

The action is made use of as a means of controlling halogenation. The effect is, in many instances, so great that we find it necessary to distil fractionally any chlorine which is to be used for certain investigations of halogenation for the express purpose of removing traces of oxygen.

In addition to the workers quoted by Bauer and Daniels, others have described the influence of oxygen on halogenation reactions. Luther and Goldberg [*Z. physik. Chem.*, **56**, 43 (1906)] describe the inhibition of substitution of chlorine into benzene, toluene, xylene and acetic acid, and conclude that this is a typical phenomenon of all photochlorination; Pease and Walz [*THIS JOURNAL*, **53**, 3729 (1931)] demonstrated the inhibitory effect of oxygen on the thermal chlorination of methane.

In these Laboratories it has been shown that the chlorination of propane, butane and pentanes is similarly inhibited by oxygen irrespective of whether the chlorination is being catalyzed by

light or by the presence of olefins simultaneously reacting. This last-mentioned catalysis of halogen substitution by a simultaneously occurring addition reaction is also the subject of patents issued to this Company [British Patent 399,991, 1933] but has not yet been otherwise published.

Our experiments have failed to show any inhibition by oxygen of the addition of chlorine to olefinic hydrocarbons such, for example, as beta-butylene, which reaction proceeds rapidly in the dark in the absence of catalysts. In view, however, of the observations of Bauer and Daniels on the bromination of cinnamic acid and Dickinson and Leermakers on the photochlorination of tetrachloroethylene, this may be only a matter of degree. The reaction of beta-butylene with chlorine in darkness is so fast that retardation by oxygen or, conversely, acceleration by light is not easy to detect.

SHELL DEVELOPMENT COMPANY  
EMERYVILLE, CALIFORNIA

R. M. DEANESLY

RECEIVED OCTOBER 22, 1934

## NEW BOOKS

**Bilder zur qualitativen Mikroanalyse anorganischer Stoffe.** (Illustrations for Qualitative Microanalysis of Inorganic Substances.) Collected by W. GEILMANN, Professor at the Technical High School of Hannover. Verlag von Leopold Voss, Salomonstrasse 18 B, Leipzig C 1, Germany, 1934. Text + 240 figs. 16 × 23.5 cm. Price, RM. 8; bound, RM. 9.

This assemblage of photomicrographs of crystalline inorganic salts should prove a valuable reference book to micro-analysts. The 240 photomicrographs (many double) show distinctive forms of one or more salts of nearly all the elements, the magnification varying from 55× to 490×. The photomicrographs are very clear and are remarkably free from the confusion of form often found in this sort of illustration. The text consists of short descriptions of each preparation.

LAWRENCE T. FAIRHALL

**Der Zündvorgang in Gasgemischen.** (The Explosion Process in Gas Mixtures.) By DR.-ING. GEORG JAHN, Berlin. Verlag von R. Oldenbourg, Schliessfach 31, München 1, Germany, 1934. vii + 69 pp. 25 figs. 17 × 25 cm. Price, RM. 6.

This booklet is concerned with the velocity of inflammation (flame speed) and the factors which govern the propagation of flame in space. The author attempts to show the validity of the equation for the velocity derived

thermodynamically by Nusselt [*Z. Ver. Deutscher Ingenieure*, **59**, 872 (1915)] by comparing it with velocities determined experimentally by the Bunsen burner cone method. There is no mention of the identical theories of Jouguet [*Compt. rend.*, **156**, 872 (1913); **179**, 454 (1924)] and Daniell [*Proc. Roy. Soc. (London)*, **A126**, 393 (1930)]. All three theories are based on the same fundamentals, namely, that the gas to be burned must be raised to its ignition temperature before combustion ensues and that this rise in temperature is accomplished by the process of heat conduction from the burned gas. The only difference between the three theories lies in the assumption regarding the rate of liberation of thermal energy due to chemical reaction along the  $x$ -axis between the boundaries of the flame front, that is, from unburned phase to burned phase. While no experimental basis exists for any of the assumptions made, Nusselt arbitrarily assumed that equal amounts of heat are released in unit lengths of the  $x$ -axis.

