 205 pp. $45.00, ISBN 3-540-15820-0

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*Unsigned book reviews are by the Book Review Editor.

This volume includes four review articles under the general title "Bond and Structure Models". It begins with a discussion by D. M. P. Mingos and J. C. Hawes of the "Complementary Spherical Electron Density Model" for the description and prediction of molecular stereochemistry, particularly of coordination compounds. Building on the work of J. G. Verkade and, especially, A. J. Stone, they work out a model where the linear combinations of ligand orbitals in an AX_n molecule can be approximately described as a set of spherical harmonics, here labeled S^σ, P^σ, D^σ F^σ, etc., to highlight their similarity to s, p, d, f,... functions on A. Beginning with the simplest systems, the molecular hydrides, they go on to describe the bonding in most all transition-metal molecules, including those with π-bonding. The model is shown to be useful in a variety of situations, though the authors are honest about the limitations imposed by its approximation of a discrete polyhedron as a spherical system. Potential problems with nonspherical structure (e.g., the C_{4v} geometry of AX_4) are treated by an extension of the *closo*, *nido*, or *arachno* formalism so useful in cluster geometries. Results are presented in a semiquantitative fashion, and it will be useful to see the calculational utility of this model.

A briefer but denser article on "Molecular Mechanics and the Structure Hypothesis", by J. C. A. Boeyens, follows. It summarizes some of his work in the area and, perhaps more important, treats in detail the philosophical problem posed by entangling classical force fields with quantized systems, i.e., molecules. The limitations of the Born–Oppenheimer approximation, particularly due to the neglect of electron–nuclear correlation, are presented as a prelude to a review of theoretical models currently in use and the new approaches now being developed.

A review by S.-C. Tam and R. J. P. Williams entitled "Electrostaics and Biological Systems", offers a survey of the models for solution electrostatics in light of the problem of biological systems, most notably proteins, polysaccharides, and poly-nucleic acids. The problem is followed from simple model studies up to the interactions that will affect cell–cell communication. Particular attention is paid to the effect of functional groups such as phosphate, carboxylate, or sulfate in creating a high charge density in a small area. Such systems, the authors point out, are poorly accounted for in simpler electrostatic theories. The review is hampered, severely at points, by some poor writing or editing (probably the former) that may render it less useful than its authority would imply.

The concluding paper is a well-done descriptive compilation of the "Chemistry of Tetra- and Penta-Valent Chromium", by K. Nag and S. N. Bose. Though out of place with the other essays, the review will probably stand well as a comprehensive discussion of the synthesis, reactions, and spectroscopic and structural characteristics of isolable Cr(IV) and Cr(V) species (much less space is given to such species as intermediates). The authors include a discussion of the future directions for research.

Donald J. Wink, *New York University*

Methods in Enzymology: Interferons. Part C. Volume 119. Edited by S. Pestka (Department of Molecular Genetics and Microbiology, University of Medicine and Dentistry of New Jersey). Academic Press: Orlando, FL. 1986. xxxix + 845 pp. $84.00. ISBN 0-12-182019-X

In the highly successful series *Methods in Enzymology*, this is the third volume that covers the specalized subject of interferons. These proteins are secreted in minute amounts by animal cells infected by viruses or stimulated in other ways. Binding of interferons to high-affinity receptors on the cell surface results in the induction of resistance to viral infections and in several other biological activities. Interferons were among the first proteins produced by the biotechnology industry in bacteria and were extensively tested in clinical trials. Thus far, one type of interferon has been approved by the Federal Drug Administration for prescription as an antineoplastic agent against the relatively rare hairy-cell leukemia.

This volume attempts to cover all the different methods used in interferon research in eleven sections. The first three sections deal with the induction of interferons and with their purification. The methods described are largely of historical interest since most interferons used today are of recombinant origin and are commercially available. The chaptrs on large scale purification procedures of recombinant interferons deal with industrial scale protocols for the production of these proteins.

In the three following sections are described chemical modifications of interferons, including radiolabeling, and procedures for studying interferon receptors. These methods are similar to those in general use for the labeling of polypeptide hormones and for studying receptor/ligand interactions. There is some advantage in having most of the procedures used by different investigators collected in one section, but there are some repetitions and there is no clear indication on which procedures give the most reproducible results or are the most convenient to use. Strangely out of place is a chapter on a receptor for (2′-5′)oligoadenylate on macrophages, which has not been previously described by other investigators.

