Science of Synthesis, Volume 26: Compounds with Two Carbon–Heteroatom Bonds: Ketones; edited by Janine Cossy; Georg Thieme Verlag: Stuttgart, **2005**, hardcover, 1422 pp, € 2000, ISBN 3-13-118771-9 (RoW) / US$ 2400, ISBN 1-58890-203-X.

By completely reshaping the previous Houben-Weyl series, one of the most classical reference works in organic synthesis, Thieme pursues the highly ambitious goal of publishing a comprehensive critical catalogue of organic transformations. The numbers alone are sufficient to give an idea of the amplitude of the project: in its final form, *Science of Synthesis* should comprise 49 volumes, amounting to over 48000 pages of organic synthesis, divided into six conceptual categories. Volume 26, dedicated to ketones, is part of the section dedicated to compounds with two carbon–heteroatom bonds, and complements volume 25 (Aldehydes, to be published in 2006) and volume 27, dedicated to Heteroatom Analogues of Aldehydes and Ketones (reviewed by F.G. West in *Synthesis* 2005, February issue). The hierarchical organization principle of *Science of Synthesis*, based on the specific functional arrangement to be synthesised, is certainly challenged to its limits by the topic: the status of the ketone group in between that of a final target functionality and a highly flexible synthetic intermediate is prone to highly interwoven and multifaceted interpretation. It is a real accomplishment, therefore, that the authors and editor (mostly from the French-speaking area) managed to apply the powerful product-based concept to give a solid backbone to the topic, making the volume logically organized and easy to navigate.

The 35-pages-heavy table of contents already gives a first glance at the overwhelming amount of information contained in this volume. The first and most consistent part is dedicated to aliphatic and alicyclic ketones (excluding cyclobutanones and cyclopropanones) and comprises, besides a highly informative introductory chapter by Pierre Vogel, ten chapters by seven different contributors, each dealing with a specific synthetic access to this ample chemical class. Each of these chapters is a gold mine of information on specific synthetic transformations, for example oxidation of secondary alcohols and other heterosubstituted alkanes, oxidative cleavage of double bonds, nucleophilic substitution involving acyl derivatives, substitution of the C–H bond of aldehydes, fragmentation and rearrangement reactions, alkylation of ketone enols or enolates, and formation of C–C bonds via enones. As a notable consequence of the product-based organization, each chapter deals only with the one single step that generates the ketone functionality, even when this is a part of a two- or multi-step sequence which would be considered as a unit in the strategy planning of a synthesis. While chapter 6, for example, offers a comprehensive overview of the reconversion of acetals, thioketals, enol ethers, enamines, etc., to the carbonyl function, the alkylation of enamines or the nucleophilic behaviour of acyl anion equivalents are included in other volumes of the series, to minimize the risk of redundancy.

In the second part of the volume, product subclasses of less ample scope are dealt with separately, with occasional indications of the major applications of each subclass in organic synthesis. After two solid chapters by J. Salaün dealing with cyclobutanones and cyclopropanones, three chapters covering α-heterosubstituted ketones offer an excellent, clear and compelling treatment of the syntheses and applications of 1,2-diketones (complemented by a shorter treatment of α-thioxo, α-selenoxo, α-imino and, of course, α-diazo ketones), α,α-diheterosubstituted ketones and α-monoheterosubstituted ketones. The latter chapter is very nicely written and provides, besides extensive explanation of mechanisms, a clear discussion of the scope and limitations of each synthetic method in the context of synthetic planning. α-Fluoro ketones play a much more prominent role in this volume of *Science of Synthesis*, owing to the growing importance of this halogen in bioactive compounds.

The following three chapters deal with conjugated ketones, namely ynones, aromatic ketones and enones. The treatment of aromatic ketones is cleverly limited to reactivity where the presence of the aromatic ring and/or its substituents plays a pivotal role, as well as methods where functionalisation of the aryl ring is dependent on the presence of a conjugated carbonyl function. The chemistry of enones is excellently illustrated by S.P. Marsden, who provides a highly entertaining treatment of this chemical class according to a mechanism-based classification of synthetic access. The last two chapters repeat the organization *per* oxidation states (dihetero- or monohetero-substituted ketones) concerning substitutions at a β or more remote position. The topic is very challenging, since remote functionalities can also be regarded as separate moieties, with a distinct reactivity. The authors do a good job in limiting to the essential, restricting the treatment to those cases where the functionalities influence eachother's reactivity and concentrating especially on non-obvious methods. With such a broad theme, comprehensiveness seems impossible, and the reader misses one or another method, for example the selective mono-reduction of β-diketones. The aldol reaction is also not covered here, since it is planned to be extensively covered in volume 36, dedicated to alcohols.

Volume 26 of *Science of Synthesis* offers a comprehensive, thorough and critical treatment of the most important synthetic accesses to the ketone functionality and an up-to-date review of the synthetic literature in this field (most chapters include references up to the year 2003). Together with the logical structure and the ample keyword index, all the ingredients are set for a first-line reference work which, as the other volumes of the series, should sit on the library shelves of any major research organisation. With an amazing act of balance, the authors and editors have also managed to produce a highly enjoyable didactic reading, which offers the chance to students, academics, and professionals alike to simply open at any page, sit back, and enjoy the ever-fascinating ticking of the synthesis clockwork.

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