

The low reactivity of **1** relative to the arylketenes is an item of some interest. The change in medium accounts for only a small portion of the difference,^{12a} and geminal di-*tert*-butyl groups do not cause a steric barrier to protonation.^{12b} Generation of the arylketenes in an excited state by eq 2 could lead to enhanced reaction rates in these cases.^{12c} In any event these ketenes are all quite reactive in solution relative to alkenes such as isobutene ($k_{H^+} = 3.71 \times 10^{-4} \text{ s}^{-1}$ at 25 °C),¹³ even though the proton affinities of ketene and isobutene are the same in the gas phase.

The relative stability of **1** to neutral and basic hydrolysis may reflect a steric barrier to nucleophilic attack. Quantitative reactivity comparisons of **1** and less hindered ketenes will be illuminating in this regard.

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Supplementary Material Available: Tables of original rate constants (4 pages). Ordering information is given on any current masthead page.

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Book Reviews

Fortschritte der Chemie organischer Naturstoffe (Progress in the Chemistry of Organic Natural Products). Edited by W. HERZ, H. GRIEBACH, and G. W. KIRBY. Springer-Verlag, Vienna-New York, 1977. x + 620 pp. \$118.70.

For the past 40 years "Zschmeister" has provided invaluable accounts of the many facets of natural product chemistry. As usual, the articles in the present volume reflect the broad canvas of the field ranging from the isoprenoids and alkaloids of tobacco to the hypothalamus regulating hormone. Intervening chapters survey the chemistry of the eremophilane and related sesquiterpenoids, phytoalexins, carbazole alkaloids, uropygial gland lipids, and the use of plant tissue culture in the study of secondary metabolism. Particular articles will be a standard source of reference for the specialist, but there is much to interest his noncommitted colleague, who may find it a source of new synthetic challenges, or bizarre transformations to test his arrow-pushing skills. The high standards of authorship and presentation associated with this series have been fully maintained in the present volume. It is particularly commendable that the "old-fashioned" though very helpful practice of including the titles of papers in the reference quotation is still retained. Despite the bilingual title of the series, five of the eight articles are in English.

Regrettably, only the exceedingly affluent, or the fortunate reviewer, can aspire to having a copy on his own bookshelf.

C. W. Bird, *Queen Elizabeth College*

Horizons in Biochemistry and Biophysics, Volume I. Edited by E. QUIGLIARIELLO (University of Bari), F. PALMIERI (University of Bari), and THOMAS P. SINGER (University of California, School of Medicine). Addison-Wesley, Reading, Mass. 1974. xiii + 344 pp. \$6.75 paper; \$13.50 cloth.

This book is the first in a series which is designed to keep people in various scientific areas abreast with "major conceptual and meth-

odological advances and important discoveries in biochemistry and biophysics".

Volume I contains nine chapters. The articles are vastly different in their content and emphasis; they vary from a chapter on photosynthesis to one on clinical aspects of genetic disease. Obviously no attempt was made by the editors to localize emphasis in each volume. Perhaps this is good; there are chapters to interest people in vastly different areas. This book tends to remind one of *Chemical Reviews*. This varied emphasis along with the modest price of the paperback version may interest many in entering subscriptions.

The articles themselves are generally well written and well referenced. They are largely free of typographical errors, and most are of high quality both in scientific content and literary style. Most are excellent reviews of present knowledge and contain indications of areas where research is still needed.

On picking up the book the first thing that strikes one's eye is the fact that it is reproduced from a typewritten manuscript rather than from set type. The resulting uneven right margins make one feel like one is reading a preliminary draft rather than a book, which detracts from the quality of the volume.

All things considered, this volume is a good addition to most scientific bookshelves.

Robert R. Pavlis, *College of the Virgin Islands*

The Synthesis of Prostaglandins. By ABHIJIT MITRA (Columbia University). John Wiley & Sons, Inc., New York. 1977. xiii + 444 pp. \$22.50.

This text is a comprehensive review of the reactions and mechanisms pertaining to prostaglandin synthesis. It is a well-documented book with many references to the 1977 literature.

The book begins with a brief introductory chapter reviewing the original isolation of the prostaglandins. A short discussion of their

structure, nomenclature, and biosynthesis follows.

The majority of the text is divided into chapters covering the different synthetic approaches to the natural prostaglandins. For example, there are chapters titled Syntheses via Symmetric Intermediates, Bicyclo[2.2.1]heptane Approach, and Syntheses from Chiral Precursors. Each chapter is further subdivided into individual syntheses. Each synthesis is preceded by a brief introduction which includes an antithetic flow diagram depicting the major bond disconnections of the synthetic strategy. Where applicable, there are short discussions of the stereochemical outcome of a particular reaction or of the formation of a particular by-product.