The next section deals with procedures for the isolation and expression of interferon genes. The cloning of interferon cDNA and of genomic sequences is briefly reviewed, since most of this section deals with the construction of different expression vectors. This work has been carried out in recent years and was not adequately covered in the first two volumes of this series. The next topic, "Enzymes in interferon action", was instead extensively covered and is only briefly reviewed here.

The final sections deal with assays of interferons and of their biological activities. Some of the methods described are well-established procedures, whereas others, in contrast, report new findings that have not yet been published and subjected to the scrutiny of an editorial review. I find this part of the volume rather weak. For example, the production of interferon by plant cells is still a rather controversial subject and there is little justification for devoting an entire section to this topic. A Methods book should in theory publish only procedures that have been used in several laboratories with similar results and leave out controversial findings until they have been confirmed in different laboratories. In conclusion, I doubt that this volume will be of enough use even to specialists in the study of interferons to recommend its purchase to individual investigators.

Corrado Baglioni, *State University of New York at Albany*

Quantum Mechanics in Simple Matrix Form. By T. F. Jordan (University of Minnesota, Duluth). John Wiley & Sons: New York. 1986. xi + 259 pp. $24.95. ISBN 0-471-81751-1

This is a text covering the matrix formulation of quantum mechanics from an elementary perspective. The only mathematical tools used are complex numbers and matrix algebra. However, the algebraic manipulations in some places might be a bit rough for students not having had the experience of a calculus course. The Pauli matrices and the 2-dimensional Hilbert space (although that term is not used) are treated in considerable detail. Matrix eigenvalues are never mentioned. Instead it is argued that a matrix relation such as $\sigma_x^2 = 1$ implies that the quantity σ_x has only the possible values ± 1 and thus that its expectation value obeys the inequality $-1 \leq \langle \sigma_x \rangle \leq 1$. Such arguments go a long way. The spin version of the Einstein–Podolsky–Rosen experiment is discussed, with explicit numerical examples to show violations of Bell's inequalities. The matrix mechanics of the harmonic oscillator and angular momentum, as well as Pauli's solution of the hydrogen atom, are covered. The last part of the text develops the relationship between dynamical variables and infinitessimal coordinate transformations. For example, translations of the coordinate system provide a geometrical interpretation of Born's "strange equation": $QP - PQ = i\hbar$. The text might have benefitted from introduction of vector notation, thus avoiding repetitious restatement of numerous results for all possible permutations of coordinate indices.

S. M. Blinder, *University of Michigan*

Relativistic Theory of Atoms and Molecules: A Bibliography 1916–1985. Lecture Notes in Chemistry. Volume 41. By P. Pyykkö (University of Helsinki, Finland). Springer-Verlag: New York. 1986. ix + 389 pp. $41.10. ISBN 3-540-17167-3 and 0-387-17167-3

This is a compendium of some 3119 references on relativistic quantum mechanics and its applications to atoms, molecules, and solids. Under nine chapter headings, each introduced by about 0.5 page of text, there appears a one-line description of each reference, organized in a tabular form. The topics range from fundamentals of relativistic wave equations and quantum electrodynamics to ab initio and semiempirical computations of chemical significance. Obviously, this is a useful source for any worker whose interest touches on any of these areas. The final chapter, on relativistic effects in heavy-atom chemistry, is possibly of general interest to nonspecialists. It deals with chemical effects which become significant in the 6th row of the Periodic Table, $Z > 72$. For example, earlier work of P. Pyykkö indicates that "the chemical difference between Ag and Au may be mainly a relativistic effect". The Bibliography is also available from the author as an IBM PC compatible diskette file.

S. M. Blinder, *University of Michigan*

Fourier Transform Infrared Spectroscopy: Applications to Chemical Systems. Volume 4. Edited by J. R. Ferraro (Loyola University) and L. J. Basile (Argonne National Laboratory). Academic Press: Orlando, FL. 1975. xii + 406 pp. $74.50. ISBN 0-12-254104-9

Like its three predecessors, Volume 4 of this series consists of review articles on selected applications of Fourier transform infrared (FT-IR) spectrometry. This volume contains articles on spectral data processing, vibrational circular dichroism (VCD), coupled capillary gas chromatography (GC/FT-IR), thermal analysis, coal spectrometry, diffuse reflectance (DR) in the far infrared, reflection–absorption (R-A) spectrometry of thin films, and photoacoustic spectrometry.

