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## NEW BOOKS

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**Annual Review of Biochemistry.** Vol. IV. Edited by JAMES MURRAY LUCK, Stanford University. Annual Review of Biochemistry, Ltd., Stanford University P. O., California, 1935. vii + 639 pp. Illustrated. 15.5 × 23 cm. Price, \$5.00.

The fourth volume in this series of annual reviews introduces two new sections on choline and allied substances by J. H. Gaddum, and on growth substances in plants by K. V. Thimann. The biochemistry of malignant disease as reviewed by Barbara E. Holmes differs somewhat from the discussion of malignant tissue prepared by E. Boyland a year ago.

Several new reviewers contributed to this volume, including M. H. Jacobs, on permeability; R. Sonderhoff, on biological oxidations and reductions; J. B. Sumner, on enzymes; Sir J. C. Irvine and G. J. Robertson, on the chemistry of the carbohydrates and the glycosides; E. Chargaff, on the chemistry of the acyclic constituents of natural fats and oils; E. J. Cohn, on the chemistry of the proteins and amino acids; C. Artom, on fat metabolism; B. A. Houssay, V. Deulofeu, and A. D. Marenzi, on the hormones; P. Eggleton, on the chemistry of muscle; R. Kuhn, on plant pigments; and F. C. Steward, on the mineral nutrition of plants.

In addition to these reviews, the volume also includes the following: The chemistry and metabolism of the compounds of sulfur, by H. B. Lewis; the chemistry and metabolism of nucleic acids, purines and pyrimidines, by L. R. Cerecedo; carbohydrate metabolism, by C. F. and G. T. Cori; the metabolism of amino acids and proteins, by Y. Kotake; the metabolism of creatine and creatinine, by W. C. Rose; detoxication mechanisms, by B. Harrow and C. P. Sherwin; vitamins, by L. J. Harris; nutrition, by S. Brody; the metabolism of brain and nerve, by E. G. Holmes; chemical embryology, by J. Needham; the alkaloids, by R. Robinson; immunochemistry, by M. Heidelberger; the chemistry of bacteria, by M. Stephenson. About a dozen sections or subjects that were reviewed in Volume III are omitted from the current volume, these being subjects that apparently are being covered in this series every other year or thereabouts. In fact it appears to be the policy of the editors to alternate certain subjects and the current volume covers subjects that were included two years ago but were not included in Volume III.

Comments made by the reviewer a year ago respecting Vol. III apply equally well to the recent issue of Vol. IV. The surveys are concise, and critical, and must be very serviceable to the workers in this expansive field of biochemistry. Thimann's review of growth substances in plants, covering, as it does, contributions dating back ten years, constitutes a welcomed addition to the book. Not only has he discussed cell elongation and root formation in the higher plants, but he has included a consideration of growth substances for fungi, and yeast (bios) as well.

It appears to the reviewer that errors have been made in the diagrammatic formulas of tachysterol and the compound intermediate between it and calciferol on page 364.

The two double bonds in the ring system are not represented here as conjugated, despite the fact that the text immediately above described them as such, and they were so represented by Rosenheim and King in their paper to which reference is made in the bibliography appended to this chapter.

C. H. BAILEY

**The Principles of Quantum Mechanics.** By P. A. M. DIRAC. Second edition. Oxford University Press, 114 Fifth Ave., New York, 1935. xi + 300 pp. 16 × 24 cm. Price, \$6.00.

This is a book intended for those who are interested in deepening their understanding of the essential significance of quantum mechanics, rather than in the actual solution of problems. The list of topics treated contains few that will not be already familiar to the reader; the method of approach, however, is wholly different from those usually followed.

To the exposition of this method of approach, the first six of the thirteen chapters are devoted. The author's aim is to find statements of the laws of nature which shall be as far as possible free from quantities depending upon arbitrary frames of reference or particular states of mind of the observer. Where such quantities do enter, they must merely illustrate fundamental relations, the latter remaining invariant under all possible transformations of the special terms in which they are stated. This guiding principle is developed in terms of the theory of vectors according to which the mathematical relations of directed quantities can be formulated without the introduction of any particular coordinate system or set of reference vectors, although this is required for the solution of any particular problem. In the present application, the vectors are imagined as existing in a space of infinite number of dimensions. Any particular vector corresponds to a particular state of knowledge of the observer concerning the state of the system under discussion, such as that each particular "observable" (energy, angular momentum, etc.) has a certain probability of having each of its possible values. "Eigenstates" are those for which one or more observables certainly have particular "eigenvalues," and the corresponding vectors, forming a complete orthogonal set, may conveniently serve as coordinate axes in terms of which other vectors may be expressed numerically. Owing to the characteristic impossibility of assigning definite values to several observables simultaneously, the eigenstates and the reference frames corresponding to different observables do not in general coincide. The squares of the coefficients with which the eigenvectors of a given observable must be taken in order to produce by vectorial addition any given vector (as an eigenvector of another observable) are equal to the probabilities that a measurement of the given observable, performed upon the system in the given state, will yield as result the several corresponding eigenvalues.

