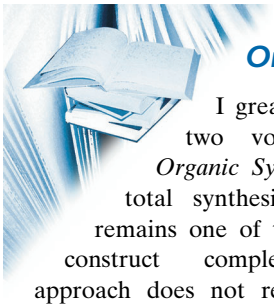

Biomimetic Organic Synthesis

I greatly enjoyed reading the two volumes of *Biomimetic Organic Synthesis*. The biomimetic total synthesis of natural products remains one of the most artful ways to construct complex molecules. This approach does not rely on the brute force of reactive intermediates or reagents, but takes advantage of reaction pathways pre-optimized by nature. In particular, the construction of complex terpenoids or alkaloids is very often only practicable by following potential biomimetic routes, irrespective of whether the hypothetical biomimetic pathway is actually realized in nature or remains purely speculative. Based on this concept, the present two volumes form an outstanding benchmark which presents all the most important biosyntheses and biomimetic syntheses as an inspiration for chemists. This field has a long tradition, but up to now the subject of biomimetic syntheses has only been covered in a fragmented way. Here, all classes of natural products are covered in a manageable yet comprehensive form.

Both volumes treat the biosyntheses on the basis of their mechanistic chemical aspects. That is in contrast to the usual biochemical habit, in which chemical transformations are often described solely by mentioning the converting enzyme, abbreviated by cryptic letters in nice colorful boxes, but without any mechanistic considerations. Here, the biochemical transformations are described in terms of chemical reaction mechanisms. It is pure enjoyment!

The authors divide the vast area of natural products in a very clever way. The first volume covers alkaloids, and the second covers terpenoids, polyketides, polyphenols, and recent developments in biological chemistry and biologically inspired chemistry. At first glance this might give the impression of an unsymmetrical coverage of the topic. However, considering the tremendous structural variety of alkaloids and the complexity of different reaction pathways, one can clearly see that this distribution is absolutely justified. The main chapters are divided into sub-chapters to cover each sub-class of natural products individually. Some of the natural products (e.g., polyketides) are easily divided into distinct groups. On the other hand, the alkaloids cannot be easily partitioned. The authors solve this problem elegantly, by treating the alkaloids based on the origin of their nitrogen. This segmentation allows one to track down natural products of particular interest without having to read through the entire book.

Each chapter begins with a brief historical review, which covers the biosynthesis as well as the chemical knowledge contributions that were pivotal to the biosynthesis. In many cases these chemical contributions are, at the same time, classics of modern organic chemistry, as exemplified by terpenoids and Wagner–Meerwein rearrangements. Based on their mechanistic treatment, the authors have no difficulty in combining classical organic chemistry with biosynthesis. This connection alone already makes the book worth reading.

After the basics have been covered, prominent examples of syntheses of natural products are laid out in detail, and further examples are described schematically. Initially, I had felt that the latter should have been treated in more detail. However, it turned out that I began to like the short coverage at the end of each chapter, since it provides, without being explicitly mentioned, a quiz that is a lot of fun if you try to figure it out on your own (or with friends).

In general, the chapters are constructed in such a way that beginners in organic chemistry can follow the content, while experts will find new aspects and helpful suggestions. These two books make an excellent connection between biosynthesis and total synthesis, and the set is a must for every chemist working in the fields of synthesis or natural products. It simply belongs in every well-kept library.

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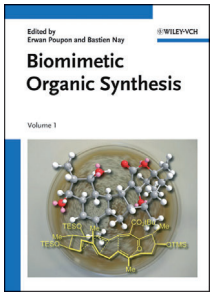

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