In general, the authors have concentrated on descriptions of their own work, as might be expected in a volume of this type. Only the chapter on photoacoustic spectrometry by Graham, Grim, and Fateley contains a comprehensive review in a totally unbiased fashion. Nevertheless, when the material is at the current state-of-the-art, as it is in the chapters on spectral data processing (by Gillette, Lando, and Koenig) and on coal spectrometry (by Painter, Starsinic, and Coleman), the fact that the authors concentrate on their own work is unimportant. Both these articles are useful and eminently readable.

With some of the other chapters, the omission of descriptions of other groups' work is a real detriment. For example, in Nerheim's chapter on evolved gas analysis during thermal treatment of solids, there is a total of four references, and the important instrumental developments made by Lephardt were scarcely mentioned. In particular, the key question as to whether temperature control should be by a simple voltage ramp or by monitoring the temperature of the sample to account for exothermic or endothermic reactions was not addressed. Similarly, in the otherwise excellent chapter on capillary GC/FT-IR by Krishnan, the use of matrix isolation spectrometry is only mentioned in one paragraph. Polavarapu's chapter on VCD spectrometry contains many useful pointers for optical activity measurements. However, the spectra often appeared to be significantly noisier than data currently being reported by Nafie's group, and sometimes it is difficult to distinguish between spectral features and noise. There also appears to be one important error in this chapter in the discussion of oversampling noise.

Of the three chapters on reflection spectrometry, the discussion on far-infrared DR spectrometry (Ferraro) was the least successful, largely because of the very limited number of measurements which have been made in this spectral region. The subject matter does not seem to be sufficiently far advanced to merit a review chapter. Finally, the two chapters on R-A spectrometry of thin films (one by Swalen and Rabolt of IBM Research and the other by Golden of IBM Instruments, both in San Jose) overlap to a large extent. Swalen and Rabolt give a good discussion of the theory of these measurements and show applications related to thin films of fatty acids and polymers on metal surfaces. Golden's chapter is more instrumentally oriented, but it covers similar material until the final section on CO adsorption. Both chapters are useful, but a single chapter would have been better.

In summary, this book has many of the strengths and weaknesses of its three predecessors. Nevertheless, there is enough truly useful material in each volume that they deserve a place on the bookshelf of all serious practitioners of FT-IR spectrometry.

Peter R. Griffiths, *University of California, Riverside*

Inductively Coupled Plasma Emission Spectroscopy. Part I: Methodology, Instrumentation, and Performance. By P. W. J. M. Boumans (Philips Research Labs). John Wiley and Sons: New York. 1987. xi + 584 pp. $75.00. ISBN 0-471-09676-5

A thorough, tutorial, and well-referenced discussion of analytical inductively coupled plasmas and their peripheral equipment is presented in this book. A literature overview chapter provides an encyclopedic guide to reviews written prior to 1985; other chapters provide even more up-to-date references. Treatment of signals and noise is rigorous, which is welcome. While there are co-authors for several chapters, Boumans' dominant role in authorship assures continuity of tone and minimal, though noticeable, overlap between chapters. The enthusiasm which characterizes the most committed practitioners of the ICP method is evident. A good balance is struck between explanation of fundamental properties and description of application approaches. In this respect, it is a more balanced presentation than the book by Thompson and Walsh, which was reviewed in this Journal in 1984.

In the absence of Part II, it is difficult to completely evaluate the book. For example, impedance-matching between RF source and the induction coil is an important instrumental function that is barely touched on in Part I. The primary literature in this area is such that a description may have been deferred to one of the more fundamentally oriented chapters in Part II. It is unknown as yet whether in fact this was done. The brief discussion of the use of helium as a support gas reflects the recent evolution of this portion of the ICP domain. Effective helium-based systems have only been described within the last year, whereas the chapters describing support gases were apparently finished just as this new work was being presented.

