

Digestible Drugs

Pharmaceuticals. Volumes 1–4. Edited by J. L. McGuire. Wiley-VCH, Weinheim 2000. 2315 pp., hardcover DM 1998.00 (ca. 1021 €).—ISBN 3-527-29874-6

If your work involves pharmaceutical agents, and if you like the relevant articles in the highly esteemed *Ullmann's Encyclopedia of Industrial Chemistry* (5th ed.) in its printed version, but do not relish having to make frequent visits to the library, and also do not have two meters of free space on your bookshelves for the 36-volume work, then this new four-volume collection of 45 pharmaceutically orientated articles, edited by J. L. McGuire, which needs only 13.5 cm of space, is the solution to the problem of compressing the information.

More than half of the articles are taken word-for-word from the above "Ullmann's", and therefore the high level of competence of these contributions from the 1980s is beyond question. Most of the authors are experienced specialists from pharmaceutical industry research departments. It is pleasing to note that some of the original authors have taken the time to revise and update their contributions. Several of the topics treated in "Ullmann's" have been re-

written by new authors, and a few others have been newly introduced. All these revisions and additions are also available in the electronically produced 6th edition of "Ullmann's" [<http://www3.interscience.wiley.com:8087>]. The volumes reviewed here contain a selection from the latter in printed form. Therefore readers who prefer to reach for a book rather than navigate through the Worldwide Web, but are uncertain whether to buy the McGuire volumes, have options to sample the contents before deciding. From either the printed or the "on-line" version of the 5th "Ullmann's" edition one can get a very good evaluation, while the electronic 6th "Web" edition provides a precise evaluation.

The contents of the four volumes are arranged under eight main headings. Volume 1 contains ten articles on "Cardiovascular Drugs". Volume 2 contains twelve articles on "Neuropharmaceuticals", six on "Gastrointestinal Drugs", and three on drugs concerned with the "Respiratory Tract". Volume 3 contains five articles on "Antiinfectives" and six on "Endocrine and Metabolic Drugs". Lastly, Volume 4 contains nine articles on the broad field of "Miscellaneous Drugs" and three under the rather vague heading "Related Technology".

Over 100 authors have contributed to the work, which has unavoidably resulted in variations in style of presentation. However, careful editing by the publishers has ensured that these are hardly noticeable, as all the articles follow a clear basic structure. In most of the articles one finds, under the generic names of the most important pharmaceutical agents, information that includes the main synonyms, the Chemical Abstracts Registration Number, the systematic name of the compound, the molecular formula, the molecular mass, some information about applications, the structural formula, and also in some cases a reaction scheme for synthesizing the compound. The literature references

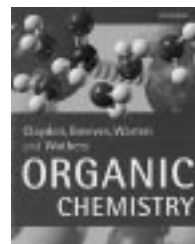
that are given enable the reader to find further information quickly if needed.

One of the main strengths of the work lies in the many articles by relevant experts explaining the biological principles of the pharmacological activity of the compounds, so that a reader with no previous knowledge of a topic is given a start in grasping the basics. For anyone requiring scientifically sound information about pharmaceuticals from a chemical standpoint, carefully presented in book format by specialists, the McGuire volumes provide the appropriate pharmaceutically focussed extracts from "Ullmann's", as an alternative to the well proven encyclopedia in its complete form.

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Organic Chemistry. By Jonathan Clayden, Nick Greeves, Stuart Warren, and Peter Wothers. Oxford University Press, Oxford 2000. 1508 pp., softcover £ 29.99.—ISBN 0-19-850346-6

Organic Chemistry sets out to provide an alternative to the range of undergraduate texts that go by the same name. The authors employ an almost unique sequence for presentation of the classical topics to give the book an edge over its mainstream competitors. The underlying principle is to develop the subject around ideas rather than facts. This seems to work quite well and each chapter starts by indicating what topics will be built upon, what topics will be presented and where these will lead. If the book is read in the



