of a stable Fe(III) chelate involving the displacement of amide protons from the ligand.

Displacement Stereochemistry and Product-Formation Selectivities in the Solvolysis of Cyclooctyl *p*-Bromobenzenesulfonate [*J. Am. Chem. Soc.* **1982**, *104*, 201]. J. ERIC NORDLANDER,* PHILIP O. OWUOR, DONNA J. CABRAL, and JEROME E. HAKY.

Several of the values for k_{EtOH}/k_{ROH} reported in Table III are imprecise.

The correct values are given below.

Table III (corrected values)

solvent	unrearranged products	rearranged products
80% EtOH, 20% H_2O	0.65	0.65
60% EtOH, 40% TFE	1.34	1.13
50% EtOH, 50% TFE	0.75	0.86
40% EtOH, 60% TFE	0.67	0.64

Propagation of Redox Reaction through a Quinoid Polymer Film on an Electrode [*J. Am. Chem. Soc.* **1982**, *104*, 28]. M. FUKUI, A. KITANI, C. DEGRAND, and L. L. MILLER.*

Captions to Figures 8, 9, 10 were omitted during printing and should be as follows.

Figure 8. Anodic peak currents for electrodes **2** in the presence of 0.2 mM IV. (a) i_p^a for cycle 5 corrected by subtracting i_p^a for cycle 4 and i_p^a for IV on cleaned carbon. (b) i_p^a for cycle 24 corrected by subtracting i_p^a for cycle 25 and i_p^a for IV on cleaned carbon.

Figure 9. Cyclic voltammogram for **2** ($\Gamma_i = 4.8$ nmol cm^{-2}) in the presence of 0.2 mM V.

Figure 10. Cyclic voltammogram for **1** in 40% ethanol–60% water. Electrode prepared by dip-coating from a 0.2% solution.

The MNDOC Method, a Correlated Version of the MNDO Model [*J. Am. Chem. Soc.* **1981**, *103*, 1413]. W. THIEL.

Page 1415, Table IV: E_{el}^A for carbon should read −120.133645 eV. The published results are correct since they are based on the parameter value given above.

Oxidation of Ketals to Orthocarbonates: A Double Baeyer–Villiger Reaction [*J. Am. Chem. Soc.* **1982**, *104*, 1769–1771]. WILLIAM F. BAILEY* and MEI-JUE SHIH.

Page 1770, Table II, third column: $C_7H_{15}OH$ (**14**) is the alcohol produced from **13**.

Oxidation of Mandelic Acid by Fenton's Reagent [*J. Am. Chem. Soc.* **1982**, *104*, 1185]. CHEVES WALLING,* KALYANI AMARNATH, and CURT B. CAMPBELL.

Dr. Curt B. Campbell's name was inadvertently omitted from the list of authors, which should read Cheves Walling,* Kalyani Amarnath, and Curt B. Campbell.

*Book Reviews**

Environmental Management Handbook for the Hydrocarbon Processing Industries. By James D. Wall (Hydrocarbon Processing). Gulf Publishing, Houston, Texas. vi + 227 pp. $16.95.

This is intended to be "a manual of practices and technologies for managers, designers and environmental specialists...". Unfortunately, it falls far short of this goal. The main problem appears to be poor editing. The "manual" is actually a compilation of presentations and articles, most of which date before 1974. The unevenness in the selections is apparent even in the first technical section, on wastewater treatment. An article on activated carbon use is followed by one on powdered carbon. But no comparison is made between the two. This is followed by State-of-the-Art Wastewater Treatment, dated 1970.

There are some good papers. In the section on wastewater, the contributions from Fluor, Exxon, and Dorr-Oliver on activated-sludge-unit design, mutant bacteria, and incineration, respectively, are well-done and useful. In the air pollution control section, the article by National Air Oil Burner on flares and that by ARCO on flue gas desulfurization are professionally prepared and valuable. Exxon's paper on Thermal de-NO_x describes selective reduction of NO_x, giving performance data as well as problems and prospects for its use. The two preceding papers, also dealing with NO_x emission control, are badly dated; catalytic reduction processes have made significant advances since these were written.