Alexander Scheeline, *University of Illinois at Urbana—Champaign*

Organic Chemistry. Volume 1. Sixth Edition. By I. L. Finar (The Polytechnic of North London). Longman Scientific and Technical; co-published in the U.S. by John Wiley and Sons: New York. 1986 (1973). xiv + 965 pp. $36.95. ISBN 0-470-20703-5

The scope and intent of the sixth edition are to describe the fundamentals of organic chemistry for the beginning chemistry major. However, as a 1986 paperback reprint of a 1973 revision it suffers both from the inclusion of dated information and the absence of techniques now standard in most introductory texts, such as three-dimensional airbrush art, multicolor formulas, and schemes and stereochemical drawings. The text's primary organization is according to functional groups, with an exceptionally early introduction of alkenes and alkynes (Chapter 4). The functional group organization extends even to the chapters on the chemistry of the benzenoid aromatics (Chapters 20-29). An exception, however is the placement of spectroscopic techniques (infrared, NMR, mass spectrometry) in Chapter 1. This presents a problem, since discussions of topics such as chemical and magnetic equivalence are introduced prior to discussions of symmetry (Chapter 17), and various structures and formalisms are used without prior presentation or explanation. For example, Newman projections are used in illustrating magnetic equivalence (p 14), whereas they are formally introduced in Chapter 3 (p 79). The functional group emphasis also forces the very late introduction of stereochemistry (Chapter 17) and alicyclics and conformational analysis (Chapter 19).

Chapters 14 and 15, entitled "Sulphur, Phosphorus, Silicon, and Boron" and "Organometallic Compounds", are welcome additions to an introductory text. However, they suffer from omissions and conspicuously dated material. One example will suffice. It is stated (p 414) that "Silicon, unlike carbon, does not form multiple bonds such as occur in acetylene (sp), ethylene (sp^2), carbonyl compounds (sp^2), etc.", an obvious error.

Several topical omissions can also be noted. No coverage of protein or DNA structure or synthesis is provided, and while a few allusions to polymerization reactions are made, there is no unified treatment of polymer chemistry. All aspects of natural products chemistry are reserved for Volume 2.

Keith A. Horn, *Allied-Signal Inc.*

Biochemistry of Sulfur. By Ryan J. Huxtable (University of Arizona Health Sciences Center). Plenum Press: New York. 1986. xii + 445 pp. $65.00. ISBN 0-306-42348-0

This monograph provides a broad and generally up-to-date review of the role of sulfur compounds in life processes. Included are chapters on the reduction of sulfate and the oxidation of sulfide, on methionine metabolism, on taurine and the oxidative metabolism of cysteine, on thioesters, thioethers, thiols, thiol disulfides, and sulfates, on xenobiotic metabolism involving sulfur, and on inherited diseases of sulfur metabolism. Readers will find it useful to have information on the diverse reactions of sulfur biochemistry summarized in a single volume with copious references. A strong point of this monograph is its emphasis on comparative biochemistry, stressing the differences in sulfur metabolism and its regulation in different species. A second strong point is the emphasis on the chemical properties of sulfur-containing metabolites and their exploitation in the biological roles of these compounds. I note particularly excellent discussions of the reactivity of thiol esters, the origin of ring strain in oxidized lipoic acid, and the role of sulfur in thiamine catalysis.

One wishes that more recent (1982-1985) work had been discussed; the chapters vary considerably in their coverage of recently published material. For example, Figure 5-20 (p 219) and the discussion on p 257 present a mechanism for flavin-disulfide oxidoreduction which has been disfavored since the 70's. Work with model systems and on lipoamide dehydrogenase (particularly from C. H. Williams' laboratory) strongly suggests that a two-electron transfer between active-center dithiol and flavin is mediated by formation of a 4a-thiol/flavin adduct.

Overall, readers will find this a useful monograph, written in a lively and sometimes provocative style.

Rowena G. Matthews, *University of Michigan*

Chemical Applications of Ultrafast Spectroscopy. By Graham R. Fleming (The University of Chicago). Oxford University Press: New York. Clarendon Press: New York and Oxford. 1986. 262 pp. $49.00.

The book is divided into four principle sections. The first part, Chapters 1-4, deals with the technology associated with time-domain spectroscopy. This treatment covers both the theoretical and technical aspects of obtaining ultrashort optical pulses with a number of different optical resonators used as examples. A fairly extensive discussion is given to characterizing the temporal pulse shape with use of autocorrelation and real-time methods. In addition, a very comprehensive treatment of the optical techniques associated with time-resolved spectroscopy is given. The advantages of each technique are discussed with numerous references. Given the highly technical nature of the field, these introductory chapters to technology are warranted and certainly well done.