In order to determine these coefficients, and to discuss other relations between the vectors, it is necessary to introduce tensors, which correspond to observable quantities. When expressed in terms of a given coordinate system, the tensors take the form of the familiar matrices of ordinary presentations of quantum mechanics. The customary processes of matrix multiplication thus appear as simply special methods of representing operations of combining tensors and vectors, whose real meaning (similar to the scalar product of two vectors) is quite independent of any particular system of axes, and which therefore are well suited for stating fundamental laws.

The picture so far is limited to a particular instant of time, and is therefore not properly relativistic. This is a defect which it has not been possible to remedy. The next few chapters are devoted to a study of the way in which the vectors change with the time, giving an account of the motions occurring in the system. An alternative presentation regards the vectors as stationary, but referred to moving axes; the tensors corresponding to observables then become functions of the time. On this basis is developed the theory of simple problems such as motion in a central field, perturbations, collision effects, etc., the final results being those already well-known.

The last three chapters, on Radiation, Relativistic Electron and Field Theory, are devoted to subjects in which the author himself has done much of the pioneer work, and will be valuable as a convenient unified presentation of the essential material.

The book is carefully worked out and well-written. Naturally, it is extremely arduous reading for anyone not accustomed to the formalism and abstractness of modern physical theory, but in the opinion of the reviewer the effort expended upon it will be richly rewarded.

ALBERT SPRAGUE COOLIDGE

*Étude Thermodynamique de la Tension Superficielle.* (A Thermodynamic Study of Surface Tension.) By RAYMOND DEFAY. Preface by Th. DeDonder. Gauthier-Villars et Cie., Éditeurs, 55 Quai des Grands-Augustins, Paris, France, 1934. xi + 372 pp. 16 × 24 cm. Price, fr. 30.

This volume coordinates the work of the author on surface tension published 1929 to 1934 and contains the material of his doctorate thesis. In the first part of the work he takes up from the beginning the thermodynamic problem of capillary and adsorption phenomena, using the approach of DeDonder, which postpones the assumption of equilibrium to a later point in the reasoning than in the treatment of Gibbs and thus enables the presentation of certain results more general than those of Gibbs. The equilibrium assumptions which the reviewer has noted as being thus postponed are those relating to phase equilibrium and to equilibrium with respect to chemical reactions.

In his logical development he rejects the hypothesis that the surface phase is autonomous, *i. e.*, that its thermodynamic properties can be expressed by functional relations containing only variables appropriate to the surface phase itself. This is of consequence only when there is not equilibrium; for when the hypothesis of "localization of equi-

librium" is admitted—that any portion of a system in equilibrium constitutes itself a system in equilibrium—the usual results for equilibrium are obtained.

The reviewer does not agree with a remark (page 77) that this latter hypothesis is introduced by Gibbs when he writes his equation 476, but considers it explicitly introduced in the beginning when Gibbs states that in case of equilibrium the criteria must be satisfied in *all possible variations*.

Defay introduces the radius of curvature into his equations by means of the relation  $p'' - p' = \sigma/(R_1 + R_2)$ , which is assumed from mechanics. He places the dividing surface always within the region of discontinuity, insisting that the location of this dividing surface is not arbitrary (page 99). His treatment here is very clear. Yet his remarks on Gibbs and his followers seem not entirely adequate, and Gibbs' statements on page 234 seem ignored: (1) that the position of the quantity  $\sigma$ , considered as a tension, is in the surface of tension and, strictly speaking, nowhere else; (2) that the value of  $\sigma$  is independent of the position of the dividing surface, when this is plane; and (3) that the positions which he will consider will not vary from the surface of tension sufficiently to make this distinction of any practical importance. Defay has a right to his own development and this is in several respects simpler than that of Gibbs. The gain here is accompanied, however, by a loss—Defay is not able to derive the Gibbs equation for the so-called adsorption isotherm and does not discuss it.

