ine and related compounds in the first three chapters, followed by a chapter on 6-hydroxyDOPA. There are then two chapters on 5,6- and 5,7-dihydroxytryptamines as serotonergic toxins. Together with a chapter on MPTP, these contributions seem the most useful and provide a reasonably comprehensive overview of both the chemistry and effects of these neurotoxins.

Perhaps less well-known are the 2-chloroethylamines DSP4 and xylamine, neurotoxins for noradrenergic neurons, and the chemically related ethylcholine aziridinium ion AF64A, as well as a more experimental antineuronal immunotoxin 192 IgG-saporin, the latter two of which specifically lesion cholinergic neurons. The book usefully gathers together in two chapters what is known about these toxins.

A chapter on glutamate and excitatory amino acid toxicity and another on NMDA receptor antagonists, principally PCP and MK801, cover subjects of such complexity that not much more than an overview is presented, but with many useful references to the primary literature.

Four additional chapters describe less specific toxins. One discusses at length the specific and relatively obscure toxicity to the habenula of chronic cocaine and amphetamine administration, while another discusses the neurotoxicity of amphetamine derivatives to dopamine or serotonin neurons. These topics probably appeal to a narrower range of interests than some of the others.

More speculative and much less useful (but intriguing) is a chapter that discusses the possibility that haloperidol-derived pyridinium metabolites may possess clinical relevance with respect to tardive dyskinesia. While the topic is interesting, whether or not these metabolites are actually important in the etiology of TD cannot be concluded from present data, and this chapter seems out of place in the context of the others.

A final brief chapter discusses "toxic vanilloids". Primary sensory neurons are destroyed by neonatal capsaicin administration (at least in rats), which has no toxic consequence if given to the adult. Except for that fact, it is not clear why this chapter was included.

This book will be of general interest to neuroscientists and neurotoxicologists. While it does not provide actual methodology, it is loaded with secondary references that will guide to the relevant literature any investigator wishing to incorporate brain lesions into his/her experimental paradigms. The book will be of specific interest to neuroscientists who are embarking on the study of any of a variety of neurodegenerative processes and who wish to gain appreciation of the effect of lesions in particular brain areas.

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Pharmacologic Analysis of Drug−Receptor Interaction. By Terry Kenakin. Lippincott-Raven Publishers, Philadelphia. 1997. xii + 491 pp. 16 × 24 cm. ISBN 0-397-51815-3. $99.00.

This third edition contains 13 chapters that present a number of important pharmacological aspects of drug−receptor interactions. It begins with a very basic set of definitions, including drugs and receptors, and discusses various theories and models of drug−receptor interactions. It next focuses on seven-transmembrane receptors and the involvement of G-proteins.

In the third chapter such terms as agonist, partial agonist, antagonist, and inverse agonist are illustrated. Human recombinant receptor systems are discussed, along with the fidelity of the signals. Response quantification with dose−response curves is illustrated liberally throughout the book. Discussions are presented concerning how drugs arrive at sites for activation or inhibition of receptors. The all-important topics of affinity and efficacy are given full chapters in the book. The means by which drug molecules can bind and interact on a receptor surface are discussed and are nicely illustrated with schematic drawings and with dose−response curves. Some of the useful techniques for studying kinetics of drug action are discussed in the final chapter.

The book provides an in-depth discussion of how receptors have their own innate behaviors and how they interact with membranes and ligands. The book is well-referenced and has a very useful subject index; the index provides indicators on tables and figures. The book gives valuable insights as to how ligands can interact with receptors and produce different types of dose−response curves. The choice of receptor system to be used depends upon what information is desired; theoretical advantages are discussed. This text should be especially useful for pharmacologists, cell biologists, and physiologists.

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Combinatorial Chemistry, Synthesis and Application. Edited by S. R. Wilson and A. W. Czarnik. John Wiley & Sons, Inc., New York. 1997. ix + 269 pp. 16 × 24 cm. ISBN 0-471-12687. $69.95.

There have been several recent reviews describing many aspects of the technique known as combinatorial chemistry. This book has a different feel in that it does not tabulate long lists of solid-support resins with examples of where they have been used, nor did it list all of the references to date summarizing all of the known solid- and/or solution-phase syntheses that have been described. Via 12 chapters written by academic and industrial scientists (mostly about their own experiences), this book presents an excellent perspective on most of the key aspects of this field. Each chapter is very well-written and shows detailed diagrams of lab equipment, synthetic schemes, and concepts.