The last three chapters cover applications of time-domain methods to chemical phenomena. One chapter is devoted to intramolecular dynamics of isolated molecules in the gas phase—principally radiationless relaxation processes as a function of vibrational-mode density. The most detailed treatise covers picosecond studies of the liquid state. A wide range of topics is discussed in detail. Examples include hydrodynamic considerations of molecular rotation and large amplitude motions, electronic/vibrational energy transfer, solvent dynamics, and reaction mechanisms, to name only a few. Almost half the book is devoted to studies of liquid phase processes, which reflect the major focus of research to date. The last chapter covers progress made in understanding vibrational relaxation, dephasing mechanisms, and excitonic transport in organic crystals.

All in all, the book is extremely well written. The topics are covered concisely with good insight given to the importance of the particular subject. Each topic is up to date and done in a review fashion with an abundant supply of references to gain a quick foothold into the literature. This book will certainly replace earlier versions on the subject, which were written more as advances in the area rather than tutorial. *Chemical Applications of Ultrafast Spectroscopy* provides a thorough grounding in the art and science of time-domain spectroscopy. It will serve as an excellent introductory source to the subject for those entering the field and should provide a ready reference to a wide variety of topics to the more experienced researcher. In summary, there is finally a reference book for picosecond spectroscopy.

R. J. Dwayne Miller, *University of Rochester*

The Peptides. Volume 8. Chemistry, Biology, and Medicine of Neurohypophyseal Hormones and Their Analogues. Edited by Clark W. Smith (Upjohn Company). Academic Press, Inc.: Orlando, FL. 1987. x + 370 pp. $75.00/£62.50. ISBN 0-12-304208-9

As the original series editors, E. Gross and J. Meienhofer, state in the preface to Volume 1, *The Peptides* is an open-ended treatise providing comprehensive and critical reviews of important developments in three major areas of peptide research: analysis, synthesis, and biology. Volume 8 in this series, edited by Clark W. Smith, a superb peptide chemist with extensive experience with neurohypophyseal (i.e., posterior pituitary) peptides, follows in the stellar tradition of the previous seven volumes.

This volume is composed of eight contemporary reviews. Chapter 1 (A. G. Robinson and J. G. Verbalis) deals with the anatomy, physiology, and clinical disorders of the first identified, neurohypophyseal hormones, oxytocin, and vasopressin. Chapter 2 (T. L. O'Donohue and J. Z. Kiss) describes opioid, release and release-inhibiting factors, and "gastrointestinal" peptides recently identified as present in the neurohypophysis. Chapter 3 (D. Richter) is an excellent review of polyproteins, structure of oxytocin and vasopression genes, transcriptional regulation, processing and modification of precursor proteins, and the genetic basis of the genetic defect in diabetes insipidus (i.e., a deficiency of vasopressin). Chapter 4 (V. J. Hruby and C. W. Smith) presents in 23 tables and accompanying text the structure–activity relationships among numerous mono- and di- and multisubstituted analogues of oxytocin and vasopressin, which themselves function as agonists and antagonists. Chapter 5 (J. C. Hempel) is a clear summary of the three-dimensional structure of oxytocin and vasopressin gleaned from X-ray crystallography, nuclear magnetic resonance, circular dichroism, infrared and Raman spectroscopy, as well as energy-based molecular modelling. Chapter 6 (P. L. Hoffman) describes the effect of vasopressin and oxytocin on the central nervous system. Chapter 7 (S. Ishikawa, J. K. Kim, and R. W. Schrier) summarizes the effect of arginine vasopressin on renal function. Chapter 8 (P. G. Schmid and K. P. Patel) discusses the cardiovascular effects of vasopressin, mediated by polyphosphoinositides and adenylate cyclase, as well as intracellular and regional vascular effects.

Clark W. Smith has done an incredible service to the field by organizing the diverse knowledge of the chemistry, molecular and cell biology, pharmacology, and physiology of the major hypophyseal hormones. This volume is the best available treatise dealing with this subject, and it should be read by all peptide chemists and endocrinologists working in this field and by anyone who is considering doing peptide chemistry in the midst of modern biology and molecular medicine.