In accepting Nusselt's ideas Jahn recognizes the insufficiency of expressing the rate of chemical reaction by the simple mass law and no attempt is made to treat the chemical reactions kinetically. Assuming that the intermediate reactions introduce a factor which is constant throughout the explosive mixture concentration range, he groups everything but the mass law expression for the rate into a single constant which is determined from an experimental flame velocity measurement. The constant having been so determined the agreement between the calculated

and experimental maximum flame velocities for various mixtures of  $H_2$ ,  $CO$  or  $CH_4$  with different compositions of  $N_2$  and  $O_2$  or  $CO_2$  and  $O_2$  is found to be reasonably good, indicating that Nusselt's equation (now reduced to a constant times square root of mass action reaction rate) predicts the form of the maximum flame velocity-gas composition curve. In this connection one is reminded of similar but more spectacular results of Stevens [THIS JOURNAL, 50, 3244 (1928); Nat. Advisory Com. Aeronautics Report No. 337] who found, for a variety of complex fuels, agreement between the experimental velocity of flame propagation and the velocity derived from an equation consisting of the product of an experimental constant and the concentrations of the reactants raised to whatever power they appear in the chemical equation.

It is further demonstrated that the application of Nusselt's equation to the calculation of maximum speeds of inflammation of mixtures of combustible gases shows better agreement with experiment than the mixture rule as applied by Payman and Wheeler.

Although of interest in itself, this analysis and test of the Nusselt equation contributes little to the theory of flame movement. In the light of modern chemical kinetics the role played by active atoms or radicals which diffuse into the unburned gas, there initiating chemical reaction, would bear serious consideration. In fact the process of diffusion of the constituents from one elementary layer to another within the confines of the flame front boundary itself, automatically takes care of the problem of energy transfer across elementary layers and would seem to be of as much or more importance than the process of heat conduction [Lewis and von Elbe, *J. Chem. Physics*, 2, 537 (1934)]. This provides a means of studying the molecular processes within the flame front.

The reviewer suggests that it is the experimental conditions and not turbulence which accounts for the difference in flame speeds found in the Bunsen burner method and the spherical flame propagation method. In the former the mass flow is not normal to the flame front but is variable in direction as the gas passes through the flame front, whereas in the latter the mass flow is always normal to the flame front. On this basis lower speeds are to be expected by the Bunsen burner method. In this connection attention is called to the fascinating study (yet in its infancy) of flame shapes.

It is timely that the knowledge of chemical kinetics gained from slower reactions at lower temperatures should be applied to the problem of flames.

The inclusion of the work of Jahn is heartily recommended for the general reading of students in this field.

BERNARD LEWIS

**The Fundamentals of Chemical Thermodynamics.** Part II. Thermodynamical Functions and their Applications. By J. A. V. BUTLER, D.Sc., Lecturer in Chemistry in the University of Edinburgh. The Macmillan Company, 60 Fifth Avenue, New York, 1934. x + 271 pp. 43 figs. 12.5 × 19.5 cm. Price, \$3.00.

This volume comprises the material used by the author in a second course—that presented in Part I [noticed

in THIS JOURNAL, 51, 1954 (1929)] constituting a first course in thermodynamics for students of chemistry. Its scope is indicated by the several chapter headings: Thermodynamical Functions, The Thermodynamics of Perfect Gas Reactions, The Third Law of Thermodynamics, The Properties of Solutions, The Free Energy of Solutions, Activity Coefficients and Related Properties of Strong Electrolytes, Ionic Equilibria in Solution and Salting-out, The Standard Free Energies and Entropies of Ions, Potential Differences between Phases, The Thermodynamics of Surfaces, General Criteria of Equilibrium and Stability. The general method employed is essentially that of Gibbs, the notation is that of G. N. Lewis and extensive use is made of the partial derivatives used by him; the treatment is very concise and brings up to date the discussion of many points, particularly with respect to aqueous solutions, upon which new experimental material has appeared in the decade since the classic of Lewis and Randall was published.

J. J.

**Molekülstruktur. Bestimmung von Molekülstrukturen mit physikalischen Methoden.** (Molecular Structure. Determination of Molecular Structure by Physical Methods.) By DR. H. A. STUART, Lecturer in Physics at the University of Königsberg I. Pr. Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany, 1934. x + 388 pp. 116 figs. 14.5 × 22 cm. Price, RM. 32; bound, RM. 33.80.

