according to general procedure H followed by chromatography on silica gel with toluene–ethyl acetate produced gummy **64**.

2-[(Trityloxy)methyl]-5-(pivaloyloxy)-4-pyrone (68). A mixture of 0.188 g of **59** and 0.232 g of trityl chloride in 10 mL of pyridine was refluxed for 4 days. Most of pyridine was blown off under nitrogen stream and the residue was treated with water and toluene. The organic layer was dried ($MgSO_4$), absorbed on a Florisil column, and eluted with toluene. After a small amount of triphenylcarbinol, the desired **68** was eluted. Recrystallization from ethyl acetate–cyclohexane produced 0.170 g of **68**.

Book Reviews

Modern Biological Theories of Aging. Vol. 31 of Aging. Edited by Hobert R. Warner, Robert N. Butler, Richard L. Sprott, Edward L. Schneider. Raven, New York. 1987. xviii + 324 pp. 16 × 24 cm. ISBN 0-88167-310-2. $69.50.

Aging is inevitable; it starts the minute one is born. The first 30 years of life involve physiological development, the remainder covers decline. This slowing down of hundreds of functions may proceed fast or gradually. According to the best estimates, the upper life expectancy for humans is 115 years (including Methusaleh in whose days years were not clearly defined) and for laboratory mutant mice, less than 10 years. Medicinal chemists might be able to flatten the curve of aging to a more gradual slope and to make it end in a whisper rather than a tortuous terminal ordeal.

The book under discussion represents the results of a conference on aging by the National Institute on Aging. It lists advances in theories of such topics as senility, Alzheimer's disease, recognized changes in neuroendocrine substances, genetic materials, and components of "normal" organs, especially hepatic tissues. Twenty-seven contributors have labored to offer a comprehensive picture of the present stage of research on aging. There are six symposia: evolution of life span in placental mammals; developmentally programmed aging; free radical damage; error catastrophe; DNA damage and repair; and organ systems as pacemakers of aging. Each of these symposia is introduced with an overview of the discussions and summarized at the end.

The individual papers open up a pandora box of new vistas, new observations, and importantly, the shelving of some concepts which, only a decade ago, were regarded as gospel. The error catastrophe theory is one example of such changes in research emphasis. Medicinal scientists could dip into reservoirs of compounds left over from anti-irradiation drug research and submit them as free radical inhibitors in tests that bear on aging. This is at present the area most amenable to drug research, but there is a question whether it will remain pertinent to the problem of aging. Those of us in the upper brackets of statistical life expectancy who are struggling with restrictive diets and with exercise should program our souls to look down from the stratosphere, or up from the interior of earth's hot magma, and watch with interest where the next volumes in this series will take us.

Department of Chemistry **Alfred Burger**
University of Virginia
Charlottesville, Virginia 22901

Pharmazeutische Wirkstoffe. Synthesen, Patente, Anwendungen. Supplementary Volume 1982–1987. A. Kleeman and J. Engel. Georg Thieme Verlag, Stuttgart and New York. 1987. viii + 288 pp. 17 × 24 cm. ISBN 3-13-701301-1. DM 178.

This is a catalog of new and old drugs. For each of them is listed a brief therapeutic application, similar to entries in the much more comprehensive *Merck Index*. Then follow extensive synthetic schemes with ample structures, formulas, and references. Proprietary names are given according to the countries where applicable, especially France, Germany, Italy, Britain, Japan, and U.S.A. There are indexes of all the drugs in the volume and their synthetic intermediates and indexes according to medicinal indications and trade names.

The most valuable feature of this register is the listing of synthetic methods leading to the drugs. There are strange bedfellows: besides many exotic agents with unfamiliar generic names, there are phenolphthalein, primaquin, proguanil, inositol, methylene blue, khellin, chlorthalidon, eucalyptol, benzyl alcohol, L-aspartic acid, and dozens of other old and even ancient standby's that have been known for decades. An instructive insight is gained from inspecting the proprietary names. It demonstrates how few of the world's medicinal agents have been approved in the U.S.A.

Users of the *Merck Index* who can read German will find this volume a welcome more international compilation of some drugs and their chemical accessibility.

Department of Chemistry **Alfred Burger**
University of Virginia
Charlottesville, Virginia 22901

Stereoselective Synthesis. By Mihály Nógrádi. VCH, Weinheim, FRG, and New York, NY. 1987. xiv + 356 pp. 17 × 24 cm. ISBN 0-89573-494-X. $93.00.

This book, which uses the term "stereoselective" (rather than the more nebulous "asymmetric") synthesis in the title, deals with the subject in eight chapters comprising 1381 references, covering the literature through 1984. Most of the references postdate the previous comprehensive treatise of the subject by J. D. Morrison and H. S. Mosher (1971). Some of the material in the five major chapters—Stereoselective Catalytic Reduction, Stereoselective Non-Catalytic Reduction, Stereoselective Carbon–Carbon Bond Forming Reactions by Nucleophilic Addition to Carbonyl Groups, Stereoselective Carbon–Carbon Bond Forming Reactions, Stereoselective Carbon–Carbon Bond Formation by Pericyclic Reactions—has, however, been summarized elsewhere, notably in the five-volume treatise edited by J. D. Morrison (1983–1985).