Also included in the review is a chapter on the synthesis of thromboxanes and a chapter on the synthesis of prostaglandin analogs.

The flow diagrams are large and generally easy to follow. There are some pages, however, which contain too many structures and are difficult to browse. Other minor criticisms include footnotes without any corresponding references in the flow diagrams (e.g., p 29, footnote 31; p 80, footnote 81; p 356, footnote 10), two structures with the same number (pp 40 and 42, structure 9), a reference without a journal name (p 171, footnote 5), and the poor placement of the structure of R groups used in the flow diagrams. The poor placement of footnotes corresponding to a particular reagent or structure also makes the text difficult to follow at times.

All told, "The Synthesis of Prostaglandins" is a well-organized, comprehensive text. It will be useful to the synthetic chemist working on prostaglandins, as well as to the individual searching for new selective and stereospecific reactions required in other areas of synthesis.

Russell Buchman, *Diamond Shamrock Corporation*

Fate of Pesticides in Large Animals. Edited by G. W. IVIE (U.S. Department of Agriculture) and H. W. DOROUGH (University of Kentucky). Academic Press, Inc., New York, 1977. x + 265 pp. \$14.50.

The book is a collection of 14 papers which were presented at an American Chemical Toxicity sponsored symposium on fate of pesticides in large animals, August 29–September 3, 1976, in San Francisco. Each paper is headed by an abstract and, with a few notable exceptions, the list of references at the end of each paper appears quite complete. The lack of titles in the reference lists makes them somewhat harder to use if one wants to obtain additional information. There is a short subject index at the end of the book.

When I think of large animals, cows, pigs, etc., come to mind; thus the title of the book may be somewhat a misnomer. One paper is on DDT metabolism in deer, which may fit this category, but the paper on herring gulls does not. The book is divided into three general areas: (1) general facets of large animal pesticide metabolism in the first three papers, (2) comparative metabolism aspects in the next four papers, and (3) data on specific compounds or on specific large animal species in the last seven papers. Generally, papers in the first half of the book are reviews containing little new information. Some are excellent while others are rather short and superficial. Papers in the latter half generally do contain new data. By in large, the papers throughout the book were easy to read and comprehend.

Considering its low cost, the book would probably be of value to workers in this particular field. It would also serve, to some degree, as an introduction and review (although not a complete one) to someone new in the field.

Marvin T. Case, *3M Company—Riker Laboratories, Inc.*

Special Topics in Electrochemistry. Edited by PETER A. ROCK (University of California). Elsevier, Amsterdam and New York, 1977. viii + 224 pp. \$39.50.

As stated in the Preface of this book and in various advertisements which have appeared, the material in the volume is based on papers presented at a symposium entitled "Teaching of Electrochemistry" held at the 172nd National Meeting of the American Chemical Society in 1976. It is also stated that the presentation is for chemistry teachers and for senior and first-year graduate students who wish to survey a variety of fields in contemporary electrochemistry.

These prefatory remarks make this book difficult to review: if the volume is to be judged on these intentions regarding education in electrochemistry, it must be stated that it falls far short of what is currently necessary. Thus, ten chapters are presented covering recent (and in one chapter, not so recent) advances in a variety of topics, several of them interesting but esoteric (electrochemical oscillations,

electrochemistry of nerves). These chapters are all of the kind that one expects to find in an "Advances in" type of monograph, of which there are already three or four series running at the present time.

Nowhere in this volume will a student of electrochemistry find a description of the structure of the double layer or of its role in electrode processes. Nor will he find an account of the origin of metal/solution potential differences or the thermodynamics of charged interfaces, fundamental to the proper understanding of electrochemistry. In the reviewer's experience, these are the basic areas where students and teachers new to the subject find their greatest difficulties in its comprehension and in perceiving its elegant relation to the rest of physical, colloid and surface chemistry. They will not gain much on these aspects from reading this volume. Also as far as the Reviewer could find, none of the several articles on the teaching of electrochemistry, which have appeared in the *Journal of Chemical Education* over the past 12 years, have been referred to.

The ten chapters cover the following topics: battery systems (McCoy); photovoltaic phenomena (Gerischer); electrochemical synthesis (Mann and Asirvatham); cells without liquid junction (Rock); species-selective electrodes (Rock); electrochemical oscillations (Keizer); electrochemistry of nerves (Moore); three chapters by Marcus on polarization and electron-transfer in electrode processes.

While a contribution by (R.A.) Marcus will add interest and prestige to any volume on electrochemistry, it is unclear why *three* chapters by Marcus are included on rather closely related topics, yet other equally important areas, from the education viewpoint, have been omitted, as mentioned earlier. Unfortunately, however, readers will not find in Marcus's chapters any reference to the historical development of his subjects, for example, the early works of Gurney, Fowler, Butler, or Weiss, which are surely so important for the new student or teacher if he is to understand the subject.

