Table 1 to be 101.0 ± 1.1% of those obtained by a procedure (*5*) based on combustion and conversion of the water to hydrogen. The standard error of an analysis is 0.6% for the zinc fusion method and 0.7% for the combustion method.

Additional information on the scope of the method has been obtained by experiments in which the reaction tubes contained tritiated water and unlabeled organic compounds, including pyridine, thiophene, urea, cholesterol, and various aromatic and aliphatic amines, hydrocarbons, and halides. In such experiments, the recovery of tritium as noncondensible gas is a measure of the completeness of decomposition of the compound, since there is extensive exchange of hydrogen during fusion.[5] With all compounds, except urea and aromatic halides, more than 99% of the expected tritum was found in gas which contained less than 1% of condensible material. With urea and the aromatic halides, the gas, which included 1–3% of ammonia and benzene, respectively, still contained more than 95% of the tritium.

[5] Incomplete decomposition of Benzyl-α-*t* alcohol by fusion with zinc in the absence of nickelic oxide yielded benzene and a nonvolatile product, both of which contained tritium.

References

1. Eidinoff, M. L., and Knoll, J. E. *Science,* **112**, 250 (1950).
2. Henriques, F. C., Jr., and Margnetti, C. *Ind. Eng. Chem., Anal. Ed.,* **18**, 420 (1946).
3. Melander, L. *Arkiv Kemi,* **2**, 211 (1950).
4. Biggs, M. W., Kritchevsky, D., and Kirk, M. R. *Anal. Chem.,* **24**, 223 (1952).
5. Wilzbach, K. E., and Van Dyken, A. *Atomic Energy Commission Document,* AECD-2998, October 18, 1950.
6. Fukushima, D. K., *et al. J. Am. Chem. Soc.,* **74**, 487 (1952).
7. Graff, J., and Rittenberg, D. *Anal. Chem.,* **24**, 878 (1952).
8. Borkowski, C. J. *Atomic Energy Commission Document,* MDDC-1099, declassified, June 12, 1947.
9. Brownell, G. L., and Lockhart, H. S. *Nucleonics,* **10**, No. 2, 26 (1952).

Manuscript received June 18, 1953.

Book Reviews

Phosphorus Metabolism: A Symposium on the Role of Phosphorus in the Metabolism of Plants and Animals, Vol. II. Sponsored by the McCollum-Pratt Institute of The Johns Hopkins University. William D. McElroy and Bentley Glass, Eds. Baltimore: Johns Hopkins Press, 1952. 930 pp. Illus. $11.00.

The McCollum-Pratt Institute has performed an outstanding service to biochemists in the organization of its annual symposia and in the prompt publication of the symposium papers. This new volume covers a number of topics omitted from the 1951 symposium, which was published as Volume I.

The general subjects included in Volume II are: mechanisms of phosphate assimilation in animals and plants, the role of phosphate in amino acid and protein metabolism, the role of phosphorus in the metabolism of lipids, the chemistry and metabolism of nucleic acids, the role of phosphate in the metabolism of photosynthetic and chemoautotrophic organisms, the influence of hormones on phosphate metabolism, and phosphate metabolism in specialized tissues. These topics are covered in a total of 41 papers together with a large amount of informative material contributed under the general heading "Discussion." A valuable feature of the book is the last chapter, a summary of the symposium by Bentley Glass, in which the major points are reviewed in some 90 pages. The volume closes with author and subject indexes.

Phosphorus Metabolism, II, presents a summary of recent advances in a number of very active fields of research and, as such, is of particular value to graduate students and research workers in the biological sciences. The chemical element phosphorus forms a very tenuous linkage between some of the topics discussed, but this very heterogeneity of subject is in itself a valuable educational aspect of such a symposium.

Because of the many important roles played by phosphorus compounds in metabolism, Volumes I and II of *Phosphorus Metabolism* present a rather comprehensive view of biochemical knowledge at the mid point of the twentieth century.

Mark H. Adams

Department of Microbiology
New York University Bellevue Medical Center

Sampling Technique. William G. Cochran. New York: Wiley; London: Chapman & Hall, 1953. 330 pp. Illus. $6.50.