The remainder of the book has articles on odor, noise, and spills. They are interesting but not detailed enough for design nor recent enough to show state-of-the-art. An exception is that on use of lead sheathing for noise control.

Overall, this compilation cannot be recommended as either a practical manual or a status report.

Jack Winnick, *Georgia Institute of Technology*

Biogeochemistry of Amino Acids. Edited by P. E. Hare (Geophysical Laboratory, Carnegie Institute of Washington), T. C. Hoering (Geophysical Laboratory, Carnegie Institute of Washington), and K. King, Jr. (Lamont-Doherty Geological Observatory). John Wiley & Sons, New York. 1980. xviii + 558 pp. $56.00.

This book is a collection of 39 papers presented at a conference on the Biogeochemistry of Amino Acids held at Arlie House, Warrenton, Virginia (October 21–November 1, 1978) sponsored by the Carnegie Institute of Washington and the National Science Foundation. It is divided into four sections: I. Distribution and Characterization of Proteins, Peptides and Amino Acids (17 papers); II. Techniques and Methods (4 papers); III. Kinetics and Mechanisms (7 papers); and IV. Applications: Geological, Archeological and Biological (11 papers). Each section is introduced by a short summary written by the editors who, by their high standing in the area of organic geochemistry, are eminently suited to this task.

Of importance to the understanding of amino acid biogeochemistry is the understanding of the preservation of amino acids and their polymers the proteins over geological time. The papers in section I deal with diagenetic changes in protein structure, particularly of collagen, the principal component of vertebrate hard tissue. They also make clear that while the microstructure of fossils may be preserved, chemical changes may be great and contamination is an ever present problem. Such problems are discussed and criteria are suggested that may be of value in overcoming the inherent difficulties associated with diagenetic changes in the amino acid composition of fossils.

The second section is perhaps not very well defined as a distinct section in that many papers in the book describe in some detail the techniques and methods used. Nevertheless, the papers presented are of interest and place in perspective some of the analytical methods of current use in biogeochemistry. The paper by Kvenvolden detailing the findings of a small (13 laboratories) quality control assessment study is of particular interest. The disappointingly high interlaboratory variability observed is of great concern.

A basic understanding of chemical kinetics and reaction mechanisms is essential for an informed approach to resolving the many problems a study of amino acid biogeochemistry raises. The papers of section III are very important to the overall biogeochemical picture in this respect. They particularly illustrate the complex nature of racemization even in the relatively simple and well defined laboratory environment where matrix effects, pH, temperature, metal ion concentrations, leaching, peptide structure, and specie differences are controlled and can be studied individually.

Each of the papers in sections I, II, and III contribute knowledge that is important in pursuing the complexities of applying amino acid racemization rates and diagenetic changes in fossil amino acid composition to geochronology, paleotemperature estimations, and stratigraphic correlations of marine sediments. This is the important subject matter of section IV. It highlights the many problems of making the step from simulated to real geological environments.

The book is a valuable contribution to research in amino acid biogeochemistry. It places in proper perspective the inherent problems

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*Unsigned book reviews are by the Book Review Editor.

associated with the applications of D/L amino acid ratios to geochronology and makes clear that a rigorous phase of research has now been entered which is generating an enormous cross disciplinary research effort.

This book is to be commended for the above reasons and for not compromising on issues which are still in disagreement. Despite some lack of uniformity of presentation (not all papers have abstracts for example) it is recommended as an important reference book for those involved or proposing to enter the area of research into the biogeochemistry of amino acids.

Ken Williams, *St. Vincent's Hospital, Sydney, Australia*

Immobilized Enzymes in Analytical and Clinical Chemistry, Fundamentals and Applications. Volume 56. Chemical Analysis Series. By P. W. Carr and L. D. Bowers (University of Minnesota). John Wiley and Sons, New York. 1980. xvii + 460 pp. $45.00.

