

Organic Chemistry Principles in Context

This is an interesting book—although not in the sense of the songs of praise by the many “experts” printed on 4½ pages of the book.

What is the purpose of yet another textbook on organic chemistry? For the author there are two main reasons for a new text. Many of today’s organic textbooks neglect the context in which science takes place, especially the historical context. This deficit has been reprimanded often, usually with the intention of making “science more human” for students, thus increasing their motivation to study the field. The second point concerns the factual richness of modern textbooks. Rather than taking the novice by its hand and explaining complex relationships step-by-step carefully and in depth, modern texts, which often have more than 1000 pages, compile huge amounts of scientific facts and leave the reader alone. This deficit has also been addressed in the past, whether by discussing “case stories” from physical organic chemistry (for example by Peter Sykes) or synthetic organic chemistry (for example by Ian Fleming). Green’s attempt to solve these two problems is much more comprehensive, as he wants to deal with all of organic chemistry in this sense, whereas the older texts have always sacrificed width for depth.

In the reviewer’s opinion, Green has failed in his attempt, or he is forced to accept so many compromises that in the end a book results which would better have the title “Organic Chemistry Principles as I see them”.

The book is also interesting because it marks the transition of a classical organic textbook, which the reader can hold in his hands, to a “dematerialized” internet text. The classical textbook implicitly demanded to be all-embracing and was very cautious with personal comments and own experiences or did not mention them all. The resulting book, was “universal”, a monolith in the literature landscape (this is obvious for Karrer’s classical text, later then for Fieser’s books and the Beyer–Walter textbook in Germany).

This is not the case here anymore. Organic chemistry is that what interests the author most. And this is: cellulose and starch, the spectroscopic methods, the (industrial) production of gasoline, the role of carbocations in life processes, polymer chemistry, and so on—to present just a small selection of the chapter headings. That the formerly frowned-upon pronoun “I” is often used in Green’s book is only consistent with this.

Of course an author can mirror the world in a grain of sand. But—and this, in my view, is the main disadvantage of the text—many concepts of organic

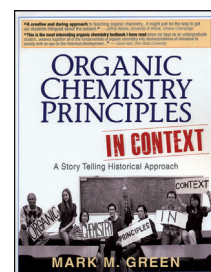
chemistry are introduced ad hoc and “fitted” into a “story” where they are just needed. There is, for example, no separate chapter on stereochemistry and its nomenclature (nomenclature in general is only dealt with very sparingly in the whole text). Only selected stereochemical principles and concepts are introduced where they are needed, for example in carbohydrate chemistry. It is obvious that in these cases the treatment can only be cursory, because otherwise it would disrupt the narrative continuity. Often the reader is consoled to “later”—later in the text or elsewhere. Consequently it comes as no surprise that time and again the text contains “links” to the internet, where one can study a problem in detail “oneself”. If this approach would be extended, the text in the end would “dissolve” itself. Somehow and somewhere everything can be found in the net and the motto could be: Since everything is connected to everything else: look for yourself!

That this approach ruins many excellent pedagogical opportunities is obvious. An example is the halogen addition to olefins, a reaction which is superbly suited to learn the principles of stereochemistry and reaction mechanisms: How do I translate experimental facts into a coherent mechanistic image/metaphor? In the present case this would be the bromonium ion concept. This essential (and crucial!) mechanism is not dealt with in the book at all, but somehow reintroduced through the backdoor by invoking the addition of a “doubly-labeled chlorine molecule” to an olefin, an experiment which—for good reasons—has never been carried out at all.

In the end the reader asks himself what he can carry home, black on white: A few stories? More or less interesting anecdotes about human beings and their behavior? Chemical relationships? True: The reader—not to forget: this is the learning student—is “guided” by the teacher/author in the discussion of a chemical important process such as ester saponification carefully. But often the story becomes so long and verbose that he/she will have difficulties recounting it (and certainly not in an exam!). But this is the main point in teaching: To enable a beginner to express the facts of a matter in his/her own words! Stories must be retold again, not just little anecdotes.

To express it yet again: the book is interesting; that is, one can learn from and through it if one knows organic chemistry already. Those who have worked through a classical text will profit from this book as it presents different points of view on (selected) chemical ideas.

The historical approach has its own severe problems by the way (which are not discussed in Green’s book). History is a science as well, and therefore its “facts” must be checked, doubted, or even rejected, all the time.



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Two examples may suffice to illustrate the problems related to the historical approach. It is obvious that Kekulé does not belong to the heroes of the author, as shown by the story about the concept of the tetracoordinated carbon atom. According to Green this concept dates back to A. S. Couper, who was prevented by Wurtz (the mentor of Couper and a friend of Kekulé) from publishing his ideas quickly enough, so that in the end Kekulé pocketed all the fame. This may well be the case—scoops are a daily occurrence in chemistry. But history as a science must base its conclusions on facts and not, as done here, on unscientific remarks such as “it has been reported” or “it has been called” (both without sources). The reader of these stories is recommended to consult the ground-breaking study *Image and Reality* by Alan Rocke and not be satisfied with the historical toast given here. A second (and not the last) example: About the Nobel laureate Odd Hassel, the book mentions [that he] “spent a couple of years in a Nazi concentration camp”. If one reads Hassel’s biography on the corresponding pages of the Nobel Organization (fortunately there is Wikipedia!) the situation presents itself in a more complicated way. The “historical context” thus acquires an element of arbitrariness—a different author would have written something different, told a different story. Unthinkable for the author of a classical chemistry textbook!

The book is lavishly endowed with portraits of scientists, and this is very much appreciated, although one often asks why certain persons are honored by a picture and others are not.

That there are no textbooks without errors and mistakes is a truism, and this is true for the present text as well. A particularly curious one concerns the (notorious) Kolbe. To the left of his passport-sized portrait he is called Adolf, whereas directly under the picture he is named Adolph. His actual name was Herrmann, at least it is the one of his three Christian names under which he became known.

The book contains numerous exercises and problems. Some of these are quite difficult and require knowledge that is not always given in the running text. Fortunately, the reader can look up the solutions on the web. Personal and subject indices are not separated, and especially the latter is of such poor quality that it is almost useless.

In summary: Green’s book is a very personal presentation of organic chemistry that cannot substitute the reading of a classical “great” textbook.

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