There are a few surprising omissions of general references e.g. (in the introductory chapter on General Concepts of Stereoselective Synthesis) of the excellent review by J. Seeman, *Chem. Rev.* **1983**, *83*, 83 and of the review on prochirality (heterotopism) by E. L. Eliel, *Top. Curr. Chem.* **1982**, *105*, 1. Perusal of these reviews might have led to a less superficial treatment of the Curtin–Hammett principle and might have avoided two somewhat serious errors in dealing with prochirality, which is confused with heterotopicity on p 13; on the same page, the Prelog–Helmchen Re/Si nomenclature is mistakenly equated to the Hanson *pro-R*/*pro-S* designation.

The book is handsomely laid out, written in excellent and clear English, and relatively free of misprints except in a few names (Wittig's name is repeatedly misspelled in Chapter 7). There are, however, a number of errors in the diagrams; this reviewer has the misfortune that both the structure of the chiral auxiliary used in a stereoselective synthesis devised by him (structure **17** in Figure 5-5) and the table referring to the synthesis (Table 5-3, allyl instead of vinyl) are mistaken. Anyone using the information in this book should, as always, check the original source!

There is an adequate subject index and, interestingly, a table of the cost, on a molar basis, of 71 frequently used chiral auxiliaries relative to (+)-tartaric acid taken as unity.

Most of the examples in the book relate to enantioselective synthesis; diastereoselective reactions are, in general, dealt with only as they ultimately lead to optically active products for, according to the author (p 131) "the most important aspects of

this subject (diastereoselective synthesis) have already been assimilated by the chemical community".

The book deals with a subject of substantial current interest in a comprehensive fashion and for this reason alone and, despite the minor shortcomings mentioned above and its rather high price, deserves to be included in industrial as well as academic libraries serving organic chemists. The extensive material in the volume should prove particularly useful to anyone involved in synthetic chemistry or teaching a course in organic synthesis.

Department of Chemistry **Ernest L. Eliel**
CB# 3290 Venable & Kenan Labs.
University of North Carolina
Chapel Hill, North Carolina 27599-3290

Neurotoxins and Their Pharmacological Implications. Edited by Peter Jenner. Raven, New York. 1987. xv + 297 pp. 16 × 24 cm. ISBN 0-88167-335-g. $45.00.

This book represents the Proceedings of a Symposium which was held in London in April 1986. There are 17 individual chapters, all by well-known and prominent scientists. These individual chapters are generally well written, current, and informative. Four major headings include Site directed neurotoxicity, Neurotoxins as probes for ion channels, MPTP-induced Parkinsonism, and Clinical and pharmacological applications for neurotoxins. In this volume there is considerable emphasis placed on the mechanism of action of several neurotoxins, both exogenous and endogenous. There is also a considerable effort directed at the use of pharmacological agents to interfere with the neurotoxic processes and on the use of neurotoxins to increase our understanding of the functions of the nervous system and on the processes which underlie neurodegenerative diseases such as Parkinson's disease and Huntington's disease. There is considerable emphasis placed on various aspects of the dopaminergic neurotoxin MPTP, the administration of which leads to widely used animal models of Parkinsonism. This emphasis on MPTP is perhaps not surprising in that the editor has worked extensively in research related to Parkinson's disease and the use of MPTP.

This book should be valuable to the expert or nonexpert who wishes to have a broadly based book which deals with several different neurotoxins. It provides an excellent source for recent literature and thus should be particularly useful for graduate students, nonexperts, or those who do not specialize in research with neurotoxins. It represents an excellent first place to go for important information. One negative comment, which in no way detracts from its overall usefulness, is that since the book covers research with so many individual toxins, combined with its relatively short length, it covers no individual neurotoxin in real depth. However, this book, together with other more detailed and more specialized and in-depth works, should be a valuable addition to one's personal library.

UMDNJ **Richard E. Heikkila**
Robert Wood Johnson Medical School
Piscataway, New Jersey 08854-5635

Annual Reports in Organic Synthesis—1986. Edited by Eric F. V. Scriven and Kenneth Turnbull. Academic, New York. 1987. xiv + 456 pp. 15 × 23 cm. ISBN 0-12-040817-1. $39.00.

Those familiar with this series will know it as a set of convenient, contemporary assemblies of useful synthetic methods which deserves its place on the laboratory desk shelf of the practitioner of organic synthesis. The volume for 1986 is no exception. A well-arranged table of contents precedes the abstracts themselves, which are arranged for maximum information content in small spaces. Structures are informative and references abundant, ranging over 45 of the most important primary journals.

More than half of the book is taken up with carbon–carbon bond forming reactions. Current emphases on radical-mediated processes and bond formations using organometallic reagents are reflected in this section, which can serve as an informative summary of current synthetic thinking in this area. The sections on oxidation, reduction, and protection are likewise useful. Two sections of this book which I have found especially interesting and helpful are that on heterocyclic synthesis and the listing of protective groups.

Like its predecessors in this series, this book represents excellent value and high potential usefulness in the laboratory. Incidentally, for academic readers it is also a good source of mechanism problems!

Northeastern University **Philip W. Le Quesne**
Boston, Massachusetts 02115

Books of Interest

Cell Commitment and Differentiation. Norman Maclean. Cambridge University Press, New York. 1987. x + 244 pp. 19 × 25 cm. 0-521-30884-4. $69.50.

Chemotherapy of Tropical Diseases. M. Hooper. Wiley, New York. 1987. x + 244 pp. 16 × 24 cm. 0-471-91241-7. $61.95.