

rials and equipment needed, followed by any preliminary or preparation instructions. Then the procedure is given in numbered steps and finally instructions are given on the evaluation and reporting of the data. References for supplementary information are usually given at the end of each experiment. So far as the experience of the reviewer extends, the experimental directions are more than adequate and should give manageable results, and yet the work is not oversimplified or remote from actual practice.

The part entitled Chemical Techniques contains nine experiments which, together with material from the preceding general section, offer adequate material for instruction of chemists. However, some of the descriptive material in the first section might be a little beyond the training and experience of the average graduate student in chemistry, and is certainly too advanced for students in still more remote fields such as biology. Some of the experiments require equipment or materials which would be available only at a laboratory having a strong research program in the field, and like most advanced laboratory books, this one is somewhat tied to the particular equipment described. The experiments offered make excellent use of the natural activities and those which can be induced by a small Ra-Be neutron source. A few experiments require cyclotron bombardment, and one or two require activities distributed by the A.E.C. It would seem that the latter source has not been exploited as fully as would have been desirable from the viewpoint of institutions without a cyclotron or equivalent device. However, such shortcomings are almost unavoidable, and have been adequately minimized through the variety of the offering, which includes many significant experiments which can be performed with relatively simple facilities. This book should certainly be of great value for either formal or informal training in experimental nucleonics.

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● PRESSURE-VOLUME-TEMPERATURE RELATIONSHIPS OF ORGANIC COMPOUNDS

Compiled and Developed by *Robert R. Dreisbach*, The Dow Chemical Co., Midland, Michigan. Third edition. Handbook Publishers, Inc., Sandusky, Ohio, 1952. xi + 303 pp. 239 full-page P-T tables and several minor tables. 27 × 21 cm. \$10.

ORGANIC chemists and chemical engineers may well join with the author in acknowledging "indebtedness to the late Dr. Willard H. Dow...for the wonderful way in which he encouraged pure research that often did not have any foreseeable commercial value." The present volume will never pay in mere book sales revenue for the great outlay which the Dow Company has authorized in the development of tables, charts, and calculation techniques in the vapor pressure-temperature field.

The 239 lithographed tables constitute the main body of numerical data, totaling about 200,000 entries of temperature and vapor-pressure values. Preceding these data are examples, fully worked out, for 21 types of problems encountered in the handling of more or less volatile organic compounds. Foremost in these type problems is the one most useful to the organic laboratory worker: namely, to find a boiling point at a designated pressure when only one P-T value is known—usually the "normal" boiling point at 760 mm.

Although complete precision in solution of such a P-T problem is impossible, the Dow group has classified compounds so elaborately (21 "Cox-Chart" families) that much better results may be obtained than are possible from the various logarithmic graphs, nomographs, slide rules, algebraic equations, etc., in current use. In particular these Dow charts yield decidedly better values than the old stock method of plotting $\log p$ against $1/T$ and assuming the validity of a straight-line graph, which ignores variations in heat of vaporization. In general, Dreisbach's data are far more dependable than published P-T data for specific compounds found

in handbooks, many of which are now known to be highly erroneous. Striking exception to this deprecation of handbook data is seen, however, in the useful Stull tables (*Ind. & Eng. Chem.* **39**, 517 (1947)), which, by the way, also came from the Dow laboratory.

Chemical engineers will be interested in the other types of problems, including estimation of heat of vaporization, compressibility, dt/dP , equation constants, critical temperature, approximate flash point, and vapor pressures at extremely low or high temperatures. An example of the elaboration of detail by small intervals is seen in the 17 pages devoted to the "normal alkyl primary amine family," in which over 13,000 boiling points, at different pressures, are given for amines boiling normally at -10° to $+349^\circ$ C.

Aside from chemical research libraries, where this book may be considered absolutely essential, it should be available as a handbook to college students in laboratory courses of advanced synthetic and qualitative organic chemistry. The reviewer knows of no work remotely comparable with this highly creditable, and well-printed volume.

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● THE PHOSPHATIDES

H. Wittcoff, Head, Product Development Section, General Mills Research Laboratory, Minneapolis. ACS Monograph No. 112. Reinhold Publishing Corp., New York, 1951. xviii + 564 pp. 16.5 × 23.5 cm. \$10.

IN CONTRAST to the attention that has been given in recent years to the preparation of monographs on the chemistry and biochemistry of the carbohydrates and proteins, there have been relatively few definitive accounts of the chemistry of the lipides. Therefore, Dr. Wittcoff's monograph, which is devoted to a discussion of the chemistry, biochemistry, and technology of the phosphatides, will almost certainly be well received. It not only provides a modern survey of this segment of lipide chemistry but does so in a scholarly and critical manner. It is hoped that in the future the chemistry of the cerebrosides, which is not considered in the present edition, will be accorded comparable treatment.

Dr. Wittcoff's discussion of the phosphatides is divided into six parts, *i. e.*, I, The Chemistry of the Phosphatides, 140 pages; II, The Analytical Determination of the Phosphatides, 41 pages; III, Phosphatides from Plant Sources, 160 pages; IV, Phosphatides from Animal Sources, 81 pages; V, The Biochemistry and Physiology of the Phosphatides, 141 pages; and VI, The Industrial Aspects of the Phosphatides, 51 pages. In addition to the bibliographies at the end of each part there are provided both author and subject indexes. The literature has been covered through 1949 and some reference is made to papers appearing in 1950.

The author properly opens his treatment of Part I with a discussion of the nomenclature and classification of the lipides, and this excellent and thorough account should be welcomed by all teachers of organic chemistry. The statement on page three that a purely chemical classification of the lipides is not possible is a bit strong and should be modified to limit the statement to current ability. Chapter II is devoted to a consideration of the structure of lecithin and it is here that the author first reveals a sense of humor and a willingness to put nonsense in its proper place. In this excellent chapter, and later in subsequent chapters, the author occasionally, but not universally, employs the convention of placing a formal positive charge on the phosphorus atom present in phosphate esters. While there is no doubt as to the validity of this practice, *cf.*, L. Pauling, *J. Am. Chem. Soc.*, **56**, 361 (1934), it would have been helpful to comment upon the basis for this convention and to use it consistently. In the third chapter, on the structure of the cephalin phosphatides, the statement made on page 34 in respect to the acylation of β -aminoethanol is awkward, and attention should have been called to the fact that, depending on the reaction conditions,