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How to teach chemistry

John Coyle

Essentials of Molecular Photochemistry.

By Andrew Gilbert and Jim Baggott.
Blackwell: 1991. Pp. 538. £17.95, \$44.95.

THE title *Essentials of Molecular Photochemistry* suggests an intentional comparison with Turro's classic text *Modern Molecular Photochemistry*, and certainly there is a similar balance in the two books between organic photochemistry and the physical and theoretical ideas on which to base a good understanding of the reactions. Andrew Gilbert and Jim Baggott have succeeded in producing a text that may well be a standard for this decade. Those academic institutions which offer a substantial undergraduate course in photochemistry should find this book a strong contender for a course text, and where photochemistry is a small component of the course, the book should be on the reading list. There is so much that reinforces other aspects of chemistry, such as models of molecular electronic structure, quantum theory, organic reaction mechanisms and kinetics, and my view is confirmed that photochemistry can be used as an effective teaching vehicle for a substantial portion of what undergraduates are expected to learn about chemistry.

In the second part of the book, the descriptive organic photochemistry is organized according to functional group types — unsaturated carbon systems, carbonyl compounds, aromatic compounds, nitrogen-based systems, other classes, and photo-oxidation as a separate chapter. This is an approach that I have consistently advo-

cated, because it ties in well with the way organic thermal reactions are generally presented, and it makes sense in terms of the theoretical grounding required for each group.

If I do have a general criticism, it is one I would level also at a wide range of organic chemistry texts, not only photochemistry texts. An appreciation and understanding of the chemistry requires some familiarity with one or more theoretical models for describing electronic structure and changes in electronic structure. If the book is read sequentially from the beginning, however, the scientist with an interest in practical science may well lose heart before he gets to the 'real' chemistry after about 200 pages that include the Schrödinger equation, vanishing integrals, perturbation theory, equations for integrated absorption coefficients, Q-switching, Marcus theory, and much more. The premise seems to be that science theory needs to be taught before the practice of science, and my contention would be otherwise. What I would do to redress this somewhat in the current instance, is to whet the reader's appetite with an introductory overview of some important or unusual reactions that can be accomplished photochemically, without theory or explanation at this point. Then the reader might be better motivated to work through the 200 pages deemed necessary to help him appreciate the chemistry better.

I do not expect to change chemistry teaching habits overnight, so my earlier conclusion stands — this is a worthwhile successor to Turro and will serve the organic photochemical community well for several years to come. □

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A complete skeleton of a dimetrodon found in Texas and dated to the Late Permian (about 245 million years before present). One of 1,300 colour photographs to be found in *The Illustrated Encyclopedia of Fossils* by Giovanni Pinna and published by Facts on File, priced at £21.95, \$35.