Under the heading "Catalysis at a Distance," Defay shows the theoretical possibility (depending on the non-autonomy of the surface phase) that a surface may act as a catalyst without any exchange of mass and that surface catalysis can affect the affinity of a reaction.

The phase rule is extended to systems containing surface phases (in both parts of the book) and is often applied in the treatment. Various thermodynamic theorems are generalized to take account of the presence of surface phases and the possibility that equilibrium is not reached.

It is pointed out (page 17) that the surface tension is not necessarily equal (when there is adsorption) to the superficial free energy per unit area.

The second part of the work is so written as not to require preliminary study of the first part. It is entitled "The Extrema [maxima or minima] of Surface Tension and the Indifference of Capillary Systems" and deals mostly with the azeotropic properties of such systems. The conditions of equilibrium of systems containing surfaces which meet *along edges* are discussed, but without consideration of the effects of gravity. The rule of Antonoff 1907 is traced to Poisson 1831 and it is shown that (in a system uninfluenced by gravity) this rule is inconsistent with the presence of edges between coexistent surface phases. Theorems of Duhem, of Saurel, and of Gibbs and Konow are generalized.

The book is clearly written by an author obviously competent in mathematics and the theory of thermodynamics. The symbols chosen will give little or no difficulty to readers of Gibbs. There is no index, but the table of contents is unusually effective as it contains over 150 headings.

L. J. GILLESPIE

**Physique Moléculaire. Matière et Énergie. (Molecular Physics. Matter and Energy.)** By VICTOR HENRI. Professor at the University of Liège. Herimann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris, France, 1933. v + 436 pp. 16 × 24.5 cm. Price, fr. 110.

The ten chapters of the book are entitled: Discontinuity of matter, Determination of the number of molecules, The chemical elements, X-ray spectra, Atomic numbers, Periodic System, Radioactive elements, Isotopes, Disintegration and synthesis of elements, Space properties of the elements, Kinetic theory of gases, Atomic structure.

Inspired by an early attachment to the Leibnizian monadology, the gifted author has burst the walls of his own specialty and tried to write in one moderate-sized volume a compact yet penetrating account of nearly all those aspects of modern molecular and atomic physics which are of special significance for chemistry. Henri's own early studies (1908) of the Brownian movement in rubber latex gave him an interest in molecular theory and the determination of  $N$  which make the first chapter (on the discontinuous structure of matter) unusually excellent. In the chapter on the chemical elements (p. 61) he espouses a lost cause when he tries to limit the word "element" to a single atomic species.

The later chapters contain good discussions of ionization and resonance potentials and their significance for the periodic system. The Bohr theory is discussed in some detail, but modern quantum ideas are hardly mentioned. The spatial properties of atoms and ions receive some attention.

The book was surprisingly up to date when it was published two years ago, but has already fallen somewhat behind the rush of new developments in its field. It contains a large number of very useful literature references, but is marred by careless proof reading, particularly of English names. Some random examples are thalium, Lokyer, isote for isotope, Stockes, Bridgeman for Bridgman, John Tydall. On p. 355 and elsewhere Davisson and Germer's discovery is credited to Davisson and Kunsman.

NORRIS F. HALL

**The Chemistry of Organic Compounds. A Year's Course in Organic Chemistry.** By JAMES BRYANT CONANT. Professor of Chemistry, Harvard University. The Macmillan Company, 60 Fifth Avenue, New York, 1933. x + 623 pp. 14.5 × 22.5 cm. Price, \$4.00.

The present text, designed for a full year course in organic chemistry, and an appropriate expansion of the author's excellent "Brief Introductory Course," has much to recommend it. It is concisely and logically written; it adapts itself admirably to classroom usage; and it gives a true appreciation of the scientific method.

The author has made use of the electron theory of valency with excellent discrimination, employing it in cases where it is generally regarded as of value to the organic chemist, and avoiding it when it would make for confusion in the minds of elementary students.

There is material beyond the scope of the usual course, but this is of particular advantage for the instruction of the honors type of student, to whom, in most institutions, special reading is given.

In short, then, this text is a very notable addition to the group of the few worthwhile texts of its degree of difficulty in organic chemistry.

ARTHUR J. HILL

**A Comprehensive Treatise on Inorganic and Theoretical Chemistry. Volume XIV. Fe (Part III), Co.** By J. W. MELLOR, D.Sc., F.R.S. Longmans, Green and Co., 114 Fifth Avenue, New York City. viii + 892 pp. 277 figs. 15.5 × 25 cm. Price, \$20.00.

