

Nonetheless this is an interesting book which could, as its editors claim, form the basis for a more comprehensive work. Many could learn and profit from it. For example, it is useful to know that because of its Greek derivation the glassy basic igneous rock should be spelt *tachylyte* not *tachylite*, and entertaining to be informed that the god Hermes is remembered petrologically by a rock of undetermined composition. The book is a pleasure to browse through, but I must confess to a slight disappointment that the long-awaited Tomkeieff *Dictionary* is not a more definitive work than it has turned out to be.

Daniel Barker's *Igneous Rocks* was written for geology students who have had basic courses in chemistry and mineralogy. The book covers a wide range of topics, including phase relations, descriptions and occurrences of the main rock groups, the generation of magmas and the relation of magmas to tectonism. It is well written with good diagrams, though some of the photographs are not too clear, and the reference list of some 600 items is to work which is mainly post-1970. The treatment is extensive rather than intensive, but the book gives a good review of the current state of igneous petrology which will be suitable for second-year undergraduates in Britain and for geology majors in the United States. □

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Organic assembly

John Mann

Organic Synthesis: The Disconnection Approach.

By Stuart Warren.

Wiley: 1983. Pp.391. Hbk £19, \$38; pbk £7.95, \$15.95.

Workbook pp.550, £6.95, \$13.95.

Advanced Organic Chemistry, Part B Reactions and Synthesis, 2nd Edn.

By Francis A. Carey and Richard J. Sundberg.

Plenum: 1983. Pp.650. Hbk \$59.50, £45.80; pbk \$16.95, £13.05.

Alicyclic Chemistry, 2nd Edn.

By F.J. McQuillin and M.S. Baird.

Cambridge University Press: 1983. Pp.225. Hbk £20, \$39.50; pbk £7.95, \$16.95.

THE publishing fraternity is deeply involved in a love affair with organic synthesis, and these three books are but a few of the progeny of the liaison. It seems reasonable to enquire why so many eminent chemists have suddenly chosen to write about their *grand passion*. Financial inducements apart, I suspect it may be because the art of organic synthesis has reached a critical stage in its development. Many chemists wish to take stock, to scan the horizon for new and yet more challenging targets for synthesis, and to contemplate how these may be assembled in ever more elegant ways.

Stuart Warren's book encompasses most of organic synthesis, but from an analytical viewpoint; it represents the first successful attempt to place E.J. Corey's ideas on "retrosynthetic analysis" before a general chemical readership. The basic strategy is to disconnect the target molecule at selected points in order to recognize potential synthetic intermediates. The best disconnections are those that are formally the reverse of synthetic operations, hence the term "retrosynthesis"; but any chemical bond may be broken to provide a novel structure. Often new chemistry must be devised if the actual synthesis is to proceed via such intermediates, and many of the innovations of the past ten years arose out of efforts to execute some of the obscure transformations suggested by retrosynthetic analysis.

Warren has produced an excellent systematic account of the subject. He includes numerous examples, mostly taken from the medicinal, pesticide and perfumery chemistries, thus providing a sense of purpose for the analyses. The information is given in concise packages interspersed with clear illustrations, and the book is in consequence easy to read and comprehend. This text should become essential reading for all chemistry undergraduates, and is excellent value for money. The accompanying workbook has a complementary set of examples, and is

also very reasonably priced for its size.

Many of the recent developments in the methodology of organic synthesis are included in Carey and Sundberg's book. (Part A, which has already appeared in a second edition, covers most areas of organic chemistry apart from synthesis.) During the 1970s there was an explosive growth in this kind of chemistry, and their first edition (1977) came too early to capture but a part of the action. This has now been remedied by substantial coverage of, *inter alia*, the applications of sulphur, selenium and silicon reagents, an expanded treatment of cycloaddition reactions, asymmetric syntheses, and alkylations, and a new chapter on the interconversions of functional groups via nucleophilic displacements. There are literally hundreds of illustrative syntheses, and problems on synthesis, many drawn from the recent research literature, and references are provided for both types.

This is the most comprehensive and up-to-date book on organic synthesis for the advanced undergraduate, and will, I am sure be widely read. However, its sheer weight will preclude casual reading on the train or in the bathtub. There are several other books — such as W. Carruthers's *Modern Methods in Organic Synthesis* (Cambridge University Press, 1978) and R.K. Mackie and D.M. Smith's *Guidebook to Organic Synthesis* (Longman, 1982; for review see *Nature* 302; 189; 1983) — which provide excellent and more lightweight (both in mass and content) alternatives.

In chemical analysis, most targets can be considered as an assembly of rings (and associated functionality), appendages and stereochemistry; in synthesis, formation of the rings is usually the critical part — the right choice of method can establish correct functionality and stereochemistry, as well as the foundations for subsequent appendage application. A thorough understanding of alicyclic chemistry is a prerequisite for those who wish to prepare rings, and the book by McQuillin and Baird seeks to satisfy this need.

Once again there have been numerous advances since the first edition of the book appeared in 1972 — not least, almost the whole of prostaglandin chemistry with its attendant demands on cyclopentane chemistry. This new edition thus contains extra examples of the applications of modern alicyclic chemistry in the synthesis of natural products, though some of these examples are not as relevant as they could have been. Special treatment is also given to Baldwin's rules for cyclization and to the frontier orbital treatment of Diels-Alder reactions, but the classical work on conformational analysis and associated topics is still pre-eminent as it should be. Overall the book provides a useful, if somewhat unexciting, introduction to alicyclic chemistry. □

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