What's in a Name

Nomeclature of Organic Compounds. Principles and Practice. 2nd Edition. By *Robert B. Fox* and *Warren H. Powell.* Oxford Univesity Press, Oxford 2001. XVII + 437 pp., hardcover £ 150.00.—ISBN 0-8412-3648-8

The most important factor in the ever increasing area of international and interdisciplinary scientific exchange is, according to the preface of this book, "that the information passed forward is the same as the information received", that is, in the case of a chemical name it must be "unambiguous and understandable for the audience being addressed". With the aim of providing instructions for this, the authors succeed in bridging the gap between IUPAC and *Chemical Abstracts* nomenclature. Although one of the authors was formerly a *Chemical Abstracts* employee, this book does not put the case for a rigorous nomenclature that leads to a single name for a compound, which is imperative for the *Chemical Abstracts* indexes. On the contrary: in most cases several names are presented for a compound, and a distinction between *Chemical Abstracts* and IUPAC nomenclature is regularly made in the text, with the occasional comparison to the former *Beilstein* nomenclature. The advantages of the IUPAC variant, when the authors prefer it, are justified.

In each chapter the reader is provided with an initial detailed explanatory introduction of the acceptable nomenclature procedures. The presentation of the rules is followed by a discussion that includes, amongst other topics, sources of errors, boundaries with other substance classes, as well as, in most cases, additional examples. Finally, there is a reference section to the chapter.

There are four introductory sections in which nomenclature conventions are explained in general terms as well as in terms specific to this book. A historical overview of the development of chemical nomenclature is also included. The third chapter describes the fundamental methods of organic-chemical nomenclature. Particularly well-worth reading is the fourth chapter, which is dedicated exclusively to typical errors, misunderstandings, and pitfalls.

The next chapters are the obligatory ones on the different parent hydrides—acyclic, alicyclic and aromatic hydrocarbons, and compounds with heteroatoms. The various classes of organic-chemical compounds such as acids, aldehydes, ketones, alcohols, as well as phosphorus, sulfur, boron, and organometallic compounds are dealt with in the subsequent eighteen chapters. Synthetic polymers are covered in chapter 29. The book is completed with chapters on radicals and ions, isotopically modified compounds, and particularly important classes of natural products, including amino acids, carbohydrates, and prostaglandins.

It was pleasing to find a 30-page chapter devoted to the specification of configuration. In this chapter a number of carefully selected examples have been painstakingly worked through—also by means of the methods generally used by *Chemical Abstracts* up until 1998 which are unavailable in such detail from other sources. Sadly, the description of racemates has not been included. This exclusion is particularly unfortunate from the standpoint that since 1998 *Chemical Abstracts* no longer differentiate between a racemate and a pure enantiomer of known relative but unknown absolute configuration, although in the case of drugs these are often not equivalent when a single enantiomer or a racemate is administered.

Whilst errors in a book of this size are unavoidable, they are, in this particular volume, few and far between. However, it is rather embarrassing in the chapter on stereoisomers to find the repeated use of putative "enantiomers" in connection with *meso* compounds. This demonstrates that the use of the prefix *rel-* in front of the name of a *meso* compound, such as has recently become the custom in *Chemical Abstracts*, is misleading if not completely nonsensical.

In addition to the table of contents, successful navigation through the extensive material in this well-structured book can be achieved by means of the detailed index. Other useful features include an appendix with a glossary of important terms in nomenclature, an eight-page table of prefixes with their synonyms and linearized formulas, and a table of common endings.

This excitingly written work, as far as chemical nomenclature can be exciting, is heartily recommended to the readers.

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Cross-Coupling Reactions—A Practical Guide. Edited by *Norio Miyaura.* (Series: Topics in Current Chemistry.) Springer Verlag, Berlin 2002. 248 pp., hardcover € 160.00.—ISBN 3-540-42175-0

Transition-metal-catalyzed cross-coupling reactions have become a well established tool of modern synthetic chemistry because of their high efficiency and wide range of applications. However, the impressive pace at which the catalyst systems are developing makes it

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increasingly difficult for the synthetic chemist to keep up-to-date with the many variants of the reactions.

From the title of this latest volume in the series *Topics in Current Chemistry* one can assume that it is a practical handbook on the application of modern cross-coupling reactions. The reader is entitled to expect that the information contained in a "Practical Guide" will indicate which particular reaction is best for a given synthetic task. In order to then carry out the appropriate cross-coupling reaction and to achieve a high yield immediately, the reader also needs a detailed and reliable laboratory recipe, and these should be provided for a wide variety of synthetic applications. Unfortunately, however, on first glancing through the list of contents it becomes clear that the book only deals with a small selection of very new cross-coupling reactions. These are limited to reactions using organoboron, organosilicon, and organotin compounds, C–N and C–O bond-forming reactions, and arylation reactions by activation of C–H bonds. As explained in the introduction, the reason for this choice of topics was to avoid duplicating material in the book *Metal-Catalyzed Cross-Coupling Reactions* published by Wiley-VCH in 1998.