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intended order, the student learns first how to communicate organic chemistry and how structures are determined. Then, using this platform, the properties and reactions of organic compounds are introduced. Throughout this development there is continual expansion and refinement of spectroscopy and physical organic chemistry. The 'Outline' at the start of the book describes the flow of material: Organic structures; the carbonyl functionality; delocalization; pK_a ; organometallic reagents; conjugate addition; NMR; equilibria; rates and mechanisms; stereochemistry; conformational analysis; alkene and arene chemistry; chemoselectivity; retrosynthetic analysis; pericyclic reactions; rearrangement and fragmentation; radical reactions; methods for determining mechanisms; stereoelectronics; heterocycles; asymmetric synthesis; main group chemistry; organometallic chemistry; biological chemistry; polymerization. The book concludes with a chapter entitled "Organic Chemistry Today". This last chapter, which is as much a look at the organic chemistry of the future as the present, is very upbeat.

The style is intended, quite successfully, to be direct and engaging, and this is aided by a colorful layout, unusual photographs, and notes in the margins. At some points the discussion or figures benefit substantially by an element of humor and this, in addition to the friendly, enthusiastic, and informal style of writing, gives the text an appealing and modern feel. For an undergraduate course, the coverage is more than comprehensive. Indeed, the level of detail in some sections is enormous and goes well beyond that encountered in most universities. Consequently it may also prove a useful source-book for introductory postgraduate lectures. Perhaps from personal preferences, I particularly appreciated the permeation of spectroscopy, physical organic chemistry, and organometallic reagents throughout the text. An additional and useful feature is the regular demonstration of how *not* to write structures, mechanisms, etc. Most often this is clearly indicated by a large cross covering the deliberate error.

Despite these very positive attributes, the book does have a range of inconsistencies, idiosyncrasies, and a fussiness that is sometimes irksome. The copy of

the book that I received contained a fairly large number of printing errors. Whether these will be eliminated before general release in 2001 is hard to tell. Some errors, such as missing fragments of text, overprinting, and spurious duplications, were significant enough to substantially corrupt a number of figures. In addition, there are a few chemical errors or ambiguities. For example, the Favorskii rearrangement is introduced and the mechanism neatly distinguished from the benzillic acid rearrangement. However, the preparation of cubane is then given as an example of the synthetic utility of the Favorskii rearrangement—despite the existence of an anti-Bredt enol suggesting that the semi-benzillic mechanism will operate. Other examples include the statements that only $^1\text{H}/^1\text{H}$ isotope effects are large enough to be useful, and that *cis*-2-bromocyclohexanol prefers the equatorial-Br/axial-OH conformer. Additionally, there were errors or ambiguities in the problems (for which a solutions manual is available). For example, we are asked to decide, from a range of reactions, whether the products will be chiral and/or optically active; to explain why the diagram of 7-hydroxynorbornane is stereochemically ambiguous (it isn't); in a Heck-style phenylation reaction of norbornene that leads to *exo*-2-phenyl norbornane a proton is shown at the phenyl-bearing carbon atom (but not at C-3), and we are asked why the formic acid is necessary. However, it is important to remember that it will always be easy to find a scattering of such omissions, ambiguities, or errors in any work of such an enormous size. On the whole, the text is accurate, lucid, informative, and not shy of giving the reader a thorough treatment of the principles and consequences of each topic, as well as relevant examples that are often accompanied by a potted history.

The indexing of the book is not quite adequate, and some of my colleagues found that certain items were missing. For example, *pro-S*, *re*, and *si* are mentioned in the text but not indexed, and kinetic isotope effects are discussed in more than one section but are indexed only to the first occurrence. However, the book also contains an outline section at the front and a fairly detailed contents section, albeit with a few incorrect page

numbers. Despite these aids, given the sheer volume of content it is sometimes hard work to locate a particular topic. There is also a list of abbreviations, which includes rather obscure ones such as SAC (specific acid catalysis), but omits some that are used in the text, e.g., RaNi. Additionally, for a work that contains such a range of advanced topics, a few references to the primary literature would also have been useful. A comment on the physical size of the book: its soft-cover format and ca. 2.5 Kg mass make it very unwieldy to handle when it is not laid out flat on a desk. A two-volume format may be a possible solution.