This book provides a reliable, interesting and well-written discussion of modern physical methods of investigating the detailed structure of molecules and of the results obtained by their application. A very thorough treatment is given the topics of electric moment and polarizability of molecules, including the Kerr effect, to which the author has made important contributions, and of the oscillational motion of molecules, with briefer discussions of sizes and nuclear configurations as determined by the diffraction of x-rays and electrons and by older methods, and of the band-spectral determination of potential curves and heats of dissociation. The book is written especially for the chemist and experimental physicist, attention being given mainly to the structure of stable molecules in the normal state. A valuable feature is the tabulation and critical discussion of experimental results for many substances.

LINUS PAULING

**Resonance Radiation and Excited Atoms.** By ALLAN C. G. MITCHELL, Ph.D., Assistant Professor of Physics, New York University, and MARK W. ZEMANSKY, Ph.D., Assistant Professor of Physics, College of the City of New York. The Macmillan Company, 60 Fifth Avenue, New York, 1934. xvi + 338 pp. 84 figs. 14.5 × 22 cm. Price, \$5.00.

This book deals with a large variety of problems connected with the absorption of radiation by atoms in their normal states and emission of radiation by excited atoms returning to their normal states. This study includes consideration of the elementary processes which result in the production of resonance radiation, as well as the experi-

mental conditions under which these processes may be realized, and discussion of absorption coefficients, natural widths of spectral lines and the life times of excited states, collision processes and collision broadening, and the polarization of resonance radiation. Accounts of many experiments, together with descriptions of the apparatus, experimental technique and the theory of the experiments, are given, often in considerable detail, but purely theoretical consideration are in general only outlined.

As an example of the method of the authors, we may consider their treatment of the natural and Doppler broadening of spectral lines. Having listed the various agencies by which spectral lines may be broadened, they give the formulas for Doppler and natural broadening without deduction. They then consider in some detail the effect of a combination of these two types of broadening and the integration over the broadened line to get the total absorption. The final formula is then applied in the interpretation of various experimental results. This example is typical as illustrating the type of material which is stressed. In many cases the omission of the details of the theory is justified in that good accounts are available elsewhere. The reviewer, however, feels rather disappointed that the newer theories of collision broadening, for example, are presented in a manner which he finds quite unintelligible. The use of the space necessary for a clearer discussion of this material, which, as far as the reviewer is aware, is now available only in the original literature, would certainly have been very well worth while. But those who are interested in the experimental aspects of the subject, and especially those who are working in this field, will find in the book a valuable collection of material, while for both the theorists and the experimenters it will, with its many references, serve as a helpful guide to the literature.

O. K. RICE

#### **The Lyophilic Colloids (Their Theory and Practice).**

By MARTIN H. FISCHER, Professor of Physiology, and MARIAN O. HOOKER, Research Associate in Physiology, University of Cincinnati. Charles C. Thomas, 220 East Monroe Street, Springfield, Illinois, 1933. viii + 246 pp. Illustrated. 16 × 24.5 cm. Price, \$4.50.

Everyone will admit that because a point of view is unorthodox it is not thereby to be condemned. There is, however, in the unorthodoxy of the authors of this book much less of striking originality than mere restriction of the imagination, and deliberate or unconscious adherence to a naive realism in dealing with their facts. The whole gamut of colloid phenomena is to be related to, or described (one cannot say explained), by the experimental observation of phase inversion with changing proportions in such a system as soap and water. Very diagrammatic representations of this transition (Figs. 2A and 2B) for the cases, (a) liquid soap:water, and (b) solid soap:water, are given in the earliest pages of the book. They are, so to say, the Jachin and Boaz of Martin Fischer's temple of colloid science to which every head must bow entering therein. No more complex "phase diagrams" than these are allowed to appear in this treatise, so that the elaborate analysis of soap systems by McBain and his co-workers is entirely ignored. Moreover, this "Ignoramus" atti-

tude is repeated with regard to innumerable other facets of colloid science. The electrometric titration of proteins is dismissed with the following remark about gelatin "as we believe that present day methods do not allow us to know when a protein has been neutralized by an acid, etc." (p. 72). The phenomena of change of electrical conductance with temperature fall, in gelatin and other similar solutions, are restated in terms of the original and all embracing formula (hydrated protein dissolved in water: water dissolved in hydrated protein). Once again, no more profound analysis is attempted nor any effort made to relate results to possible molecular structures of the proteins.