The stated purpose of this eight-chapter book is to "serve as a guide and introduction to the area of immobilized enzymes for scientists involved in analysis". The first chapter concerns Basic Enzymology (25 pp) and provides an elementary introduction and definition of terms for analytical chemists unfamiliar with biochemistry and enzymology. Unfortunately, the section on enzyme isolation and purification is poorly done. The subject could have been covered by reference to the classical early volumes of "Methods in Enzymology" (Academic Press). Each chapter ends with a helpful bibliography and some chapters include a glossary of terms. In Chapter 2, Enzyme Kineics (35 pp), an introduction to Michaelis–Menten and Briggs–Haldane models and formulae is presented for simple and complex enzyme substrate systems. Since immobilized enzymes used in analytical systems encounter a myriad of conditions, the authors properly include discussions of the kinetic effects of activators, inhibitors, pH changes, buffer composition, and enzyme concentration variation. A short description of heterogeneous systems of co-immobilized enzymes is noted with ample references for further study. Principles of Kinetic and Equilibrium Methods of Analysis are developed in Chapter 3 (87 pp). After pointing out the major advantages of speed and specificity of enzymes for analytical purposes, the theoretical basis for equilibrium analysis is presented. This method, sometimes referred to as "end-point" analysis, is discussed from a practical point of view and includes a table of minimum reaction times for complete conversion of substrate at various concentrations of substrate relative to the Michaelis constant. Theory and practice of kinetic analysis with enzymes is covered well, with due regard for the realities of measurement variables associated with instrument stability and sensitivity. Nearly half of the chapter catalogs chemical techniques used to visualize the course of enzyme reactions. Spectrophotometric, bioluminescent, amperometric, and potentiometric detection systems are discussed and reviewed. Chapter 4 provides another step on the path to the purpose of the book as the Immobilization of Active Biochemicals is detailed (49 pp). The generally beneficial effect of immobilization on enzyme stability is discussed and the importance of a thorough study of the effects of immobilization on kinetic behavior is emphasized. Techniques of immobilization covered are: adsorption onto a water-insoluble support; gel entrapment; intermolecular crosslinking; and covalent attachment to synthetic and natural supports. The special class of immobilized enzyme reactors coupled to electrodes is covered in Chapter 5 (114 pp), wherein the many combined virtues of enzymes and electrochemical detectors are documented. For instance, Table 5.1 reproduces Clark's summary of 32 enzymes found to be useful in combination with oxygen electrodes for the determination of a wide variety of substrates, including carbohydrates, amino acids, alcohols, carboxylic acids, mono- and diamines, nicotinamide coenzymes, and cholesterol. Tables including 104 examples of enzyme-linked potentiometric or amperometric detectors are available with analysis of characteristics of the detectors and literature references to further details. Drawing on the literature of high-performance liquid chromatography and chemical engineering, the fundamentals of reaction kinetics in flowing systems and mass transfer/diffusion processes in immobilized enzyme reactors are revealed in Chapters 6 (40 pp) and 7 (42 pp), respectively. Finally, Chapter 8 (60 pp) delves into the mystery of theoretical considerations of immobilized enzyme reactors (IMER). Such reactor systems involve a flowing analytical stream that is directed to a detector. Table 8.3 lists 102 examples of IMERs. An example of a commercially important IMER is the glucose detection system of Technicon, in which enzymes are covalently attached to the inside of a nylon tube, whereby the flowing stream reacts to produce a detectable signal. The authors conclude that "the real power of immobilized enzyme based analysis is its low cost and general ease of operation and maintenance ... with increasing availability of commercially prepared instrumentation and immobilized enzyme preparations, the usefulness of these materials should increase". Likewise, the availability of this introductory book should serve as a starting point for research enzymologists, clinical chemists, biochemical engineers, and analytical chemists to better utilize the vast potential of enzymes and immobilized enzymes in solving analytical puzzles in university, industrial, and clinical laboratories.