In summary, those university undergraduates and their teachers who succeed in lifting this heavy tome from the shelves will be rewarded substantially: it is a magnificent resource. With its refreshing style of presentation, I can envisage it being widely adopted as an advanced undergraduate organic chemistry text, but probably not for the entry level courses as the authors had intended. Furthermore, given the length and the level of detail, I somehow doubt that the average undergraduate is likely to read the text from cover to cover. Nonetheless, for the more able and more ambitious students, the book contains plenty of problems (and in many cases well-discussed solutions) as well as a rich collection of background material that is sure to inspire further study.

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Chiral Separation Techniques. A Practical Approach. Edited by Ganapathy Subramanian. Wiley-VCH, Weinheim 2000. 350 pp., hardcover DM 248.00. (ca. 126 €).— ISBN 3-527-29875-4

Chirality as a principle of the architecture of nature has existed from the very beginning. Chemists "discovered" it at a comparatively late stage. If an asymmetric synthesis fails or turns out to be too expensive, chiral separation techniques need to be applied. At the beginning of their contribution to this

book, P. Franco and C. Minguillón state: "The recognition of differences in the pharmacological activity of enantiomeric molecules has created the need to administer them..." And that's how it is.

This book, in its second and completely revised version, addresses modern aspects of chiral separation techniques. It gives a good survey of all relevant chiral separation techniques and presents the current state of the art, which is well documented by numerous examples of synthesis and application. Examples of the optimization and validation of chiral separation complete the book. The ambitious objective of addressing all important aspects of this research area in a well-balanced way has been achieved, a fact which is not surprising in view of the list of contributing authors.

Chiral separation systems are widely used, especially in the pharmaceutical industry. Therefore the comprehensive treatment of preparative-scale chiral separations in this book is well justified, especially as this aspect has been put in second place in too many textbooks. The book also provides information about relevant organizations (FDA, CDER, DIA, EMEA, CPMP, MHW, PSMP, etc.) and legal requirements in the USA, Japan, and the European Union concerning quality standards and management.

Due to the large number of topics that are addressed in a concise form, this book may be regarded as a "macroreview" rather than as a student textbook, offering easy access to the entire subject. The separate topics are treated by experts in independent chapters. An exception to this is the first chapter, which provides a useful survey of the entire area, and is highly suitable even for newcomers. Since this is presented in a rather condensed form, less advanced readers will have to take advantage of the extensive literature cited. The following 12 chapters deal with relevant aspects of enantiomer separation by chromatographic and nonchromatographic techniques. As well as method development, which is exemplified for chiral stationary phases based on macrocyclic glycopeptides, the book devotes equal attention to synthetic and conceptual aspects. Current developments such as membrane technology and imprinting technology, electrophoretic techniques,

supercritical fluid chromatography (SFC), and simulated moving bed (SMB) techniques are presented in an attractive way, supported by references to recent literature (up to 1999). It should be stressed that in addition to these "classical" techniques, modern topics such as combinatorial approaches for chiral recognition, software-directed literature and data searching, and process optimization are also described. Where applicable, this is done within the context of industrially relevant problems. Sufficient references have been added to each chapter, thus providing an excellent survey of both fundamental research and the current state of the art. Layout, figures, and illustrations are of high quality throughout. The index is detailed and comprehensive, and the extensive table of contents affords an additional way of locating topics.

In summary, this book is suitable for both students and advanced readers. The individual chapters are of a high standard, and the contents are well organized, and therefore the work should be part of the library of every scientist interested in chiral separations.