These restrictions and limitations should be realized by anyone attracted to read this book and who might think it a general treatise on the subject. Its scope is solely the application of the inversion phenomenon already mentioned to gelation *in vitro*, to certain technical processes, products and "sicknesses" thereof, such as the livering of paints, and to life processes. Here one finds interesting discussions of protoplasm and oedema. Yet in this field an implicit if not explicit denial of Donnan (membrane) equilibria cannot be regarded as a logical sequel to the authors' point of view, nor as merited by the facts.

The biochemical conclusion of main importance which the authors reach is that in the organism synthetic reactions are chiefly or wholly accomplished in substantially anhydrous media, decompositions in aqueous media.

The most interesting experimental results described are, perhaps, those relating to development of heat in the process of gelation of certain colloids, a subject to which more attention might profitably be devoted. Taken as a whole the work represents an undue simplification of the subject, but a simplification which is inflated by the inclusion of large numbers of unnecessary tedious tables paralleling curves, as well as equally unnecessary plates of specimens.

S. E. SHEPPARD

**The Physico-Chemical Properties of Plant Saps in Relation to Phytogeography.** Data on Native Vegetation in its Natural Environment. By J. ARTHUR HARRIS, late Head of the Department of Botany, University of Minnesota. Formerly Resident Botanist, Station for Experimental Evolution, The Carnegie Institution of Washington. The University of Minnesota Press, Minneapolis, Minn., 1934. vi + 339 pp. 13.5 × 23.5 cm. Price, \$4.50.

Following the untimely passing of Dr. Harris in 1930, a survey of his records and notes indicated that these contained a vast number of useful data resulting from his studies of plant saps. These data had been accumulated by him and his associates during a period of sixteen seasons. They were the results of expeditions into many habitats, including rain forests, Florida everglades, dismal swamp of Virginia, sand dunes, coastal plains, mountain slopes, deserts, lava fields and salt flats. For these surveys he had developed techniques for field observations and measurements of certain physico-chemical properties of the plant tissue fluids in these varied habitats.

Papers were published during the progress of these studies which were based upon fragments of the work, but most of the data were not recorded where they became

available to other workers in this field. Accordingly the President of the University of Minnesota charged a committee consisting of Dr. C. O. Rosendahl, Dr. G. O. Burr and Dr. R. A. Gortner with the task of studying the records and preparing them for publication. Mr. Chas. Crane collaborated in preparing the description of the "stations" from which the samples were taken. For the present volume the records are confined to the actual data classified by species, station and habitat, without endeavoring to analyze or interpret them in terms of phytogeographical or ecological problems.

The first chapter of the book is a republication of Dr. Harris' paper on "Physical Chemistry in the Service of Phytogeography" which outlines the principal objectives of the large study that he undertook many years ago. Next follows an outline of the major project in terms of the constants to be determined and the habitats to be included, which is accompanied by a bibliography of the papers published during the period from 1913-1930.

"The importance of phyto-chemical studies in the field of plant geography" is next presented by Dr. H. L. Shantz. These three divisions conclude Part I.

Part II consists of a tabulation of the experimental data on the physico-chemical constants of the plant saps of the native vegetation. These data are arranged by areas, and within each area (commonly a state) they are in alphabetic order of the genera represented. Accordingly it has not been necessary to provide a botanical index. The several columns include (a) botanical name, (b) chemical number, the first two figures of which indicate the year of collection, (c) station number or (d) habitat, or both, which carry a key designation that is described in detail in Part III, (e)  $\Delta$  ( $^{\circ}$  C.), or depression of the freezing point in  $^{\circ}$ C., (f)  $P$  (atm.), or the osmotic pressure of the sap in atmospheres as computed from  $\Delta$ , (g)  $K$  (mhos), or the specific electrical conductivity in reciprocal ohms, (h) the value of  $K/\Delta$ , (i) chloride content in terms of grams  $\text{Cl}^-$  per liter and (j)  $P_{\text{H}}$  of sap. Not all of these constants are recorded for every sample, however.

Part III, as already indicated, records the description of the stations or habitats from which the samples were taken, grouped by states, and the latter arranged alphabetically. An index to experimental data is appended, by means of which one can locate the data for all the plants collected in each habitat.

The book is unique in the wealth of these physico-chemical data which it contains. It should constitute a nucleus about which further compilations of this nature may be built. In such an event these data of Harris should be in physiological and reference libraries.