The introduction and Chapters 1–5 that follow have been written by well-known authors with a wealth of practical experience in their specialist fields. It is pleasing to find that the book is very up-to-date: the literature coverage extends to the end of 2000, and in some cases even to 2001.

Chapter 1, by N. Miyaura, is devoted to cross-coupling reactions using organoboron compounds. The author describes the main methods for preparing various organoboron compounds, and discusses their use in cross-coupling reactions, illustrated by examples. Different catalyst systems are described, and the effects of the choice of solvent and base on the reactions are discussed. The many detailed laboratory recipes should be especially useful for the synthetic chemist, making it possible to carry out the reactions described without time-consuming literature searches. Thus, Chapter 1 fully comes up to the promise in the book's title.

In the second chapter T. Hiyama and E. Shirakawa describe the possibilities for using organosilicon compounds in cross-coupling reactions. Many different types of reactions are discussed with the help of examples, nearly always accompanied by a laboratory recipe of a general kind. However, the introductory part, dealing with practical aspects of the reagents and coupling reactions, is perhaps rather too short. Also it would have been useful to give a survey of methods for synthesizing these reagents.

Chapter 3, by F. Fugami and M. Kosugi, is devoted to cross-coupling reactions using tin compounds, and has the advantage of a more detailed introduction. The chapter gives a good overview of the topic. Here too there are many explicit laboratory recipes, providing the user with detailed information about the experimental aspects of any synthesis problem. Both the preparation of organotin compounds and their use in cross-coupling reactions are treated in thorough detail.

Chapter 4 on C–O and C–N bond-forming reactions, by A. R. Muci and S. L. Buchwald, is the longest in the book. It provides the reader with an up-to-date survey of the many types of practical applications of transition-metal-catalyzed aminations and etherification reactions. Unfortunately, the reader will not find it easy to decide from this chapter which of the many catalyst systems described is most suitable for a particular synthesis. However, that difficulty seems unavoidable in view of the nature of the task, and cannot be blamed on the authors. These reactions are of great practical value, and that would have justified including even more laboratory recipes containing explicit details, and comparing them with regard to efficiency and practicability.

The last chapter, by M. Miura and M. Nomura, has the rather awkward title "Direct Arylation via Cleavage of Activated and Unactivated C–H Bonds". It contains a heterogeneous mixture of very interesting cross-coupling reactions, some of which are little known, such as the arylation of phenols and the coupling of arenes with olefins. A reaction of special synthetic importance is the rearrangement of enolates using aryl halides. Unfortunately, however, the synthetically very useful reaction for coupling ester-enolates and aryl halides to yield arylalkane acids, which was published in 2001, is not mentioned here. This chapter is especially well worth reading for catalysis specialists, but is not so useful as a guide for users of cross-coupling reactions, especially since not all the reactions described are supported by laboratory recipes.

To summarize, this book can be thoroughly recommended for all who have an interest in the cross-coupling reactions treated therein and wish to bring their knowledge up to date. It is especially valuable for synthetic chemists who use these reactions or plan to do so. However, the book does not completely fulfill the high expectations raised by the very general wording of the title. As it only deals with a selection of reactions, without mentioning standard methods such as the use of Grignard reagents or organozinc compounds, more space should have been given to comparing the coupling reactions described with other commonly used methods, and discussing the relative advantages and disadvantages. One would expect a work described as a practical handbook to give more guidance on which reagent is likely to be best for a given purpose, and to explain the limitations of the coupling reactions described.

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Stereochemistry. By *David G. Morris.* Royal Society of Chemistry, Cambridge 2001. 170 pp., softcover £ 9.95.—ISBN 0-85404-602-X

This short textbook is primarily directed at undergraduate students of organic chemistry and provides an introduction into organic stereochemistry issues. It is part of the Royal Society's new *Tutorial Chemistry Texts* series, and as such is comparable in both volume and price to Michael Robinson's book *Organic Stereochemistry*, which appeared in 2000 in the established *Oxford Chemistry Primers* series. In light of this, the question as to the need for (yet) another short text on stereochemistry arises, and has to be answered by Morris's book. I did not find a convincing answer. My overall impression is that the