James E. Willis, *P-L Biochemicals, Inc.*

New Commercial Polymers. 1969–1975. By H.-G Elias (Midland Macromolecular Institute). Translated by M. M. Exner. Gordon and Breach Science Publishers, New York. 1978. xiv + 211 pp. $19.50.

This book was translated from the third (1974) edition of a German original, with amendments when new information became available. It is a compendium of information on "commercial" polymers, defined as those that "went into production or into experimental production or whose commercial sale was announced". Twelve of the fourteen chapters are devoted each to a specific class of polymer, such as saturated carbon chains, polyethers, aramid fibers, sulfur polymers, etc. For each polymer, there is given information on synthesis, properties, applications, proprietary interests, sometimes fabrication, and even a bit of history. The reader can quickly find the essential information about modern and important polymers and can learn, for example, that carboxynitroso rubber is a copolymer of tetrafluoroethylene and trifluoronitrosomethane that may be vulcanized in various ways and has use as a cold-resistant elastomer in aircraft operating in arctic conditions or in space vehicles. References, tables, and structural formulas are plentiful, and an appendix identifying the innumerable acronymic polymer names is a most valuable feature.

Computer Applications in Chemical Engineering: CACE 1979. Edited by W. T. Rippin (ETH, Zürich).

This volume is actually a special issue of the journal "Computers & Chemical Engineering", of which it is Nos. 1–4 of 1979. It consists of the proceedings of the 12th European Symposium on the subject, held in April 1979. The papers range from 1-page abstracts up to articles of as much as 25 pages.

Römmps Chemie Lexikon. Eighth (Revised and Enlarged) Edition. Volumes 1 (A to Cl) and 2 (Cm to G). By O.-A Neumüller. Franckh'sche Verlagshandlung, Postfach 640, 7000-Stuttgart-1, Germany Federal Republic. 1981. Volume 1: 768 pp. Volume 2: 774 pp. DM 195 per volume.

This remarkably useful work deserves to be better known in the English-speaking world; its value transcends the language barrier. It consists of succinct, pithy entries, ranging in size from a line to rarely several pages, arranged in alphabetical order. The subject matter consists of compounds, chemical terms and procedures, apparatus, proper names (including famous chemists, living and dead), prefixes, acronyms, trade names, names of chemical firms (with their products and addresses), etc. The information provided for each is satisfyingly specific, and often includes a key reference. Structural formulas and illustrations are shown where needed. For terms that may be different in German and English, the English equivalent is given.

So many of the terms are identical or very similar in English and German that there is little difficulty in locating a desired subject, and help is provided by cross-indexing. The text of the entries is in German, but is in short, declarative sentences, and can be understood even by readers whose German has become rusty and feeble. This edition is made still easier to understand because it embraces the recent decision of German chemists to revise the spelling of "Äthan" and its derived forms to be the more international "Ethan".

The two volumes that have so far appeared are addicting; the fascination of the information in them almost compels one to browse on and on. Kinds of information only found elsewhere in many different sources are brought together, such that the work serves the purpose of glossary, history, guide to hazards, biographical reference, German-English dictionary, and, even one might say, textbook. A good sampling revealed no anachronism; in fact, the entries are remarkably accurate and up to date. Certain terms that have been borrowed from English are defined in a much narrower way than in English usage; "doping", for example, is described solely in terms of athletics and horse racing, without reference to its meaning in solid-state physics. A rare instance of not being totally up to date appears in the definition of the Fahrenheit temperature scale, which is stated to be still used in the Anglo-Saxon countries, whereas it has been nearly completely superseded in the British Commonwealth. These are very minor matters, however, and do not detract from the overall reliability of the work.

Appropriately for a work that sould see heavy use, the production is of high quality in paper and binding, and the type is very clear.