their results in a book at quarterly intervals, the authors being only named collectively at the beginning. However, he failed to get a majority in favor of the idea. The last two chapters deal with retro-viruses and DNA cloning in *E. coli*. Although these were not his areas of activity, he worked closely beside the researchers involved, and consequently both chapters are interesting.

The book contains a seven-page chronological list of discoveries covering the period 1941–1987. There is a 71-page bibliography, but it is placed after the ten chapters and is not directly linked to their contents. As the citations essentially end with 1990, they do not cover many topics that one would have wished to find. For example, there is no mention of Jeffrey Miller, who achieved the most precise mutant analysis of Lac repressor available up to now. Similarly there is no reference to the work of Richard Ebright, who first showed in detail how the CAP/CRP protein interacts with RNA polymerase. Also there is no discussion of the function of the auxillary operators *lac 02* and *lac 03*.

Thus, the book is very good within the topics that it covers. However, it does not include all the topics that one should know about. Quite a lot is missing, and the reader should be aware of that. Nevertheless, advanced students and researchers in biochemistry should not be discouraged from reading the book thoroughly. The subjects covered are treated very clearly. Leaving aside its omissions, I prefer it to any textbook that I know. I recommend interested scientists to buy it and read it.

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Electrochemical Reactions and Mechanisms in Organic Chemistry. By *James Grimshaw*. Elsevier Science, Amsterdam 2001. 414 pp., hardcover $ 251.50.—ISBN 0-444-72007-3

Organic electrochemistry is an interdisciplinary science in the best sense of the term. It combines the techniques of physical chemistry with the methods of organic synthesis and the study of organic reaction mechanisms, with the aim of preparing new compounds, finding new synthetic routes, or optimizing existing ones. Modern techniques in organic and inorganic chemistry have already moved much closer together, at least for small molecules, so that now it is common to refer to electrochemical studies in both fields as molecular electrochemistry. A very wide variety of molecules can undergo some form of electron transfer at an electrode. Consequently this branch of chemistry is highly relevant for material sciences and life sciences, from fundamental research to large-scale technological applications. For example, electrochemical methods are now extensively used to characterize the redox properties of new compounds.

However, in stark contrast to that, the general level of interest in this area of chemistry is not very high if one looks at the situation in the universities. It only rarely appears in the undergraduate curriculum. When positions for electroorganic specialists become vacant, they tend to be replaced by different specialities. Thus, a concise monograph on organic electrochemistry could have a useful effect in making chemists again more aware of the subject. James Grimshaw of Queen's University, Belfast, who is well known in the field, has now produced such a work: *Electrochemical Reactions and Mechanisms in Organic Chemistry*.

Molecular or organic electrochemistry has two main facets: the first concerned with the synthesis of molecules (which puts the emphasis on the "organic" side), and the second with the elucidation of the reaction mechanisms involved (the more physical chemistry orientated aspect). Ideally, these two should interact closely with each other, but for most electrochemical research groups the focus is mainly on one or the other. In James Grimshaw's book it is the synthetic applications that predominate. The techniques for investigating reaction mechanisms and their fundamental principles are described concisely (perhaps too briefly) in an introductory chapter. It would have been helpful throughout the book, and especially in this chapter, to cite some of the many review articles including the most recent ones, so that the interested reader could have easy access to the original literature when necessary. Unfortunately not all the chapters provide that. For example, the most recent reference given on the use of simulation methods for analyzing cyclic voltammogramms (which provide the experimental data for the quantitative study of reaction mechanisms) is the 1981 book by Dieter Britz. A new edition of that appeared in 1988, but more recently (since 1995) there have been other important reviews of this topic, covering radical advances such as commercial simulation programs, new computational techniques, and ways of describing mechanisms in the formula language familiar to chemists. Here the author has omitted an important part of the toolkit used by the electrochemist working on mechanisms.

The main part of the book is concerned with detailed descriptions of electrochemical syntheses involving the preparation or use of the most important classes of organic compounds (saturated and unsaturated hydrocarbons, halides, arenes, alcohols, amides, amines, carbonyl compounds, and nitro, nitroso, azo, and azoxy compounds). Two chapters fall outside this classification, as they deal with a particular type of reaction: reductive cleavage of bonds. However, that scarcely interferes with the flow of the text. Oxidations and reductions are equally represented. Direct and indirect (i.e., mediated) electrolyses are discussed. For all the reactions described, the mechanisms are discussed very thoroughly, citing experimental evidence from the literature, then their synthetic applications are listed. The importance of the effects of different electrolytes, electrodes, and additives on the progress of reactions is, of course, emphasized, as also are the effects of these factors on selectivity, which can also be greatly influenced by the choice of potential. The text is enlivened by many attractive formula schemes, which also encourage one to thumb through the pages looking for items of interest.

