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 BOOK REVIEWS
 

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**Advances in Analytical Chemistry and Instrumentation.** Volume I. Edited by CHARLES N. REILLEY, Department of Chemistry, University of North Carolina, Chapel Hill, North Carolina. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N.Y. 1960. vii + 445 15.5 × 23.5 cm. Price, \$12.00.

This is the first volume of a planned continuing series, whose volumes will appear annually. Each volume will comprise a collection of review articles dealing with a variety of analytical topics. The intention is that these articles will avoid "a dry and terse cataloguing of the literature without description or evaluation," and that they will fill a purported need "for critical, comprehensive articles surveying various topics on a high level, satisfying the specialist and non-specialist alike." By and large the seven articles in this initial volume fulfill these aims.

The first article on *Tetraphenylboron as an Analytical Reagent* by H. Flaschka and A. J. Barnard, Jr., occupies 118 pages and is probably the most comprehensive discussion of this reagent which has yet appeared. Wittig, Rafi and their co-workers about 1949 first suggested tetraphenylboron as a precipitation reagent for potassium, and most of the subsequent studies have been concerned with this particular application. However, the tetraphenylboron salts of rubidium, cesium, ammonium, silver, +1 thallium, tetraalkylammonium, various alkaloids and other amine bases are also only slightly soluble and procedures for their determination have been proposed. This chapter describes all of these applications, with emphasis, of course, on the determination of potassium. Much of the text pertains to the remarkable variety of titrimetric methods based on precipitation of potassium tetraphenylboron that have been proposed to circumvent one or another difficulty of the gravimetric technique, or, if would seem in some cases, merely for the sake of novelty. Analytical procedures are presented in detail, and in most cases typical performance data are given.

The next article on *Recent Advances in Gas Chromatography Detectors* by R. B. Seligman and F. L. Gager, Jr., is true to its title in that it concentrates on the various physical means of evaluating the composition of the vapor effluent from a gas chromatographic column. Few analytical techniques have enjoyed such immediate acceptance, and have developed so rapidly, as gas chromatography. Scarcely eight years have passed since James and Martin published the paper which launched this subject. The writer recalls very vividly hearing a lecture on gas chromatography at a Gordon Research Conference in August, 1954, at which recent date the technique was still unknown to most of the professional analytical chemists in attendance. Today it would be hard to find an industrial analytical laboratory which does not utilize this powerful tool. Consequently this article should have many readers.

The 48 page article on *Trends in the Determination of Fluorine* by C. A. Horton provides a concise review of methods in use prior to 1953, and then a detailed discussion of methods developed since then. The treatment is limited to the determination of fluoride in inorganic compounds. In the author's words "An attempt is made to point out the difficulties and shortcomings of both the prior and recent methods for the determination of fluoride, and to challenge analytical chemists toward development of more satisfactory methods and techniques." Certainly he has succeeded in this aim, particularly in the last section on *Challenges for Future Investigation*.

A 40-page essay on *New Ideas in Organic Microanalysis* by W. Schöniger is an authoritative review of newer developments in the cloistered field of organic elemental analysis. Since Dr. Schöniger is well known as the inventor of the closed flask combustion technique, one might have expected that much space would have been devoted to it. On the contrary, it is mentioned, all too briefly, in only two paragraphs. Although one can admire the author's humility in not emphasizing his own work, nonetheless this technique is so truly novel and valuable that it is disappointing that it was not described and discussed more adequately.

The fifth chapter on *Theory of Electrode Processes* by W. H. Reinmuth is much too short to do justice to its broad title. The author quite obviously is intimately conversant with his subject, but in the short span of 51 pages he has been able to do little more than mention the many recent developments in this complex field and provide a comprehensive bibliography. It would have been better if the scope of this chapter had been restricted so that fewer topics could have been discussed in greater depth.

The 50-page essay on *The Analytical Chemistry of Thioacetamide* by E. H. Swift and F. C. Anson critically reviews the use of this reagent for the precipitation of metal sulfides. Thioacetamide is the most promising of the several substances that have been proposed as substitutes for hydrogen sulfide, but, as Professor Swift and his co-workers have demonstrated, the reactions by which it causes precipitation of metal sulfides are far from simple. Anyone who thinks that thioacetamide can be used indiscriminately as a general substitute for hydrogen sulfide should study this article. He will learn that the physical properties of metal sulfides precipitated by thioacetamide are, indeed, usually much better than by precipitation with hydrogen sulfide. However, he will also learn that the optimum conditions for the quantitative separation of metal ions are, in general, not the same with thioacetamide as with hydrogen sulfide. He will come to the realization that a great deal more fundamental study will be needed to prepare thioacetamide for the ambitious role in which it has been cast by the overly-optimistic advertising literature of chemical manufacturers.

