
NEW BOOKS

Bibliography of Solid Adsorbents. By VICTOR R. DEITZ. Research Associate for the United States Cane Sugar Refiners at the National Bureau of Standards. A Contribution from the United States Cane Sugar Refiners and Bone Char Manufacturers and the National Bureau of Standards, Washington, D. C., 1944. Distributed by Dr. J. M. Brown, Chairman, Revere Sugar Refinery, 333 Medford St., Charlestown 29, Mass. Printed by Lancaster Press, Lancaster, Pa. lxxxi + 877 pp. 18.5 × 26 cm. Price, \$12.00.

This useful compilation is one of the first fruits of the broad program of fundamental research sponsored by the Cane Sugar Refining Industry, the Bone Char Manufacturers and the National Bureau of Standards. Charcoal, bone char and the other adsorbents used in decolorizing sirups are of primary interest in this program, but they and the phenomenon of decolorization could not be adequately studied apart from other adsorbents and the phenomena of adsorption in general, so that a complete bibliography covering the whole field of adsorption was undertaken.

The result is indeed gratifying. Brief abstracts of all the published articles are given in seven separate chapters occupying 805 pages, with titles as follows:

- I. Adsorption of Gases and Vapors on Solid Adsorbents.
- II. Adsorption from Solutions on Solid Adsorbents.
- III. Thermal Effects in Adsorption Processes.
- IV. Theories of Adsorption.
- V. Refining of Sugars and Other Applications of Adsorbents.
- VI. General Information on Adsorbents and Special Methods of Investigation
- VII. Preparation of Carbon Adsorbents.

These chapters are further subdivided into a total of fifty-nine separate sections. Within each section the articles are arranged chronologically. All told, 6002 articles have been thus listed and abstracted.

In addition, there is an introductory section of seventy pages giving a history of commercial adsorbents, particularly in relation to the sugar refining industry. Also, at the end, there are a list of the sources of the bibliography, a key to the abbreviations, and author and subject indices. The volume is well and attractively printed. It will be of great assistance to the workers in this important field.

Dr. Deitz and his collaborators at the Bureau of Standards are certainly to be congratulated on the successful completion of this difficult and laborious task. The Cane Sugar Refining Industry and the Bone Char Manufacturers are to be complimented on their vision and altruism in supporting this very worthwhile undertaking.

ARTHUR B. LAMB

The Analytical Chemistry of Industrial Poisons, Hazards and Solvents. By MORRIS B. JACOBS, Ph.D., Senior Chemist, Department of Health, City of New York, 1928—, Director of Gas Reconnaissance, Gas Defense Service, New York City. Second Revised Reprint. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y., 1944. xviii + 661 pp. 110 figures. 15.5 × 23.5 cm. Price, \$7.00.

This "second revised reprint" is essentially a reprint with only minor changes. Owing to a change in the grade of paper the book is larger; however, it contains exactly the same number of pages as the original volume (1941) and the organization, chapter headings, and sub-headings are the same.

The book consists mainly of a compilation of analytical

methods and dust-counting procedures that are used for determining gases, vapors, dusts, fumes, and mists in concentrations that are of hygienic significance. In addition to the analytical procedures, considerable information is given on sampling devices and procedures, and measurement of gas volume and flow, as well as information on toxicity and physiological effects. A chapter on chemical warfare agents is also included. An appendix contains a number of worthwhile tables dealing with inflammable limits, acute physiological response to gases and vapors in air, and probable safe concentrations for gases, vapors, dusts, and fumes.

A good review of the literature has been made in preparation of this book. The material is presented in a non-critical manner and in many cases the exact wording of the original authors has been maintained. For some of the compounds, particularly lead and carbon monoxide, several different methods are discussed in considerable detail, whereas for other substances only a single method is briefly presented. As would be expected, considering the magnitude of the material covered and the fact that it is presented in a non-critical manner, some pertinent references have been overlooked, over-emphasis has been given to some sections, and methods of little importance have been included. However, there is a wealth of good information and the many references to the original literature, not only on analytical methods but on sampling and toxicity, make this a valuable reference book. It should be interesting and helpful to anyone working in industrial hygiene.

H. H. SCHRENK

Proceedings of a Conference on the Ultra-fine Structure of Coals and Cokes Held at The Royal Institution, London, June 24th and 25th, 1943. The British Coal Utilisation Research Association, Rickett Street, London S. W. 6, England. Distributing Agents H. K. Lewis and Co., Ltd., 136, Gower Street, London, W. C. 1, England. 366 pp. 14.5 × 22.5 cm. Price, 25s. net.

This collection of twenty-three papers deals with the study of coal using some of the methods of physics for the study of colloidal and molecular structure. One group of papers concerns the colloidal structure of coals and the adsorption, and the phenomena associated with such adsorption, of gases and liquids by coal. This group includes papers on the colloidal and internal structure of coals and cokes; the inherent moisture content of coal as estimated from moisture contents attained in equilibrium with atmospheres of varied relative humidity; the heats of wetting of coals, cokes and chars in organic liquids, particularly methanol; the measurement of internal areas of solids from adsorption isotherms; the estimation of elastic constants from the amount of swelling caused by the adsorption of gases or vapors; and the changes on carbonization of coal as indicated by changes in heats of wetting. The heat of wetting of coals and cokes by methanol is stressed as a promising tool in coal research.