One of the chapters by Marcus is an Office of Naval Research Report (1954), reproduced in its entirety!—hardly a form suitable for the defined pedagogical purposes of this book.

Judged on the individual chapters, the book presents useful accounts of fields of current research interest. McCoy's chapter on battery systems gives an excellent review of this topic, with useful tabulated data. Gerischer's chapter, as may be expected, also provides a fine review of photovoltaic phenomena in electrochemistry, although much of the material is to be found in other, previously published articles by him and others. Those interested in specialized areas of electrochemical research will be intrigued by the material in the chapters by Moore and by Keizer. There are two chapters by the Editor himself on cells without liquid junction and on species-selective electrodes. These are interesting in themselves, but, like most of the other chapters, fail on the test of pedagogical value: there is virtually no introductory thermodynamic material pertaining to the treatment of electrochemical potentials of ionic species in two phases, which the beginning student would need.

In summary, therefore, this volume signally fails in its professed objectives, but the material presented in various chapters will nevertheless be of interest to the specialized researcher. The material of some chapters has, however, appeared in more or less similar form in other monograph series.

B. E. Conway, *University of Ottawa*

VIIth International Symposium on Carbohydrate Chemistry. Edited by P. BIELY (Slovak Academy of Sciences). Butterworths, London, 1976. 494 pp. \$18.75.

This book represents a diverse assemblage of works presented at the International Symposium on Carbohydrate Chemistry held in Bratislava, Czechoslovakia, in the summer of 1974. Most of the topics center around polysaccharides and include such items as structural chemistry of plant glycuronoglycans, ion binding of certain polyuronates, metabolic pathways of some specific polysaccharides, and immunochemical approaches to structural chemistry of polysaccharides. Each contributor has included a significant list of references dealing with his topic. This book should be especially useful to researchers entering one of these areas of carbohydrate research.

Michele A. Crayton, *Pacific Lutheran University*

Stereochemistry: An Introductory Programmed Text. By R. W. GIESE (Northeastern University), R. P. MIKULAK (U.S. Disarmament Commission), and O. A. RUNQUIST (Hamline University). Burgess Publishing Co., Minneapolis, Minn. 1976. iv + 159 pp.

This programmed text provides useful supplementary material for students taking undergraduate organic chemistry courses. Sections of the text are devoted to topics such as models and perspective drawings, the classification and properties of stereoisomers, systems of nomenclature involving the sequence rules, and the steric aspects of chemical reactions. A further useful feature is an annotated bibliography which provides guidance for further reading in the main areas of stereochemistry and applied aspects such as the stereochemistry of odor, taste, and vision.

The book can be recommended as an aid to self-study in an area in which not-a-few students find difficulty.

G. W. H. Cheeseman, *Queen Elizabeth College
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High Pressure Technology. Volume I: Equipment Design, Materials and Properties, Volume II: Application and Processes. Edited by IAN L. SPAIN and JAE PAAUWE (University of Maryland). Marcel Dekker, Inc., New York, 1977. Vol I: xx + 608 pp. \$40.00. Vol II: xx + 536 pp. \$35.00.

These volumes are a compilation of chapters by a wide variety of authors covering a broad range of high-pressure activity. The first volume deals largely with high-pressure equipment with just a few chapters on properties at elevated pressures. The second volume consists of a series of applications of high-pressure technology.

As with any work of this type, there are both advantages and disadvantages to having different authors for each chapter. The coordination between chapters is perforce imperfect, there are some duplications and some omissions, and the occasional changes in approach or symbols are mildly disconcerting. The presentation of a series of different viewpoints will probably be welcome to experienced workers in the high-pressure area, those already acquainted with the basic material.

Volume I has essentially the common thread of equipment design, with the emphasis in most chapters tending toward laboratory scale equipment. The safety chapters are interesting but should not be regarded as a complete documentation of the possible hazards of high-pressure work. The equipment chapters help new workers in the field learn the rudiments and provides useful reference materials. The chapters on properties, which are unfortunately brief, serve primarily as a reference source to direct readers to more complete presentations.

Volume II appears to be much better suited for multiple authorship. It does a good job of presenting useful and informative overviews of high-pressure technological applications to a wide variety of industrial processes such as synthesis, polymerization, liquifaction, isostadii processing, etc., plus references to more detailed work. There are also interspersed a few more fundamental chapters on topics such as critical phenomena and phase changes, which, though well done, appear to be more closely related to the property sections of Volume I than to the rest of Volume II.

Overall these volumes provide a reasonably up-to-date overview of high-pressure research techniques and industrial applications not currently available elsewhere in any single work. Despite the variations and omissions cited, they will provide both to novices and to experienced high-pressure workers as a survey and source of further references.

