physical constants, toxicity, and use of the commercial and important experimental organophosphate pesticides. The limited information available on the mode of action of pesticides other than insecticides is also described in this chapter. Individual pesticides are presented according to their use and chemical group. If a reader is interested in a specific pesticide and knows the chemical, common, or commercial name, he must consult the subject index in order to locate the information about it in chapter 5.

Eto has thoroughly reviewed the literature through the middle of 1974. This readable book will prove useful for students and other beginners as well as for specialists. It provides over 1000 reference citations and a reasonably good subject index, though it lacks an author index.

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Organolithiums

The Chemistry of Organolithium Compounds. B. J. WAKEFIELD. Pergamon, New York, 1974. x, 336 pp., illus. $22.50.

In the 44 years that have elapsed since the first report of the preparation of an organolithium compound by the reaction of an organic halide with metallic lithium by Ziegler and Colonius, the chemistry of organolithium compounds has developed broadly and in great depth. The organolithium reagents now play an important role in organic and organometallic synthesis. The discovery that they could initiate the polymerization of 1,3-dienes, styrene, and other olefins to give commercially useful materials led several companies to produce a number of alkyllithiums on a large scale. Their commercial availability has greatly accelerated the rate of development of organolithium chemistry, and this field has flourished during the last ten years. As a graphic illustration of this, D. W. Slocum's survey of organolithium chemistry in 1973, soon to be published in the *Journal of Organometallic Chemistry,* covers 347 references. The first such annual survey of organolithium chemistry, written by this reviewer to cover the 1964 literature, cited only 89 references.

The question of structure and bonding has been a fascinating aspect of organolithium chemistry, and the research efforts devoted to these problems have made important general contributions to our knowledge of "electron-deficient" compounds. In view of the importance of organolithium compounds, it is surprising that a book devoted exclusively to them has not been available until now. The 1970 Houben-Weyl volume on organoalkali compounds was devoted mostly to organolithiums, but the constraints of the Houben-Weyl concept restricted the scope of the coverage. Other monographs and review series have had chapters on organolithium compounds, but these have dealt with specific aspects of their structure or chemistry. The book under review thus fills a need, and it will be welcomed by synthetic organic and organometallic chemists.

A summary of a such a vast field (several thousand references) that is restricted to about 270 pages of text, exclusive of reference sections, must of necessity be very concise. The author has succeeded admirably in his stated aim of presenting an account of organolithium chemistry that is comprehensive but not exhaustive. The book is organized into four parts dealing with the constitution of organolithium compounds, their preparation, their use in organic synthesis, and their applications in the synthesis of organometallic compounds of other metals.

The brief chapter on the constitution of organolithiums nicely summarizes what is known about the solid state structures of these compounds, about the nature of organolithium species in hydrocarbon and in donor solvents, and about the configurational stability of organolithiums in solution. The preparative routes to organolithiums are covered well and the discusssions of mechanisms are useful. The longest part of this book is devoted to the use of organolithiums in organic synthesis —additions to multiple bonds, alkylation reactions, and so forth. An excellent chapter discusses organolithium compounds as precursors for reactive intermediates: carbenes, arynes, cycloalkynes and cycloallenes, ylides. The final part presents a good summary, with many examples, of how organolithiums serve in the preparation of organic derivatives of the main group and transition metals. A useful index concludes the book.

This well-organized, well-written, critical survey presents an excellent overview of the field. It is indispensable for all chemistry libraries and will be well worth the price to individuals who wish to become better acquainted with this highly reactive and versatile class of organometallic reagents.

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Nuclear Properties

Nuclear Magnetic Resonance Spectroscopy of Nuclei Other than Protons. T. AXENROD and G. A. WEBB, Eds. Wiley-Interscience, New York, 1974. xvi, 408 pp., illus. $18.95.

This book consists of 25 relatively short chapters, most of which were written to supplement lectures at a NATO Advanced Study Institute held in 1972. The purpose of the institute was to acquaint young research workers with the difficulties of and chemical uses for new techniques that now make possible the routine observation of important nuclei such as ^{2}H, ^{11}B, ^{13}C, ^{15}N, ^{29}Si, and ^{31}P. That purpose seems to have carried through into the book. Thus, the first three chapters, two of which were written quite carefully and lucidly by E. D. Becker, first provide the reader with an introduction to the relevant magnetic and relaxation properties of nuclei other than protons and next introduce him to pulse and Fourier transform methods as applied in NMR (nuclear magnetic resonance) spectroscopy. For the student who might wish to acquire a more detailed mastery of the material, adequate references to available specialized texts are provided.

Following the discussion of experimental methods, several aspects of nitrogen NMR are considered by the editors of the book. In one chapter Webb concisely reviews recent efforts to calculate nitrogen chemical shift values; two later chapters by Axenrod and co-workers treat ^{15}N coupling constants. The structural effects that influence measured ^{15}N-H coupling constant values are presented, and factors that determine ^{15}N-^{15}N spin couplings are discussed. Together, the several chapters on ^{15}N NMR provide a useful summary of the more important information available about that potentially interesting subject.

Several chapters are also devoted to ^{13}C NMR spectroscopy. The chapter