The use of X-rays in the study of coal is discussed in the second group of papers. One paper reports extensive work on the estimation, by means of X-ray diffraction photographs using the powder technique, of the size and orientation of crystallites in coals of various ranks and in the solid residues obtained on heating these coals under similar conditions to increasing temperatures. For comparison, studies were made of the residues from the carbonization of glycine, cellulose and lignin. A series of coal specimens taken from the vicinity of an igneous intrusion were also included. From their observations the authors advance theories concerning the changes which take place during coalification and carbonization, the probable rea-

sons for the differences between coking and non-coking coals, the maximum temperatures to which coals have been subjected during their history and the differences in the nature of the crystallites in the solvent extracts and extraction residues from coal.

Other papers in this group discuss low angle scattering of X-rays by coals, the identification of non-coal minerals in coal by X-ray diffraction and the possibility of a regular orientation of coal substance being induced by the mineral matter in high ash coals.

The remaining two groups of papers discuss the optical, electrical and magnetic properties of coal, its infra-red spectrum, the use of the electron microscope for the study of finely ground coal and of method for demonstrating the plasticity of coal on a microscopic scale.

Though a few of the papers report the results of extensive programs of work, most of the papers present but a few illustrative results to indicate the possibilities of the methods described.

The discussions of the papers form a valuable and interesting part of the book and serve to give some measure of balance to ideas put forth by the main authors. In several cases the discussions present alternative theories or important objections to the conclusions drawn.

In almost all of the papers coal is treated as a homogeneous chemical substance of high molecular weight whose physical properties are dependent upon the size, shape, orientation and spacing of the high molecular weight crystallites of which it is assumed to be composed. This attitude is criticized in the discussions, particularly by Dr. Stopes who said "... With regard to the detailed study of coal, I feel I must emphasize one elementary fact that most of the contributors to the Conference seem to have forgotten, namely, the *heterogeneity* of coal . . ." "If I am told that these 'micellae,' these 'capillaries,' these 'crystalline' things are all identical and they are just 'coal,' I say 'Look again down your microscope'."

This collection of papers seems valuable, not for the new information about the nature of coal which it may present, but for the pointers it can give to workers in the field of coal research concerning the methods of physics which can be applied to the solution of their problems. The papers in the collection all concern only physical methods, the methods of chemistry, botany, geology being almost completely ignored. It is this reviewer's opinion that the most rapid progress in coal research can best be made by an integrated use of many branches of science. The newer methods of physics should not be overlooked in this respect. In reviewing these methods and their possible application to coal research this book serves a valuable purpose.

The titles of the paper are:

- Introductory Address, J. G. Bennett
 Some Physical Aspects of Coal and Coke Structure, D. H. Bangham
 The Colloidal Structure of Coals, W. Hirst
 The Internal Structure of Coal, J. G. King and E. T. Wilkins
 The Inherent Moisture in Coal, A. C. Dunningham
 An Approach to the Study of Coal Structure, W. Hirst
 The Heat of Wetting of Coals in Organic Liquids, M. Griffith and W. Hirst
 The Absolute Evaluation of Surface Areas of Solid Materials, F. A. P. Maggs

- A Method for Determining the Internal Areas of Coals, S. J. Gregg
 The Strength and Elastic Constants of Coals in Relation to their Ultra-fine Structure, D. H. Bangham and F. A. P. Maggs
 The Carbonization of Coal, C. G. Cannon, M. Griffith and W. Hirst
 Adsorption of Vapours on Carbonized Coal, F. A. P. Maggs
 An X-Ray Study of the Structure of Coals, Cokes and Chars, H. E. Blayden, J. Gibson and H. L. Riley
 The Low-Angle Scattering of X-Rays by Various Coals, D. P. Riley
 X-Ray Diffraction Technique for the Identification of Non-Coal Minerals in Coal, G. Nagelschmidt and D. Hicks
 The Crystallinity of Certain High-Ash Content Coals, D. P. Riley
 The Relevance of Optical Measurements to the Structure and Petrology of Coal, C. A. Seyler
 The Optical Properties of Coals, C. G. Cannon and W. H. George
 The Magnetic Properties of Coal, W. A. Wooster and N. Wooster
 The Infra-Red Spectrum of Coal, G. B. B. M. Sutherland, P. B. Fellgett and H. A. Willis
 Electron Micrographs of Coal, G. D. Preston and F. W. Cuckow
 Notes on a Technique for Demonstrating the Plasticity of Coal, R. G. H. B. Boddy
 The Electrical Conductivity of Carbonized Coals, J. Sandor

GILBERT THIESSEN

BOOKS RECEIVED

September 10, 1944–October 10, 1944

- M. L. ANSON AND JOHN T. EDSALL, Editors. "Advances in Protein Chemistry." Volume I. Academic Press, Inc., 125 East 23rd Street, New York, N. Y. 341 pp. \$5.50.
 ROBERT S. HARRIS and KENNETH V. THIMANN, Editors. "Vitamins and Hormones." Volume II. Academic Press, Inc., 125 East 23rd Street, New York, N. Y. 514 pp. \$6.80.
 WALTER S. LANDIS. "Your Servant the Molecule." The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 238 pp. \$2.75.
 JOSEPH H. ROE. "Principles of Chemistry." Sixth Edition. The C. V. Mosby Company, 3523 Pine Boulevard, St. Louis 3, Mo. 403 pp. \$2.75.
 JOSEPH H. ROE. "A Laboratory Guide in Chemistry." The C. V. Mosby Company, 3523 Pine Boulevard, St. Louis 3, Mo. 191 pp. \$1.00.
 JOHN ARREND TIMM. "General Chemistry." McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 18, N. Y. 692 pp. \$3.75.