opmental biologists who consider shifts in redox potential to be associated with corresponding shifts from the juvenile to the mature state. Other chapters proved similarly useful. If the reviewer's interests constitute a representative sample, then it is clear that Maksymowych's small, concise volume should serve as a standard reference work for a wide spectrum of biological scientists.

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Organophosphorus Chemistry

Organic Phosphorus Compounds. G. M. KOSOLAPOFF and L. MAIER, Eds. Wiley-Interscience, New York, 1972. Four volumes. Vol. 1, xiv, 546 pp., illus. Vol. 2, viii, 508 pp., illus. Vol. 3, viii, 500 pp., illus. Vol. 4, viii, 532 pp., illus. Each volume, $29.95. Second edition of *Organophosphorus Compounds.*

This treatise is an attempt to review much of the chemistry of organophosphorus compounds, primarily as it has developed since the publication of Kosolapoff's *Organophosphorus Compounds* in 1950. Not all topics of current active research are included, for individual authors have primarily addressed themselves to subjects of their own immediate interest. However, in my opinion, the editors have succeeded well in selecting authoritative authors and, by choosing subjects that cross many disciplines, they have made the volumes widely useful. The general style employed in Kosolapoff's earlier volume has been utilized, with syntheses, reactions, and structure-properties relationships as the primary concerns. Lists (referenced) of all reasonably well-identified compounds, and properties thereof, are included at the ends of the chapters. Particularly appealing is the inclusion, along with common physical properties, of infrared, ultraviolet, nuclear magnetic resonance, and gas liquid chromatography data, with references where available, for specified compounds. Such information was not available in 1950.

The literature coverage appears to be comprehensive up to 1970. The chapter on phosphines (vol. 1) is followed by a rather complete bibliography of monographs and review articles which could well be appropriate for most of the other chapters.

In view of the limited commercial availability of organophosphorus compounds, the chapter on phosphines and the two on phosphorus halides (vol. 4) seem especially valuable, since the methods of preparation they describe are often simple and these classes of compounds serve well as precursors of many other organophosphorus chemicals of theoretical, biological, and pharmaceutical interest.

Catalytic properties of metal complexes of several phosphorus compounds are discussed lucidly in several chapters (vols. 1 and 2). In view of the importance of homogeneous catalysis by transition metal-phosphine complexes, for example, for nitrogen fixation models, the chapter (vol. 1) on these complexes is welcome. It is likely somewhat outdated as a result of the three-year publication lag, but it is the most inclusive in the area through 1969.

In summary, this reviewer has found this set of four volumes to be well written and well referenced, and the information on the various compounds easy to locate. Scientists working directly in the field, and others who employ phosphorus reagents in their research, will find these books invaluable.

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Insect Embryology

Developmental Systems: Insects. S. J. COUNCE and C. H. WADDINGTON, Eds. Two volumes. Vol. 1, xiv, 304 pp., illus. $18. Vol. 2, xiv, 616 pp., illus. $27.50. Academic Press, New York, 1972–73.

These two volumes are the beginning of a projected series dealing with different developmental systems. Many students of insect development have been waiting impatiently for their appearance, since for over a year papers have been published referring to them. The delay in publication has made it necessary for several contributors to add appendices updating their articles. It is hoped that the publisher will be able to expedite publication of subsequent volumes.

The first volume describes the normal processes of oogenesis and embryogenesis in different insect groups and concludes with a chapter on polyembryony. The coverage of morphology does not extend into postembryonic development.

A. P. Mahowald discusses in a clear and masterly way cytological and biochemical events during oogenesis in different insects. The development of the primitive insects (Apterygota) is covered by C. Jura in a purely descriptive manner. Most of the work on this subject was published in the last century, and Jura's chapter clearly demonstrates that even though many interesting observations were made they have not stimulated much recent investigation. A descriptive analysis of embryonic development in holo- and hemimetabolic insects is given by D. T. Anderson. He presents a clear and comprehensive picture of the complex and diverse material. The eccentric reproductive mechanism of polyembryony is covered by O. M. Ivanova-Kasas. Unfortunately, new findings are scarce in this area and many of the hypotheses (for example, the formation of asexual larvae) need further clarification.

The second volume emphasizes experimental studies and covers topics that have again become subjects of major research efforts during the last two decades. S. J. Counce brings together an abundance of experimental data in her causal analysis of insect development. Early embryogenesis is under the control of different centers, the cleavage center, the activation center, and the differentiation centers; however, the molecular nature of these centers and the applicability of this concept to all species remain unresolved.

The integument of insects is an excellent system for studying the development of spatial patterns. P. A. Lawrence presents clearly the concept of the gradient model and the many experiments which have led to it.

The imaginal disks of *Drosophila melanogaster*, a system used to analyze a variety of problems in developmental biology, are reviewed by W. J. Gehring and R. Nöthiger. The authors discuss superbly the state of determination, its stability and alterability. They also describe mutants which have been used to analyze the control of disk development.

The literature on insect hormones is highly contradictory in many aspects. This is obvious, for example, with regard to the nature of the "brain hormone" (ecdysiotropin) and the activation of the corpora allata in adults. W. W. Doane here clarifies and evaluates many of the data after carefully considering the conflicting literature.

These volumes are of great value in many respects. Even though a variety