

than twenty-five years, it is highly desirable that more than one such "magnum opus" should be available, preferably with publication schedules appropriately out of phase. The work under review is accordingly a welcome addition to chemical libraries. Out of twenty contemplated volumes this is the fourth to be published; it hoped to complete the series by 1960 though this is perhaps unwarranted optimism. As with Gmelin the obituary crosses in the list of collaborators are silent testimony to the truth of the ancient saying "Ars longa vita brevis." Comparisons with Gmelin are inevitable. "Pascal" will be a good deal shorter than "Gmelin"; if Volume IV is typical, the individual elements will be covered at lengths ranging from three quarters down to one fifth of that of the corresponding treatment in the eighth edition of Gmelin. The format is satisfactory and the typography more pleasing than that of Gmelin; on the other hand the French work seems less richly provided with tables and diagrams.

The distant contemplation of such a formidable accumulation of experimental fact tends to be a trifle depressing but it is impossible to come to close quarters with any section of the book without encountering intriguing observations and many challenges to further investigation. It is probable as a source of references that such works are most useful to the investigator. Here Pascal will be of great value; the deadline for references in each bibliographical section is clearly indicated and for some elements brings the literature survey forward some twenty-five years later than the corresponding Gmelin volume. In such cases the value of Pascal as a complementary guide to the more recent literature is self-evident.

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Phosphorus and its Compounds. Volume I: Chemistry.

By JOHN R. VAN WAZER, Assistant Research Director and Senior Scientist, Inorganic Chemicals Division, Monsanto Chemical Company, St. Louis, Missouri. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. xiii + 954 pp. 15.5 × 23.5 cm. Price, \$27.50.

In his Preface, the author says "the purpose of this book is to lay the foundation for a new, separate discipline of chemistry—phosphorus chemistry." However laudable such a purpose may be, the creation of a new discipline that can occupy a position of equality among the classical disciplines of inorganic, organic, analytical and physical chemistry is complicated by the twin problems of ample systematization of fact and principle and of acceptance of the body of information as sufficiently comprehensive and varied to permit continued fruitful study. By presenting phosphorus chemistry as an approach embodying many of the principles of structure and homology that distinguish an orderly organic chemistry from an often much less orderly inorganic chemistry, the author has done much to overcome the first complication. By presenting a massive, but not encyclopedic, array of coordinated information and suggesting innumerable areas for expanding research, he has done even more to overcome the second. Whether he has succeeded in devising a new discipline must be determined by the test of time. However, it cannot be denied that he has produced a volume that will be both an outstanding reference for all workers in phosphorus chemistry and a stimulus to continuing research in this fascinating area.

This volume is concerned primarily with the development of a set of underlying principles for phosphorus chemistry and the implementation of these principles by a thoroughly and carefully documented body of factual information. The emphasis throughout is upon modern interpretation of fundamental chemistry. Technology and related aspects of the chemistry of phosphorus are to be considered in a subsequent companion volume. No attempt has been made to cover every subject with absolute completeness. Rather, the author has attempted to examine available information critically and to include only that which has survived his scrutiny. Although some may question his judgment on specific points, none can disagree that his over-all selection is consistently good and that his coverage is excellent.

Phraseology, clarity of expression and style are considerably above average and render the text both readable and

understandable. The author's boundless enthusiasm for his subject is evident throughout. In large measure, this compensates for certain interpretations with which others may take issue and for occasional overly generous statements such as the "millions of known structures with sp³ bonding" (p. 71). Quite understandably, the author's not inconsiderable contributions to phosphorus chemistry provide the central themes for many of his discussions.

The text is remarkably free from mechanical errors. This and the over-all excellence of printing, binding and presentation attest the carefulness with which the manuscript was handled. Both author and publisher are to be complimented on a job well done.

The book is strongly recommended both to those specifically interested in phosphorus chemistry and to those interested in a significant contribution to the "renaissance in inorganic chemistry." It is unfortunate that the price is so high that many individuals will find it impossible to acquire personal copies.

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Some Problems in Chemical Kinetics and Reactivity.

Volume I. By N. N. SEMENOV. Translated by MICHEL BOUDART. Princeton University Press, Princeton, New Jersey. 1958. xii + 239 pp. 15 × 23 cm. Price, \$4.50.

This is the second edition of a book which was published first in 1954 in a limited edition of the Academy of Sciences of the U.S.S.R. and was written in preparation for a national symposium on Chemical Kinetics and Reactivity. After the discussions of the symposium, the author was asked to prepare a new edition. This was expanded to include new data from the literature and certain major additions were made to the text of the original. Two English translations, the present one by Boudart and one by Bradley for the Pergamon Press (see review below), have been authorized as well as a German edition.

The present volume is the first of two to be issued by the Princeton Press and comprises the first two of a total of four parts of this work. These two parts cover Radical Reactions (reactions of chain propagation and branching) and Chain Initiation and Termination. The third and fourth parts, on "Kinetics of Chain Reactions" are scheduled to appear in Volume II.

The book was not written as a textbook or treatise, but is a survey, by an outstanding scientist in the field, of developments in the twenty years or more since his first book on "Chain Reactions" was published. It emphasizes radical and radical-chain reactions and there is a frankly personal flavor in the discussion of these. As such, readers interested in chemical kinetics will find it both interesting and rewarding.

The first part of this volume includes an extensive discussion of monoradicals and their reactivity in competitive reactions of addition, decomposition, isomerization, or substitution; the role of polar factors; etc. There is also a much briefer discussion of diradicals. Reactions such as oxidation of hydrocarbons and polymerization are discussed in some detail. In the second part, reactions of chain initiation and termination are discussed on the basis of homogeneous molecular reagents, initiation by ions, and wall effects.

This volume has the minor technical disadvantages which are to be expected in such an edition. It is a paperback edition. There are a fair number of typographical errors, and several instances in which limitations of type have resulted in rather odd notations or in the use of a letter or symbol with more than one meaning in a single equation or paragraph. In a number of instances new materials have simply been appended as footnotes rather than actually incorporated into the text.

The author expresses a note of disappointment that so much of the extensive literature which has appeared is concerned with "disjointed observations on this or that reaction and not with a plan of investigation from all sides." He notes also that it seems to him that the majority of the fundamental problems have not been completely solved as yet. Nonetheless, his book does give a picture which shows much accomplished in building up knowledge of a new group of substances, such as the free radicals represent. The