The literature coverage up to the mid-1980s is very comprehensive (at least for those areas of the subject with which I am familiar and which I can easily evaluate). However, some important publications that appeared later have not found their way into the lists of

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references. Also it is annoying that the literature references appear not to have been finally checked by the publishers before going to press. Even a cursory glance through author names and journal titles quickly reveals many careless mistakes. This can have irritating results when one wishes to refer to original publications, especially when it affects volume or page numbers or the year. The index is very brief (less than five pages), but the clear organization of the text offers an alternative approach, at least when one is searching for a particular class of compounds.

Shortly after the publication of James Grimshaw's monograph, there also appeared the fourth, enlarged, edition of *Organic Electrochemistry*, a multiauthor work edited by Lund and Hammerich. It contains almost 1400 pages, and is thus over three times longer than the book reviewed here. Readers wanting a more concise overview of the often neglected field of organic electrosynthesis in just over 400 pages will find Grimshaw's book useful. Electrochemical methods of synthesis offer important advantages in many cases and deserve to be used more often, and therefore it is to be hoped that this monograph focusing mainly on synthetic applications, with its clear structure, easy readability, and avoidance of theoretical ballast, will help to encourage that.

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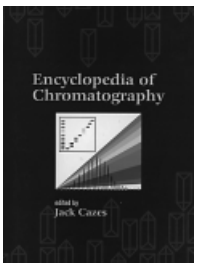
Encyclopedia of Chromatography. Edited by *Jack Cazes*. Marcel Dekker, New York 2001. 952 pp., hardcover $ 250.00.—ISBN 0-8247-0511-4

Chromatography and related methods have played a vital role in solving analytical problems in innumerable areas of science and technology during the 20th century, and will certainly continue to do so in the future. Their importance is now reinforced by the publication of this *Encyclopedia of Chromatography*, a single-volume work which also covers techniques such as field-flow fractionation and capillary electrophoresis. However, the work is not claimed to provide an exhaustive coverage of the field, as is explained in the preface by the editor, Jack Cazes, who has an international reputation in the area of analytical separation techniques through his books and original publications.



The 317 articles in the encyclopedia, occupying 885 pages, are the work of 218 authors, and contain a wealth of information about the theory and practice of analytical separation methods. The contents are not arranged under topic areas or keywords, but appear alphabetically according to the first word of each article, from "Absorbance Detection in Capillary Electrophoresis" to "Zone Dispersion in Field-Flow Fractionation". The articles deal with many different aspects of chromatographic techniques, which range from gas chromatography to HPLC, capillary electrophoresis, affinity chromatography, and exclusion chromatography. Applications in many different fields are described, including biotechnology, pharmacy, environmental sciences, polymer analysis, food science, pathology, toxicology, fossil fuels, and nuclear chemistry. The detailed and wide-ranging information will be of particular value to readers with experience in chromatography who wish to improve or refresh their knowledge of the whole field of separation science.

Unfortunately the articles by different authors and on different topics vary greatly in the depth of treatment and writing style. Some effort by the editor at achieving consistency would have improved the work, although that may be asking too much considering the large number of authors and topics. Nevertheless, the failure to even keep to a consistent set of symbols, and the absence of cross-references within the work, are serious shortcomings in my view. The keyword index fails to compensate for the latter fault, as it often does not list all the articles relating to a particular topic. This makes it difficult to search effectively in the book, leaving it to chance whether one finds the important information that one is seeking. For example, under "band broadening" an article which contains information about band-broadening mechanisms in HPLC is not listed. One would need to know that there was also the possibility of finding something on that topic under "diffusion". Another example: although the Knox equation is mentioned in the article "Efficiency in Chromatography", there is no mention anywhere of its importance in HPLC. Searching under "Knox" in the author index, one is referred to six page numbers, but on looking these up one finds only literature citations. The index does not direct the reader to page 276 in the article "Efficiency in Chromatography", where the Knox equation would be found. The same article also gives the van Deemter equation, but that is not mentioned in the keyword index. Unfortunately these examples are typical of many more. Therefore, the work only appears at its most attractive when one is browsing randomly, being reminded of things that one has forgotten, and at the same time coming across new information.

Suggestions for further reading are given at the end of each article, but these are often articles or books by the same author, or literature that is familiar to the author. These suggestions do not necessarily cover the literature that would provide the most worthwhile extension for the subject. That leads to a further qualification: the work is not very suitable for beginners or for occasional users of chromatographic methods who are looking for an introduction to a particular area of chromatography with relevant literature references. Thus, the encyclopedia is of little value for a group who might have been potential users.

Despite the work's inadequacies, it is a substantial reference source in which readers already experienced in the use of analytical separation methods can find answers to all kinds of questions about chromatography and related techniques. It will be a useful addition to the libraries of laboratories working in this field.

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