Sample surveys have played an important part in government operations for the past 20 years. They have served as invaluable research tools whenever accurate information is needed about a population, without entailing the comparatively large expense of a complete enumeration. Even if a complete enumeration were possible, it might not be as accurate as a good sample survey owing to the necessarily longer time for a complete enumeration in which time the population might change. Within recent years sample survey techniques have become increasingly more important in many of the social sciences, business, and technical fields. This book, written by a prominent statistician, gives a comprehensive outline of modern

sampling theory as it has been developed for use in sample surveys.

Professor Cochran is to be commended for not only writing an excellent, well-organized exposition of sampling, but also for attempting to impart some of his own experiences to help the reader develop a "feel" for the manner in which sample surveys are used. The author succeeds admirably in this respect. The tempo of the book is one at which the reader is being led through new material, always with Professor Cochran's kind but steady guidance.

Sampling Techniques is written so that the reader possessing knowledge of elementary algebra and the equivalent of a first course in statistics will be able to comprehend most of the material. Among the different techniques discussed are simple random sampling, stratified sampling, systematic sampling, subsampling, and double sampling. The chapters devoted to ratio and regression estimates are particularly well written. Illustrating much of the sampling theory are many carefully explained, well-chosen examples. Many of the exercises completing the chapters consist of real data that enable the reader to get the necessary practice for a fuller understanding of sampling theory. The book is carefully documented with many up-to-date references.

The main emphasis is to help the reader attain a grasp of sampling theory without being bogged down with too many mathematical details. There is much in this well-written book to recommend it to practicing statisticians, students of statistics, and those who wish to learn about sampling through individual study. This volume will long remain a classic in the field of sample surveys.

MARVIN ZELEN

Statistical Engineering Laboratory
National Bureau of Standards
Washington, D. C.

Association Affairs

AAAS Symposia at the Boston Meeting

Raymond L. Taylor
Associate Administrative Secretary, AAAS

SCIENTISTS well established in their fields and young specialists alike have come to anticipate the AAAS symposia which have become an increasingly important aspect of the annual meetings of the Association. Characteristically, AAAS symposia explore relatively neglected areas of scientific inquiry or constitute up-to-date surveys of knowledge in particular fields. Such programs are significant and valuable because they focus attention upon critical areas, summarize the present status of current research, and provide positions from which to direct further research. Typically, these programs originate in the minds of the officers of the eighteen sections and subsections of the Association and are developed by them, either personally or by others deputized as program chairmen. Often the sectional symposia are concerned with interdisciplinary problems and are sponsored by two or more sections; participating societies also may collaborate. If the potential demand warrants it, the papers of such programs are gathered together and published by the Association as symposium volumes.

In recent years there has become established the practice of arranging, for each annual meeting, several symposia of especially wide interest or timeliness. The responsibility for developing these general symposia, sponsored by the Association as a whole, rests upon the AAAS Symposium Committee, appointed each year by the president of the Association. Upon occasion, a proposed sectional program may be chosen to be developed as a general symposium; more commonly, the Symposium Committee, which represents a variety of scientific fields, plans and arranges these general sessions itself. The Committee may invoke the aid of consultants and appoint others to implement the general symposia.

This year the Symposium Committee consists of E. U. Condon, director of research, Corning Glass Works, and president, AAAS (*chairman*); Frank A. Beach, professor of psychology, Yale University, and vice president for AAAS Section I; Bart J. Bok, associate director, Harvard College Observatory, and vice president for AAAS Section D; Charles D. Coryell, professor of chemistry, Massachusetts Institute of Technology; A. M. Gaudin, professor of mineral engineering, Massachusetts Institute of Technology; A. Baird Hastings, professor of biological chemistry, Harvard Medical School; Jerome C. Hunsaker, professor emeritus of aeronautical engineering, Massachusetts Institute of Technology; James R. Killian, Jr., president, Massachusetts Institute of Technology; Paul C. Mangelsdorf, director, Botanical Museum, Harvard University; Philip M. Morse, professor of physics, Massachusetts Institute of Technology; Alfred C. Redfield, associate director, Woods Hole Oceanographic Institution; Francis O. Schmitt, head, Department of Biology, Massachusetts Institute of Technology; Earl P. Stevenson, president, Arthur D. Little, Inc., and general chairman, Seventh Boston Meeting; George B. Wislocki, professor of anatomy, Harvard Medical School; and Raymond L. Taylor (*secretary*).

Of the general symposia at this 120th meeting of the Association, "Species Which Feed Mankind" was