The application of combinatorial chemistry is a function of technique and data analysis. With a few exceptions where detailed experimental sections are written,

each chapter describes relevant techniques in a highly conceptual style. Moreover, representative analytical data are shown (i.e., mass spectral results, HPLC data, etc.) in several of the chapters together with a discussion of the interpretation. This style of authorship makes the text ideal for both newcomers to the field and seasoned practioners who might be interested in methods their peers are using. This is precisely the goal of the book as stated in the preface written by the two editors.

Through the course of the book's 12 chapters, many subjects are presented, but the focus is non-peptide synthesis. At least four of the chapters focus on solid-phase synthetic procedures. This includes some discussion about resin capture and solid-supported reagents. There are also several chapters describing solution-phase techniques, including the preparation of peptides, peptide mimetics, multicomponent condensation reactions, and polyfunctionalized core molecules. The final chapter of the book provides an overview of techniques associated with using biological systems to create and assay libraries. Although these techniques are not typically practiced by chemists, the chapter does describe phage display and related methods for peptide library generation and screening which are biological complements to the chemistry parts.

This book is well-done and timely. The style is useful, and it represents a broad collection of practical experience and ideas. The chapters are well-referenced, and there is an appropriate index. At a cost of approximately 25¢ per page, it is a good investment for anyone working in the area, or planning to do so. Moreover, because of the style and content, it might be a very appropriate text for a graduate special topics course.

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Second Supplements to the Second Edition of *Rodd's Chemistry of Carbon Compounds*. Volume IV: Heterocyclic Compounds. Part A: Three-, Four- and Five-Membered Monoheterocyclic Compounds. Edited by M. Sainsbury. Elsevier, Amsterdam. 1997. xxvi + 704 pp. 15.5 × 23 cm. ISBN-0-444-827366. $457.00.

This second supplement volume to the second edition of *Rodd's Chemistry of Carbon Compounds* updates reviews of three-, four-, and five-membered heterocycles published in a first supplement in 1984. These topics were covered, both in the second edition and in its first supplement, in six chapters written by a single author, R. Livingstone. The chapter headings in the second supplement follow the same format employed in the second edition and first supplement, except that Chapter 1 (which covered three- and four-membered monoheterocyclic compounds) has been subdivided into seven different subchapters (Chapters 1a−1g) each written by a different author. In his preface, the editor (M. Sainsbury) justifies the decision to subdivide Chapter 1 with the following statement: "In this way individual authors were able to concentrate upon single areas and even out what would have otherwise been too demanding a task for an individual author." The new subchapters in the second supplement thus become Chapter 1a, Oxiranes, Thiiranes and Seleniranes (by J. Kamal); Chapter 1b, Azirines and Aziridines (by D. E. Ewing); Chapter 1c, Three-Membered Rings with Two Heteroatoms (by E. Schmitz); Chapter 1d, Four-Membered Rings with One Oxygen, Sulfur or Selenium Atom (by E. Block and R. J. Linderman); Chapter 1e, Four-Membered Rings Containing a Single Nitrogen Atom (by T. Javed); Chapter 1f, Four-Membered Rings Containing a Single Heteroatom other than Oxygen, Sulfur, Selenium, Tellurium or Nitrogen (by D. W. Allen); and Chapter 1g, Four-Membered Rings Containing Two or Three Heteroatoms (by A. T. Hewson). Progress in the synthesis and reactions of furans, benzofurans, isobenzofurans, and their reduced forms is reviewed in Chapter 2 by T. D. Hurst, and advances in the chemistry of thiophenes, hydrothiophenes, benzothiophenes, and related compounds are detailed in Chapter 3 by K. J. Hale and S. Manaviazar. Chapter 4 (by A. V. Patel and T. A. Crabb) covers advances in the synthesis and reactions of pyrroles, pyrrolines, and pyrrolidines. Progress in the synthesis and reactions of indoles, isindoles, reduced derivatives, and carbazoles is reviewed by J. A. Joule in Chapter 5. The final chapter of Part A (by M. Scobie) reviews the chemistry and properties of five-membered heterocycles containing a single heteroatom other than oxygen, nitrogen, or sulfur, namely, boron, silicon, germanium, tin, phosphorus, arsenic, antimony, bismuth, selenium, tellurium, and a few miscellaneous elements (such as magnesium and zirconium). Each chapter is a concise, readable, and informative review. Key literature citations and important reviews are provided to guide the reader to additional information on each topic. A comprehensive subject index for the entire volume is included.

Organic and medicinal chemists interested in the properties, synthesis, and reactions of heterocyclic compounds should derive considerable benefit from consulting this volume. Library access to this supplement together with the complete series of *Rodd's Chemistry of Carbon Compounds* is highly recommended.

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Second Supplements to the Second Edition of *Rodd's Chemistry of Carbon Compounds*. Volume IV: Heterocyclic Compounds. Parb B: Five-Membered Monoheterocyclic Compounds: Alka-