C. H. BAILEY

**An Introduction to the Biochemistry of Nitrogen Conservation.** By GILBERT J. FOWLER, D.Sc., F.I.C., Professor (Retired) of Biochemistry in the Indian Institute of Science, Bangalore, S. India. Longmans, Green and Company, 55 Fifth Avenue, New York, 1934. viii + 280 pp. 14.5  $\times$  22.5 cm. Price, \$4.50.

This book covers the subject matter of a series of lectures which was delivered at Patna University, India, and accordingly is pointed rather directly at conditions as they exist in India.

In the introductory chapter the author points out that nitrogen is in many instances the chief factor which limits the food supply, and that biological organisms are very active both in the fixation of atmospheric nitrogen into a usable form and in denitrification which again returns the fixed nitrogen to the atmosphere. The great wastage of fixed nitrogen which man encourages when he pours raw sewage into streams is condemned as little short of a tragedy since "nitrogen conservation is a major factor in the world's prosperity, indeed nitrogen thus conserved together with the energy, mental and physical, liberated by an adequate food supply, is a real measure of the 'wealth of nations.'" The author points out that if the nitrogen which is wasted in India were to be conserved it would raise the standard of living, make possible a market for the products of a mechanized industry and so lead to a better balanced and a more civilized existence for the nation as a whole.

The yield of agricultural crops in India, limited as they are by nitrogen, are greatly below that of other countries: e. g., rice, India 1295 pounds as contrasted with 2783 and 3040 pounds per acre in Egypt and Japan, respectively; cotton, India 87 pounds as contrasted with 155, 181 and 371 pounds per acre in America, Japan and Egypt; sugar, 2400 pounds as contrasted with 3340, 3378, 11,988 and 18,799 pounds per acre in Japan, Egypt, Java and Hawaii, respectively.

The author further points out that the caste system in India and religious taboos make for a great wastage of nitrogen since night soil is not utilized in India as it is in China and Japan. He further suggests that the "sacredness" of the Ganges may have been originally inspired as a means of preventing pollution of the stream by sewage, but that unfortunately this aspect has been ignored, so that now nearly all Indian streams are greatly polluted, resulting in a menace to public health as well as a great loss of available nitrogen. Subsequent chapters deal with "Methods and Reagents of Biochemical Research," "Sources of Organic Nitrogen," "Building Up and Breaking Down of Nitrogenous Matter," "The Chemistry of Ammonia Formation," "Nitrification," "Decomposition of Non-Nitrogenous Organic Matter by Microorganisms" (in which the author points out that the inflammable gases (largely methane) which are formed in septic tanks would, if conserved, be adequate to pump the normal volume of sewage for the population which provided the sewage), "Nitrogen Fixation," "The Chemistry of Sewage Purification," "The Activated Sludge Process," "The Disposal of Solid Refuse," "The Assimilation of Nitrogen by Plants," "The Sulfur Cycle" and "Some Examples of Nitrogen Conservation."

The chemical treatment is for the general student, not for the specialist, and accordingly is rather brief and elementary. Nevertheless the examples cited are excellently chosen and are woven into a running narrative which can hardly fail to give the reader a picture of the importance of nitrogen conservation. It is emphasized over and over again that the activated sludge process, or some similar process, not only removes a nuisance and a public health menace, but in addition through the nitrogen so conserved provides for an increased wealth of the community and of the nation. Incidentally the author states that "Mil-

waukee is perhaps the most outstanding example of nitrogen conservation by completely modern methods."

The book is excellently printed and is provided with an adequate index. It is recommended to all interested in nitrogen conservation, especially to those who may wish to compare agricultural practices in India and China.

ROSS AIKEN GORTNER

**Electrokinetic Phenomena and their Application to Biology and Medicine.** By HAROLD A. ABRAMSON, M.D. American Chemical Society Monograph Series. The Chemical Catalog Company, Inc., 330 West 42d Street, New York, 1934. 331 pp. 106 figs. 15.5 × 23.5 cm. Price, \$7.50.