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Organic Synthesis using Transition Metals. (Postgraduate Chemistry Series.) By Rod Bates. Academic Press, Sheffield 2000. 190 pp., hardcover £ 39.00.—ISBN 1-84127-17-1

The adoption of transition metal complexes into organic synthesis as reagents or catalysts has definitely not caused a "gradual silent revolution" among organic chemists, as stated by the author in the preface. On the contrary, during some two decades a real fireworks has been launched with the arsenal of novel methodologies and their application to the synthesis of complex molecules. In the last few years numerous monographs on several topics of transition metal mediated and catalyzed reactions have been published. Nevertheless, it still remains difficult to keep track of the steadily increasing number of publica-

tions in this field. With his book *Organic Synthesis using Transition Metals*, Roderrick Bates addresses in particular organic chemistry graduate students and industrial chemists who are not yet familiar with or working with this thrilling topic. Since a comprehensive treatment of transition metals in organic syntheses obviously cannot be expected in the space of 190 pages, he refers in the introduction to several standard volumes on organometallic and synthetic chemistry that will allow the interested reader to gain a deeper insight into this field.

The book is clearly arranged in 10 chapters, each with a list of relevant references at the end. In the organic transformations discussed the main emphasis is on carbon-carbon bond-forming processes. In the introduction the author takes the reader on a forced ride through the topics of basic organometallic chemistry, considering structures, formalisms (18-electron rule, oxidation number), organometallic elemental reactions, and handling of transition metal complexes. This introduction of only 7 (!) pages is intended to give all the basic knowledge needed for the following chapters. Such an extremely condensed introduction into an unknown field is a serious didactic shortcoming, and due to the absence of concrete examples it will be very difficult to follow for non-specialists. Only the diastereoselective complexation of arenes with chromium-hexacarbonyl is actually introduced with two examples. In all the following chapters the author sticks to his concise style, focusing on the most important issues, but not giving illustrative examples to help the novice.

The general part begins in Chapter 2 with the eminently important class of Pd- and Ni-catalyzed cross-coupling reactions, arranged according to the most important metals and their related named reactions. There then follow chapters on carbonylations and on alkene and alkyne insertion reactions (Heck reactions, domino processes, zirconium and titanium insertion reactions), which are extremely relevant for natural product syntheses. In Chapter 5 electrophilic palladium and iron complexes of alkenes are introduced. The development of catalytic reactions using palladium(II) salts evolved from the Wacker process, as well as various reac-

tions of cationic cyclopentadienyl(dicarbonyl) iron alkene complexes are described with numerous examples. After reactions of alkyne complexes with cobalt (Nicholas reaction, Pauson–Khand cycloaddition), Chapter 7 is dedicated to stoichiometric (Dötz anellation with Fischer's carbene complexes and Tebbe alkenylations) and catalytic (alkene metathesis and rhodium-catalyzed transformations of diazo compounds) applications of carbene complexes in the synthesis of complex, often oligocyclic, structures. Chapter 8 deals with the multifarious palladium-catalyzed allylic alkylations (Tsuji–Trost reaction) with numerous examples. In this context Bäckvall's alternative routes to the central π -allyl palladium species are empha-

sized, as well as cationic iron carbonyl allyl complexes and their synthetic applications. Chapter 9 focuses on the classes of diene, dienyl, and arene π -complexes. Here, amazingly, the author does not mention the significant new developments in the stabilization of benzyl radicals by chromium carbonyl complexation. In the last chapter the author addresses metal-mediated and catalyzed cycloisomerizations, formal cycloadditions, and ene reactions, and thereby impressively demonstrates, with several examples, the great importance of transition metals in organic synthesis.

In all the chapters the author refers to numerous publications from the last few years, extending up to late 1999, thus emphasizing the high level of activity in

this area of research. Unfortunately, in most examples the yields of the key steps are not given. Because of the considerable didactical shortcomings in the extremely brief introduction, the book is not very user-friendly for interested graduate students.

In conclusion, this book gives an interesting snapshot of current developments in the exciting field of transition metals in organic synthesis, and after some didactical revision university teachers may find that it is well suited as an excellent template for advanced lectures.

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