The first part (416 pages) of this volume concludes the section on iron, recounting the physical and chemical properties of the salts of iron. The remainder of the volume (some 476 pages) is devoted to the element cobalt and its compounds.

The treatment throughout is analogous to, and maintains the same high quality as, that of previous volumes.

There remain but two volumes of this monumental handbook to appear: Volume XV, covering nickel and the elements of the platinum group other than platinum itself, and Volume XVI, covering platinum and containing the General Index for the whole Treatise. The publisher states that both of these volumes are in the press.

ARTHUR B. LAMB

**Annual Tables of Constants A. T. C. and Numerical Data Chemical, Physical, Biological and Technological,** published under the patronage of the International Union of Chemistry. Volume X (1930). McGraw-Hill Book Co., Inc., 330 West 42d St., New York, 1935. Two parts, about 1800 pages. Price (for subscribers) cloth, \$20.00.

In the Introduction to this Volume X (1930) of the Annual Tables, Dr. Marie, Editor-in-Chief, states:

"When Volume IX was published in 1931, we hoped that the period of the difficulties which we had to overcome was at last over and that we should be able to take up again the publication of annual Volumes. This hope, however, was not fulfilled. The financial means which we thought we could rely upon have been reduced to such an extent that we were compelled to suspend the printing of the Annual Tables. The general economic crisis is responsible for this situation. Consequently, we had to postpone the publication of Volume X, which brings to a close our 2nd series and of the Index to this series.

"We hope that this work will be completed in the course of 1935. We further hope to be able, at the same time, to start with the publication of the data of the years 1931 to 1934 in Volume XI, which is to be the first of our 3d series."

This volume follows the same method and exhibits the same excellence that have characterized the earlier volumes. Dr. Marie and his collaborators deserve both our gratitude and our congratulations in having kept alive this important branch of scientific documentation during a prolonged and world-wide period of depression.

It also should not be forgotten by those who have difficulty with the French language that all texts in the Annual Tables of Constants are given in both French and English.

ARTHUR B. LAMB

**An Introduction to Quantum Theory.** By G. TEMPLE, F.R.S., Ph.D., D.Sc., Imperial College of Science and Technology, London. D. Van Nostrand Company, Inc., New York, 1934. 196 pp. 14 × 22 cm.

This book covers the topics usual to an elementary text on quantum mechanics, including a discussion of both the wave equation and matrix mechanics, with a few elementary applications; finally the relativistic theory of the electron is presented. The treatment is based squarely on classical mechanics and relativity, and the relation between these older branches of physics and the quantum mechanics is constantly brought out and emphasized. For this reason the book will be useful to those who are interested in the fundamental aspects of the subject. It may also be recommended to beginners in quantum mechanics who are thoroughly grounded in classical physics, though it seems likely that on account of its rather abstract and formal style it will not appeal to chemists as much as some of the other books on the subject now available.

O. K. RICE

**Atomic Structure and Spectral Lines.** By ARNOLD SOMMERFELD. Translated from the Fifth German Edition by HENRY L. BROSE, M.A., D.Phil., D.Sc., Lancashire-Spencer Professor of Physics, University College, Nottingham. Volume I. E. P. Dutton and Company, Inc., 286-302 Fourth Avenue, New York, 1934. xi + 675 pp. 151 fig. 14.5 × 22.5 cm. Price, \$10.80.

In the development of quantum theory since the advent of the Bohr atom in 1913, there has probably been no one book which has been first and last of as great value and influence as the various editions of Sommerfeld's "Atomic Structure and Spectral Lines." In this connection we may well quote what the translator (Brose) says of Professor Sommerfeld: "He has earned the gratitude of physicists throughout the world for carrying out so successfully the monumental task of a comprehensive and lucid exposition of modern atomic physics." The volume in question is such a well-known one that a review of its contents seems scarcely necessary, except to remark on how it differs from the earlier editions. Like the earlier ones, it does not utilize the methods of quantum mechanics, except for occasional quotation of results. Instead the presentation of the new mechanics is deferred to a promised second volume, which will be an amplification of Sommerfeld's well-known and excellent "Wellenmechanische Ergänzungsband" (translated under the title "Wave Mechanics"). Of course this plan keeps the procedure in the first volume from being too mathematical, and there is a great deal to be said in favor of the author's statement that "it is possible to understand the new theory only by building it up from the old." Still there are many cases where the situation is really more lucid and intelligible if the new analysis has first been developed.

