Chemistry

Heterocyclic Compounds with Three- and Four-Membered Rings. Parts 1 and 2. Arnold Weissberger, Ed. Interscience (Wiley), New York, 1964. pt. 1, xii + 646 pp.; pt. 2, xii + 528 pp. Illus. $65.

The contributors to part 1 of this two-volume treatise cover the chemistry of compounds containing three-membered rings: "Ethylene oxides" by A. Rosowsky (523 pp.), "Aziridines" by P. E. Fanta (51 pp.), "Ethylene sulfides" by D. D. Reynolds and D. L. Fields (47 pp.), and "Oxaziranes" by W. D. Emmons (22 pp.). The papers in part 2 treat the four-membered rings: "Thietane and its derivatives" by Y. Etienne, R. Soulas, and H. Lumbroso (81 pp.); "β-Lactones" by Y. Etienne and N. Fischer (155 pp.); "Trimethyleneimines" by J. A. Moore (92 pp.); "Four-membered rings containing two heteroatoms" by W. D. Emmons (5 pp.); and "Oxetanes" by S. Searles, Jr. (85 pp.). These essays include 116 pages of references. There is also an author index (48 pp.) and a subject index (55 pp.).

To price such a work at $65 means that only libraries can afford it, and that should have prompted the editor and publishers to devise ways to lower the cost, in particular to save wasted pages. In the present work these items promoted extra pages: duplication of author index and alphabetized references; use of full hexagons in formulas where C_6H_5 or XC_6H_4 would have sufficed; use of unnecessary bonds in formulas, thereby ultimately requiring extra lines for an equation; too generous spacing around equations; and great empty spaces in tables. The authors did try to curtail their presentations to the extent permitted by citing pre-existing reviews, but, because the goal was full coverage, considerable duplication was inevitable. The viewpoint is commendably critical throughout.

The largest chapter by far, and a very readable one, is Rosowsky's on ethylene oxides. Etienne and Fischer's discussion on β-lactones and ketene dimers is particularly interesting. Unfortunately, the joy of reading every chapter is marred by too many distractions on the printed page. For example, [H] is generally used over the arrow of an equation to portray reduction, but on page 543 it seemingly is used to indicate oxidation. On the same page, aziridine is stated to add to "various alkenes," but no actual alkene is listed in the examples.

Repeatedly, two-word expressions have been written without spacing. The following are typical examples: haloketone (for halo ketone) and, similarly, hydroxyketone, epoxyketone, aminoketone, diazoketone, haloacid, hydroxyacid, thioacid, haloester, aminoester, bromoester, chloroester, cyanoester, iminoalcohol, epoxyalcohol, epoxyether, hydroxyketals, phenylisocyanate, and cyclopentylthiocyanate. Unsuitable terms include *n*-butanethiol (for 1-butanethiol), *tert*-butanol (for *tert*-butyl alcohol), diimidoether for bis(imido ester), 2-butyl for *sec*-butyl or 1-methylpropyl, and phosphorous (p. 547) for phosphorus.

Another error is exemplified by "formate ester" (p. 1039), which should be "formic ester" or simply "formate." Correct usage appears in a few places, as isocyanic ester (p. 804), maleic ester (p. 45), and acetoacetic ester (p. 834); but generally the incorrect style is preponderant. This includes the use of phosphate ester for phosphoric ester, sulfate ester, and sulfite ester; toluenesulfonate ester or tosylate ester for toluenesulfonic ester, phosphonate ester, and carbonate ester; and sulfite salt for sulfurous salt, and thiocyanate salt.

A serious trespass on rules—the disregard of functionality in the selection of names—should be noted. Several amines, amides, alcohols, and ketones were named as hydrocarbons: for example, 1,3-diaminopropane, 2-hydroxynorbornane, 1-acetylcyclohexane. "Arylation" is hardly a suitable term (p. 545) when the "aryl" groups refer only to triazine, purine, pyrimidine, and quinoline. Quite unsupported by rules are the names dichloropentaerythritol (p. 1032) and dicyanobromopentaerythritol; we never say "trichloroglycerol" for 1,2,3-trichloropropane. These are but some of the distractions that I encountered.

In spite of the above criticisms, my general impression is that this is a job well done. Fact and interpretation are well interwoven, and completeness seems to have been achieved. I noted only two serious omissions: (i) the chapter on ethylene oxides contains no mention of epoxy resins or other industrial applications of epoxides, and (ii) in the discussion of trimethyleneimine and β-lactams Ugi's superior synthesis of β-lactams from isocyanides, aldehydes, and β-amino acids is not cited. This work is recent (1960 to 1962), but the chapter does include references to work published in 1963.

The monograph deserves wide reading, not only by workers in these areas but also by organic chemists generally. This follows since the compounds discussed are essentially aliphatic in spite of their heterocyclic classification.

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Nuclear Reactor Technology

Principles of Radiation Protection. G. Eaves. Gordon and Breach, New York, 1964. 185 pp. Illus. $8.25.

This book is one of the Nuclear Reactor Technology Series, edited by J. F. Hill, head of the Post-Graduate Education Centre of Great Britain's Atomic Energy Research Establishment at Harwell. The series is intended to serve as a set of textbooks for general courses in nuclear engineering at technical colleges and for part of the standard reactor course at Harwell. However, the author has not restricted himself to just those topics of interest to reactor engineers and physicists, but has dealt with the subject in a general manner.

Since the treatment is nonmathematical (with the exception of a few places where an illustrative problem is essential to understanding the topic), the book can serve only as an introduction. In his preface the author, G. Eaves, says that the book "is intended mainly for those who wish or need to know something about radiation protection in a general way, either as background to their work, as in the case of the engineer or physicist engaged in work on reactors, or as an easy introduction to the more advanced texts quoted in the bibliography." I think he does achieve this limited objective, but, with the possible exception of the bibliography, the book will be of little help to one who wishes to enter the radiation protection field.

The first chapter provides a general look at biology. Then comes a treatment of the interaction of radiation with matter, after which we have a chapter on radiation damage to biological systems. Chapter 4 is on units and quantities, and chapter 5 covers radiation detection and measurement.