Here is a book which should supply a much felt need to those who have come to recognize that the properties of interfaces are a determining factor in the phenomena in which their primary interests lie, whether they are engaged in chemical, physical, biological or industrial research. That a knowledge of the electrokinetic properties of an interface does not tell the whole story may be readily admitted, but in many cases it is the only method of study applicable, and in all cases it should be of great aid in defining the properties of the surface being studied. In this volume the extensive literature on the subject has been assimilated and is presented in the light of modern theories of chemistry and physics.

Chapters I and II are devoted to the history of those electrical properties of interfaces which have been named "electrokinetic." Experiment and theory are reviewed up to the time when the idea of a diffuse electrical double layer began to replace that of a rigid double layer as postulated by Helmholtz.

The applications and limitations of the various methods used for the measurement of the electrokinetic properties of interfaces are discussed in chapter III.

In chapter IV, the real object of the book is attained. Here the subject is correlated with the modern theory of electrolytes and relationships are arrived at which will be valuable in making possible a proper interpretation of experimental data obtained by means of the methods of electrokinetics.

The manner in which electrokinetic measurements may aid in the study of the nature of surfaces is well illustrated in a chapter which is devoted to proteins and related compounds.

In the last five chapters of the book a review is given of the experimental work on electrokinetics that has been published within the last few years. This is discussed in terms of the theoretical presentation of earlier chapters. This work is classified, roughly, by the type of surface upon which the study was made, these surfaces being grouped as inorganic, organic and gas, with two chapters which are devoted to studies made upon living surfaces. Of the latter, one chapter deals with body tissues and cells while the other reviews work done on bacteria, viruses, anti-bodies and other systems of particular interest to the immunologist.

References to the literature on the subject are complete and an appendix gives a large list of patents covering industrial applications of electrokinetic methods.

The volume is clearly and concisely written. It insists upon the necessity of accurately defined experimental work in this field and offers many suggestions in the form of unsolved and pertinent problems. It gives the subject a uniformity and background of theory which will make it valuable to the teacher as well as to those doing, or interested in doing, experimental work in electrokinetics.

DAVID R. BRIGGS

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## BOOKS RECEIVED

September 15, 1934–October 15, 1934

- FARRINGTON DANIELS, J. HOWARD MATHEWS and JOHN WARREN WILLIAMS. "Experimental Physical Chemistry." Second edition. McGraw-Hill Book Co., Inc., 330 West 42d St., New York. 499 pp. \$3.50.
- JOHN A. ELDRIDGE. "The Physical Basis of Things." McGraw-Hill Book Co., Inc., 330 West 42d St., New York. 407 pp. \$3.75.
- WILLIAM J. HALE. "The Farm Chemurgic. Farmward the Star of Destiny Lights Our Way." The Stratford Company, Boston, Mass. 201 pp.
- FRITZ LAQUER. "Hormone und innere Sekretion." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 368 pp. RM. 18; bound, RM. 19.
- JOSEPH MARTINET. "Précis de Chimie d'après les Théories Modernes." G. Doin & Cie., Éditeurs, 8 Place de l'Odéon, Paris VI<sup>e</sup>, France. 934 pp. 52 fr.
- WILLIAM F. PETERSEN and MARGARET E. MILLIKEN. "The Patient and the Weather." Vol. III. Mental and Nervous Diseases. Edwards Brothers, Inc., Ann Arbor, Mich. 375 pp. \$5.00.
- G. TEMPLE. "An Introduction to Quantum Theory." D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. 196 pp.
- "A. S. T. M. Standards on Petroleum Products and Lubricants." Prepared by Committee D-2 on Petroleum Products and Lubricants, Published by The American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa. 340 pp. \$1.75; to members, \$1.50.
- "Sands, Clays and Minerals," A British Magazine Devoted to Economic Minerals. Published by A. L. Curtis, Westmoor Laboratory, P. O. Box 61, Chatteris, England.
- "Service Characteristics of the Light Metals and their Alloys." Prepared by Subcommittee VII of Committee B-7 on Light Metals and Alloys, Cast and Wrought. Published by the American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa. 33 pp.
- "The Significance of Tests of Petroleum Products." A Report Prepared by A. S. T. M. Committee D-2. Published by The American Society for Testing Materials, 260 South Broad St., Philadelphia, Pa. 76 pp. \$1.00; to members, \$0.75.
- "The Solid Products of the Carbonization of Coal." Published by Chemical Department, South Metropolitan Gas Company, 709 Old Kent Road, London S. E. 15, England. 123 pp.