Progress in Heterocyclic Chemistry, Volume 11. By G.W. Gribble, T.L. Gilchrist. Elsevier: Amsterdam, 1999, 358 pp, hardback, $ 150. ISBN 0-08-043407-X.

The intention of the current volume, which is the eleventh in the series, is to present a critical review of the 1998 literature in the field of heterocyclic chemistry.

Three specialised reviews covering Tröger's Base (M. Demeunynck and A. Tatibouët), the reaction of metalated heterocycles with carbonyl compounds (P. Merino) and nucleophilic substitution chemistry on the five-membered ring of the indole system (J. Joule) must be considered stimulating for the readers interested in the relative fields.

The following two chapters give a concise overview of recent literature on three-membered- (epoxides and aziridines) and four-membered- (nitrogen, oxygen, sulfur, silicon and phosphorus containing) heterocycles, including a review on advances in the synthesis of β-lactams by J. Parrick and L.K. Mehts.

In the chapter by A. Padua and S.S. Murphree on the three-membered ring species, special emphasis has been given to the synthesis of chiral dioxiranes using chiral (salen) complexes of manganese(III) which are of importance in the preparation of enantiomerically pure compounds.

Chapter 5 systematically describes the synthesis of five-membered heterocycles and is divided into seven different sections according the nature and the number of heteroatoms present in the ring. In Section 1, E.T.Pelkey deals with five-membered systems containing thiophene and its analogues(Se, Te); Section 2 by D.M. Ketcha deals with pyrroles and benzo derivatives; Section 3 contributed by S.Greve and W. Friedrichsen covers furans and benzofurans; Section 4 by K. Turnbull describes advances in heterocycles containing more than one nitrogen atom; Section 5 by P.A. Bradley and D.J. Wilkin reports recent work in the chemistry of five-membered ring systems containing nitrogen and sulfur or selenium atoms; five-membered heterocycles containing oxygen and sulfur (Se, or Te) atom are covered in Section 6 by A.R. Aitken and N.J. Wilson and the final section by G.V. Boyd deals with 5-membered rings containing oxygen and nitrogen atoms.

The subdivision of this chapter makes it very easy for even a novice to hetercocylic chemistry to search for recent references on compounds of a particular class. The same editing philosophy has been followed in the review of the recent literature on six-membered ring systems which is covered in Chapter 6. This chapter has been divided into four sections the first of which deals with pyridine and its benzo derivatives (Larsen, R.D. and Davies, I.W.). The diazines and their corresponding benzo derivatives (Groziak, M.P.) and the triazines, tetrazines and polyaza system (Ochoa, C. and Goya, P.) are covered in the second and third sections, respectively while six-membered ring systems containing oxygen and sulfur atoms (Hepworth, J.D. and Heron, R.M.) are dealt with in the final part of this chapter.

Seven- eight and larger ring heterocycles are reported in Chapters 7 and 8 by D.L. LeCount and G.R. Newkome, respectively.

The authors have done an excellent job of summarizing the progress in heterocyclic chemistry for the papers they have chosen. In line with the increasing interest in combinatorial synthesis, the reader may find many references dealing with this field as well as a lot of information regarding the application and/or preparation of oligomeric thiophene products.

One minor drawback of this volume is the method used for citation of the references. It is felt that a more traditional method would have made finding desired references somewhat easier. However, this minor gripe aside, it is the hope of this reader that this valued series will continue for many years since it has been proved useful to researchers alrady working in the field and others embarking on projects in this area.

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Article Identifier:
1437-210X,E,2000,0,08,1186,1186,ftx,en;B10800SS

Protective Groups in Organic Synthesis. 3rd Edition. By Theodora W. Greene and Peter G. M. Wuts.Wiley: New York, 1999, 779 pp, hardback, £ 58.50. ISBN 0-471-16019-9.

Greene and Wuts's *Protective Groups in Organic Synthesis*, whose first edition was published in 1981 and the second edition in 1991, has gained fame as an authoritative and indispensable reference tool for practitioners of organic synthesis. The third edition retains the spirit and skeleton of the previous editions but greatly expands the contents.

The spirit of this book is to be exhaustive in coverage. The protection of hydroxyls (including 1, 2 and 1, 3 diols), carboxyls (even covering sulfonic acids and boronic acids), phenols (including catechols), carbonyls, amines (including imidazoles, pyrroles, and indoles), thiols, alkyne C-H, and phosphates are covered; the latter two are newly added to the third edition. The list of protective groups as well as the conditions for their introduction and removal also seems complete. For example, listed under acetate ester protection for hydroxyls are 31 methods for formation, 23 methods for cleavage, and 77 references; nearby, triphenylmethoxyacetate ester is listed which has appeared only once in literature. In total, the third edition of this book includes 1054 protective groups and 5349 references, of which 348 protective groups and 2349 references are new-

ly introduced. The references cover through the end of 1997.

This formidably large amount of materials is compiled through a clear skeleton. The book, totally 779 pages, begins with a succinct introductory chapter (16 pages) and ends up with a complementary chapter (47 pages), where the reactivities of the most common protected functionalities to 108 prototype reagents are grouped in charts. The first chapter is slightly modified and the last chapter remains unchanged since the publication of the first edition. The other 9 chapters are organized by functional groups to be protected. Naturally, the chapter for protection of the hydroxyl groups forms the largest chapter which extends to 228 pages; while the chapter for the protection of the alkyne C-H covers only 6 pages. Each chapter begins with a list of the protective groups which are arranged in order of increasing complexity of structure. For each protective group are provided the methods of formation, then the methods of cleavage, finally the references. Efforts have been made to place the more important methods first, to provide a couple of sentences on the scope or limitation of the methods, and to cite the most recent references. Some 600 graphic schemes make the book readable and a visual pleasure. Many of the graphic examples show protection or deprotection on multifunctional substrates, that provides additional information on the selectivity of these protective manipulations.

Protective group chemistry, mechanistically, looks simple, involves dominantly the formation and cleavage of ether, ester, acetal, ketal, and their sulfur or nitrogen counterparts. But practically, protective group chemistry is subtle, which is highly dependent on the individual substrate. Practitioners have to make many, sometimes exhaustive, tries on the protection and deprotection of their molecules. That is why so many protective groups and methods have emerged. And that is why "to be exhaustive in coverage" makes this book an indispensable benchtop tool to all practitioners in organic synthesis. Besides, the overview on protective groups provided by the first and last chapter together with the brief comments on the individual protective group or its manipulations scattered throughout makes this book a valuable reference to students major in organic chemistry.

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Article Identifier:
1437-210X,E,2000,0,04,1186,1187,ftx,en;B20800SS