The field of organic synthesis has grown tremendously over the past decades. Due to the large number of compound classes and numerous synthetic procedures the individual methods cannot be surveyed any more by a single person. In order to cover the constantly increasing primary literature and to keep track of the development in this area, a large number of review articles, reference series, and electronic databases is available. It often appears difficult to find the most promising synthetic approach by exclusive use of databases. Science of Synthesis in succession to Houben–Weyl Methods of Molecular Transformations occupies a central place among these referencing tools and fills the gap between review articles, reference series, and electronic databases.

The Volumes 40a and 40b are dealing with aliphatic amines and derivatives including 13 product classes. Table 1 in the introduction comprises the compounds covered by both volumes. Product class 1 ‘amino compounds’ occupies the whole Volume 40a, thus covering about two thirds of the content. This product class is divided into seven product subclasses: alkyl- and cycloalkylamines, propargylic amines, allylic amines, n-nitrogen- or n-phosphorus-functionalized alkylamines (n ≥ 2), aziridines, azetidines, and ammonium salts.

Besides the listings in Table 1, the volume comprises three general procedures: (i) N-alkylation of amino compounds (pp. 70–71), (ii) diaminocyclopropanes (pp. 125–126), and (iii) addition reactions of nitriles and azides (pp. 129–130). All these general procedures are not limited to the product class 1 and can be applied to other amino compounds.

The major body of the text consists of synthetic procedures for the compounds of the individual product classes. The synthetic methods do not only cover recent work (in some cases up to 2008), but also older literature including procedures from the predecessor Houben–Weyl. Depending on the applicability of a method, synthetic procedures are given for individual compounds, as typical procedures describing only one example or as general procedures useful for a series of substrates (given in a table). General procedures represented by a long table are especially useful, as they often combine examples from different sources and thus make them comparable. The synthetic procedures provide all information required for reproduction, including typical analytical data (mp, [α]D, and in a few cases IR and 1H NMR data).

Of course, a giant text of this scale does contain some errors and flaws. For example, in the product of the aza-Baylis–Hillman reaction (p. 14, Table 3) a double bond is missing. Scheme 18 (p. 129) does not show a stereoelective reduction as mentioned in the text. The headline of chapter 40.1.1.2.2 (p. 203) should have been ‘nucleophilic substitution of carbon functionalities’, as in most cases the nucleophile is not the solvent. On p. 420, the (R)-enantiomer of compound 10 is shown, but (S)-10 is used in the table. On p. 435 (chapter 40.1.1.5.2) the Mannich reaction and exclusively modern (enantioselective and organocatalytic) procedures of the Mannich reaction are discussed, but classical procedures for Mannich reactions as well as their appropriate references are missing. The text describing the mechanism shown in Scheme 61 (p. 671) should be modified for the last two steps: the addition to the imine is not an S_N2 attack (also true for the text corresponding to Scheme 65 on p. 673) and the final step is not a Michael addition but a usual S_N2 reaction. The headline of Table 10 on p. 790 is wrong: following the classification used in the Baldwin rules (J. Chem. Soc., Chem. Commun. 1976, 734), these cyclizations are 4-exo-tet and not 4-exo-trig ring closures. On p. 1255 in the line below Scheme 5, it should say heterodiaziridines instead of heteradiaziridines.

The present volumes should cover alkylamines, whereas arylamines are covered in Volume 31b [Arene–X (X = N, P)], section 31.28. Although, some overlap between the different volumes appears to be desirable, at some places in the present volumes exclusively arylamine derivatives have been described, see for example product subclass 5 on pp. 1278-1279. However, these few minor mistakes do not at all diminish the highly positive overall impression of the Science of Synthesis Volumes 40a and 40b.

In conclusion, the present Volumes 40a and 40b do not only represent an integral part of the whole Science of Synthesis series but are certainly also of interest as separate reference books for synthetic procedures to alkylamines and derivatives. The excellent and uniform layout found in the whole series has been also applied to these volumes. By their exhaustive coverage of synthetic methods combined with a well-balanced content, up-to-date literature coverage, and a highly logical principle of organization, these volumes become an indispensable tool for synthetic organic chemists in academia and industry. In short, tell your librarian: highly recommended!

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