John A. Smith, *Harvard Medical School & Massachusetts General Hospital*

Advances in Heterocyclic Chemistry. Volume 40. Edited by A. R. Katritzky. Academic Press: Orlando, FL. 1987. viii + 320 pp. $85.00. ISBN 0-12-020640-4

This is an unusual volume and it marks a turning point (or maturing point) in the series. Most importantly, it contains a cumulative subject index for Volumes 1 to 40 plus the two supplementary volumes. Since the individual volumes lack subject indexes, this new feature is a boon to the reader seeking specific information. A subject index for every five volumes is promised for the future. There is also a cumulative index of chapter titles and one of chapter authors. A special introductory chapter describes changes in policy for the future, including a uniform reference style and a more definite policy on chapter structure and content.

References will henceforth be given twice: once in the body of the text in abbreviated form, using a style introduced with success in "Comprehensive Heterocyclic Chemistry" and in two monographs edited by Professor Katritzky, and also at the end of each chapter in full, using the traditional style, with authors' initials *before* the surnames, and the sequence volume, page, year that once graced the pages of this journal, but, alas, are seen here no more. Finally, a combined table of contents of Volumes 1 to 40 is included in the introductory chapter; it is bound to be useful.

There was still room in Volume 40 for three valuable chapters of the sort usually included. J. Knabe brings up to date the subject of 1,2-dihydroisoquinolines, which was last reviewed in 1972. Adrien Albert gives a detailed yet succinct account of the chemistry of 4-amino-1,2,1-triazoles. The reactivity of heteroaromatic compounds in the gas phase, a subject of recently emerging importance, is reviewed by M. Speranza.

The pricing of this volume ($85.00 or £71.00) is curious; it corresponds to no known rate of exchange.

Diazo Compounds: Properties and Synthesis. By M. Regitz and G. Maas (Universität Kaiserslautern). Academic Press: Orlando, FL. 1986. xii + 596 pp. $125.00. ISBN 0-12-585840-X

This book is dedicated to Bernd Eistert, who did so much pioneering work with diazomethane. It is a review in two parts: Properties of Aliphatic Diazo Compounds (four chapters), and Synthesis of Aliphatic Diazo Compounds (12 chapters). Under "properties" are considered spectroscopy, thermal behavior, reactivity toward acids, and photochemistry. Other types of reactivity, such as the Arndt-Eistert Synthesis, are taken up in a chapter on Substitution Reactions of Diazoalkanes.

This book is a rich source of information up to 1982, the termination of the literature coverage. An addendum, subdivided according to chapter, provides a condensed presentation of "major developments" from 1982 to 1986, but it is not complete and misses a number of things, such as the use of *I,I*-diacetoxyiodobenzene for oxidizing hydrazones to diazoalkanes. The discussion is in general critical and explanatory. Mechanism is incorporated throughout the text, with a careful distinction between what is established and what is speculative. Abundant, carefully drawn structural formulas contribute to the clarity of the work, and the many tables add to its reference value.

Apart from the many hundreds of references, there is a bibliography of general and special reviews. This is most useful, although it has missed some important recent ones. The index is good, although not as complete as it might be. Nomenclature is somewhat idiosyncratic, as shown in "pyridine-2-aldehydrazone", or ambiguous, as in "α-methyleneketones" (by which is meant RCH_2COR' rather than $RC(=CH_2)COR'$). The publishers have thoughtfully chosen alkaline paper to provide a long shelf-life for a good book.

Advances in Chemical Physics. Volume LXV. Edited by I. Prigogine and S. A. Rice. John Wiley & Sons: New York. 1986. ix + 300 pp. $69.95. ISBN 0-471-83800-4

This volume contains five contributions; Optical dephasing of ions and molecules in crystals, by J. L. Skinner and D. Hsu; Quasi-two dimensional phase transitions in paraffins, by J. Naghizadeh; Correlation effects in the ionization of molecules, breakdown of the molecular orbital picture, by L. S. Cederbaum, W. Domcke, J. Schirmer, and W. von Niessen; Semiclassical calculations of quantum mechanical wavefunctions, by J. B. Delos; Correlation functions in subcritical fluid, by J. Kerins, L. E. Scriven, and H. T. Davis.