In the last chapter (77 pages) on *Near-Infrared Spectrophotometry*, Robert F. Goddu describes the unique analytical utility of the neglected 1 to 3 micron spectral range for organic functional group analysis. Unfamiliarity with this special field renders me incompetent to judge this treatment with a critical eye. However I can testify that Dr. Goddu writes with the kind of clarity that reflects intimate experience with the subject.

The volume has been skillfully edited and very well manufactured. The only important editorial fault—and I admit that "fault" is a matter of opinion—is that references to the literature have been arranged in a manner most convenient to the printer, who does not have to use them, and most inconvenient to the reader who is expected to use them; namely, as neat alphabetical lists at the end of each article.

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**Biophysical Science. A Study Program.** Planned and Edited by J. L. ONCLEY, Editor-in-Chief, F. O. SCHMITT, R. C. WILLIAMS, M. D. ROSENBERG and R. H. BOLT. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. viii + 609 pp. 21 × 27.5 cm. Price, \$6.50.

It has long been the hope of molecular biologists that many if not all kinds of biological phenomena can ultimately be analyzed in terms of basic physical and chemical laws. This possibility, considered unthinkable a century ago, is still disparaged in many quarters. On one end of the scale, there are those who believe that physics and chemistry have no place in biology. On the other end of the scale, there are some who hold that the existing laws are inadequate to account for the behavior of the extraordinarily complicated materials found in biological systems; that different physical-chemical laws are needed to describe biological processes in the same manner that new laws have been formulated to describe the behavior of aggregates of ions in the solid state. If this latter point ultimately proves to be correct, the role that biological research will play in establishing these new laws of macromolecular behavior will probably be dominant.

The intimate relation that already exists between our understanding of biological phenomena and the behavior of macromolecules, and indeed the progress in this latter area that has already come from biological research is amply illus-

trated in "Biophysical Science." This book, which stems from a study program held under the auspices of the National Institutes of Health, is intended to serve as a "summary of some key problems in biology and provide a critical evaluation of recent advances." It serves this purpose very well. The sixty-one individual contributions can be divided into two groups. The first group, composed of twenty-three articles, provides a review of the basic methods and some of the recent results in the fields of macromolecular chemistry, spectroscopy and energy transfer. Some of the material is new and has quite properly been given full treatment. Other chapters concern background material which has already been treated elsewhere and might even have been omitted. The extensive bibliographies complement the chapters very well and the over-all effect of this section is excellent.

The remaining two-thirds of the book concerns topics of current interest in biological research such as synthesis and replication of macromolecules, fine structure of organelles, function of nerve fibers, to name a few. Some of these chapters are original contributions and the remainder are up-to-date versions of earlier studies. Since they have come from a study program, they provide excellent didactic material illustrating both the startling success in applying molecular science to some areas of biology such as collagen structure and function, and the inadequacy of our current concepts in the analysis of other areas.

Finally it should be pointed out that the book and perhaps the area may well have been misnamed. Most of the work described can very properly be classified as physical chemistry, polymer chemistry or biochemistry. Under these circumstances it seems entirely appropriate though less glamorous to give the book its proper praise as a thorough and very useful survey of molecular biology.

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THOMAS PUNNETT

**The Plasma Proteins. Volume II. Biosynthesis, Metabolism, Alterations in Disease.** Edited by FRANK W. PUTNAM, Department of Biochemistry, College of Medicine, The J. Hillis Miller Health Center, University of Florida, Gainesville, Florida. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. xv + 518 pp. 16 × 23.5 cm. Price, \$14.50.

This is the second of two volumes which, taken together, constitute a comprehensive and authoritative treatise on the plasma proteins. Emphasis in Volume II is centered principally on the physiological and biochemical role of the plasma proteins in the normal and disease states. The scope of this volume is broad, however, as is indicated by the table of contents: Structure and Function of the Human Serum Lipoproteins, F. T. Lindgren and A. V. Nichols; Plasma Enzymes, W. H. Fishman; Circulating Hormones, H. N. Antoniades; The Blood Coagulation System, R. G. MacFarlane; Comparative Biochemistry and Embryology, R. L. Engle, Jr., and K. R. Woods; The Biosynthesis of Plasma Proteins, H. S. Anker; Alterations in Plasma Protein Patterns in Disease, M. L. Petermann; Abnormal Serum Globulins, F. N. Putnam; Genetic Alterations in Plasma Proteins of Man, D. Gitlin and C. A. Janeway.