C. A. Eckert, H. G. Drickamer, *University of Illinois*

Smoke, Dust and Haze, By S. K. FRIEDLANDER. John Wiley & Sons, Inc., New York, 1977. xvii + 317 pp. \$16.95.

This reviewer found the textbook arranged in a refreshingly new fashion. Chemical engineering concepts are well presented. The book has several sections on aerosol thermodynamics, including one on chemical thermodynamics overlooked in most previous works of this type. This publication is strong on atmospheric reactions and time rate of change of aerosols including all the factors of particle formation, growth, diffusion, coagulation, and sedimentation as ultimately related to air quality.

Figure titles are unique in that most of them are explanatory discussions and not simply word titles. This may be helpful to some readers. However, the author notes that a background in fluid mechanics and physical chemistry is needed. This reviewer hastens to endorse this requirement and to point out that this is a good, complete, advanced level text.

Dr. Friedlander has included a number of excellent, thought-provoking problems in each chapter and has several good example problems sprinkled throughout. These were of value to me since many of the equations presented are detailed and complex. The worked examples with units are of assistance in deducing some of the symbol meanings. I found the diffusion section particularly interesting, although the complexity of symbols makes for slow reading.

The text deals more with aerosol behavior than with control. However, discussion of some basic collection mechanisms is included. For example, the reader will find more about coagulation than is available elsewhere but will not find coverage of diffusio-phoresis.

I find the book to be carefully assembled and full of useful information with only a few minor inconsistencies. The tables presented are good, but additional data would be useful.

A number of original and new concepts based on literature investigations and the author's personal research are included. These are excellent and serve not only to add credibility to the text, but to advance the field of aerosol science.

My major complaint is in the mechanics of printing. Wiley and other publishers try to reduce costs by using small print and overloading the pages. I prefer more room so I can fill the pages with my notes. The narration often refers to equations simply by number. This is confusing as figures, tables, and sections can have the same numbers. A final comment—the editor claims this to be the "first classroom text on the fundamentals of aerosol behavior", but there have been several books already published that could meet this definition. This book is, however, new and unique and will certainly be valuable in the field of aerosol science.

Howard E. Hesketh, *Southern Illinois University*

Collective Phenomena and the Applications of Physics to Other Fields of Science. Edited by N. A. CHIGIER (University of Sheffield) and E. A. STERN (University of Washington). Brain Research Publications, Inc., Fayetteville, N.Y. 1975. xxvi + 491 pp. \$?

This is the most unique, diverse, and emotionally loaded scientific book I have seen. It ranges in content from a contribution by Nobel Prize Winner A. D. Sakharov on "Spectral Density of the Eigenvalues of the Wave Equation and the Polarization of a Vacuum" to "Computer-Oriented Models as a Conceptual Tool in Applied Sociology" (J. Dabaghian and W. W. Harp) to "A Physical Model of Enzyme Catalysis" by V. M. Fain to "The Concepts 'Law of Nature' and 'State Law in China and Europe'" by Vitaly Rubin to "Entropy, Economics, Physics" by Jacob Marschak to "Scientific Analysis of Soil in Archaeological Research: A Jerusalem Problem". Moreover, it is based on an international seminar which never took place. However, I hasten to add that the papers included have been carefully prepared, before and after that suppressed seminar, by a galaxy of luminous scientific minds.

The alert chemist will find a treasure of useful papers included, such as "Determination of Atomic Structure in Non-Crystalline Biological Systems" (using EXAFS) by E. A. Stern, D. Sayers, and F. Lytle, or "Theory of Reaction with Transfer of the Charge in the Liquid Phase" by no less an authority than Benjamin Levich, or even "Application of Laser Technology to Fluid Dynamics and Combustion" by N. A. Chigier. To people specifically interested in collective phenomena there is "Further Investigation of the Droplet Model of Condensation" by C. Domb or "On the Order Parameter During Transition Through the Critical Point of a Fluid into Vapour" by A. Voronel.

A note of explanation is in order. A group of Russian scientists started a weekly seminar in their own apartments after they were fired from their academic jobs for political reasons (i.e., requesting to emigrate to Israel). This seminar not only kept them scientifically "alive" but actually caused them to develop important interdisciplinary theoretical studies. An example is the work of an informal leader of this seminar, Mark Azbel, on "The Thermodynamics of Language and the Deciphering of Linguistic Texts". The participants of this seminar, together with many Western colleagues, organized an international seminar to be held in Moscow (the place of "localization" of the Russian members) on July 1-5, 1974. The Russian authorities prevented this from happening for reasons known to them. This book is thus evidence of a courageous scientific and human effort which succeeded in transcending the bondage of the human body as well as mind. It is fascinating, educational, important, sad, and amusing.

Raoul Kopelman, *University of Michigan*