The chapters dealing with genetic alterations in plasma proteins, abnormal serum globulins, biosynthesis and the blood coagulation system are particularly well written. In the last instance R. G. MacFarlane has been singularly successful in effectively presenting the complex details of the clotting system and in unravelling the confused literature pertaining to this subject. H. S. Anker has written a penetrating discussion of the problem of biosynthesis of the plasma proteins. Although the plasma proteins of man receive the major emphasis, a unique chapter devoted to the comparative biochemistry and embryological development of plasma proteins has been included.

Throughout this volume there is ample evidence of thoughtful planning and design, within both individual chapters and the work as a whole. Although each chapter is the product of a different author, the work as a whole is surprisingly free of duplications. This absence of redundancy does not detract from the completeness of any one chapter since the text is liberally supplied with cross refer-

ences to related topics discussed elsewhere in the two volumes.

The printing and binding are well done. References are collected and arranged alphabetically by senior author at the end of each chapter. Author and detailed subject indices are located at the end of the volume. Together the two volumes of this treatise perform a most important function of assembling, coordinating and interpreting a highly diverse literature. The "Plasma Proteins" will be a valuable addition to the library of both biochemist and clinician.

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**Progress in Dielectrics. Volume 2.** General Editor, J. B. BIRKS, B. A., Ph.D., D.Sc., F. Inst. P., A.M.I.E.E. American Editor, J. H. SCHULMAN, Ph.D. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. vii + 225 pp. 16 × 25 cm. Price, \$9.50.

This second volume of an annual series contains six articles on as many aspects of dielectrics. The general subject can embrace a variety of interests in the sciences and engineering, and the particular topics taken up in the present volume reflect this, the only obvious common denominator being that the several discussions are primarily of properties in low applied electric fields.

A brief survey of theory of polarization and dielectric absorption by Wyllie reviews fundamentals and various models developed principally by physicists and physical chemists. Much is familiar ground, but this reviewer was reminded of several papers he should have read before.

The article likely to be of most general interest and value to chemists is the contribution of A. J. Curtis on dielectric properties of polymer systems. The author has done a notable job of putting the extensive literature into perspective and order with very competent critical comments. The review is highly recommended, and the author deserves thanks for having carried out an arduous assignment so well.

The article on irradiated polymers by Black and Charlesby is primarily an introductory discussion of radiation effects and processes in general, with quite brief descriptions of electrical properties and applications.

The contribution of P. M. Sutton on dielectric properties of glass is confined to combinations of inorganic oxides, and so is likely to be essential reading only for people with immediate interests in this restricted class of materials. As best this reader can judge, it is a well-balanced and quite comprehensive survey. The paper by Plessner and West on high permittivity ceramics for capacitors is equally special. Finally, the article on artificial dielectrics by J. Brown is highly unchemical and not likely to be useful to chemists except possibly for different applications of the mathematical analyses which have been developed to discuss microwave antenna arrays and the like.

Although interdisciplinary subjects are quite the fashion, and dielectrics is a subject capable of considerable common ground between disciplines, the present collection of articles reflects more the heterogeneity of the subject. Considerable numbers of people will find one or two articles of interest to them; but it seems improbable that many will want enough more of the book at hand to justify buying it for a personal library.

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**La Spectroscopie Hertzienne Appliquée à la Chimie. Absorption dipolaire. Rotation moléculaire. Résonances magnétiques.** By R. FREYMANN, Professeur à la Faculté des Sciences de Paris, and M. SOUTIF, Professeur à la Faculté des Sciences de Grenoble. Dunod, Éditeur, 92 rue Bonaparte, Paris 6, France. 1960. xi + 263 pp. 13.5 × 21.5 cm. Price, Broché, 23 NF.

This book is intended to provide a survey suitable for chemists of several newer fields of spectroscopy. The authors concentrate mainly on nuclear magnetic resonance and electron paramagnetic resonance but they also treat dipolar absorption in solids and, very briefly, rotational