As compared with earlier editions, sections have been added on the Pauli principle, hyperfine structure, complex spectra, and other subjects. In the discussion of helium, one misses the dramatic quotation from Faust "Hier stock'ich schon; wer hilft mir weiter fort?" found in

earlier editions. The dilemma of the helium atom has been explained away by the new quantum mechanics, and the words of Faust are no longer necessary. However, the revision is not sufficiently drastic and recent that the volume can be classed as up-to-date, particularly as regards references to the literature. It is, for instance, somewhat startling to learn that the most recent experimental determinations of the hydrogen fine structure are those of G. Hansen in 1925. Actually a whole bibliography could be given of later papers. It is now, we believe, generally conceded that the old theory of Fues and Wentzel of "partially penetrating orbits" discussed in section 5 of Chap. VII is not the true explanation of the anomalous behavior of the principal series of mercury, but that rather the latter is due to a perturbation effect, as proposed by Shenstone and Russell in 1932, and so on.

A major reason why the volume is not more modern is that whereas the German edition was written in 1931, the English translation did not appear until 1934, without any attempt to collate with publications in the intervening period (except for a translator's addendum of five papers largely on nuclear structure).

J. H. VAN VLECK

**Alkaloidhaltige Genussmittel, Gewürze, Kochsalz.** (Alkaloid-Containing Luxuries, Condiments, Cookery Salt.) By E. BAMES, A. BEYTHIEN, C. GRIEBEL, H. HOLTHÖFER, P. KOENIG, R. STROHECKER, K. TÄUFEL, J. TILLMANS. Bömer-Juckenack-Tillmans, "Handbuch der Lebensmittelchemie," Vol. VI. Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany, 1934. ix + 604 pp. 344 figs. 17.5 × 25.5 cm. Price, RM. 76; bound, RM. 79.60.

This is volume six of a series of eight volumes of a Handbook of Food Chemistry which are not appearing in numerical order. Volume one—a general introduction to the series—was reviewed in *THIS JOURNAL* [56, 1429 (1934)] by C. A. Browne. This volume is divided into six principal sections and an appendix, each by a separate compiler: I, Coffee, coffee substitutes and adulterants (Täufel); II, tea, tea substitutes, maté and cola (Strohecker); III, cocoa and chocolate (Beythien); IV, tobacco (Koenig); V, condiments (Griebel); VI, cooking salt (Strohecker); and the supplement which gives a very brief digest of the laws and regulations under which the products are sold in various countries (Holthöfer-Bames). Under coffee (for example), the compiler (Dr. Täufel) describes the botanical and geographical sources of the product, its varieties and physical properties and gives methods for the determination of the principal chemical constituents such as ash, water-soluble extract, caffeine, nitrogenous substances, etc. The composition of unroasted and roasted coffee and the changes which take place in roasting are discussed at considerable length. Several brands of "caffeine-free" coffees are named and the methods for preparing them are described in a general way. The chapter on the microscopical characteristics of coffee and its substitutes is by Griebel, although most of the drawings are taken from Moeller rather than from the author's publications. The other sections of the work are treated in a similar manner. The references to German writings on all of the topics are very complete but the authors have

made almost no use of the literature in English. It is difficult for the reviewer to understand how it was possible to compile a work of this character and omit nearly all references to American or English contributors. For example, the Power-Chesnut method for determining caffeine, which was published in 1919, and which has been adopted by the Association of Official Agricultural Chemists, is not mentioned. Instead, other less reliable methods are given. Again, the Self and Rankin method for the determination of theobromine and theophylline, which has been known for several years and is official now in the British Pharmacopoeia, is not considered.

Six methods for determining volatile oils in such materials as cinnamon and cloves are given but no editorial opinion is expressed as to which is considered best. The Clevenger method, which has attained such wide recognition in this country because of its relative simplicity and broad applications, is overlooked. Even where the original papers on other topics are in English, such as Schmitt's researches on the assay of theophylline, the compiler refers only to abstracts in German. The reviewer did not observe a single reference to any method adopted by the Association of Official Agricultural Chemists and noted but few references to papers published in its Journal. The volume includes a workable index. Throughout the work there is neglect to discuss critically the merits of the several methods for the determination of a given substance where more than one procedure is given. From the standpoint of the analyst this is the most conspicuous fault in the volume. Because of its lack of critical judgments and because of its general ignorance of the chemical literature of the world (except German) this volume of the work will not be as serviceable to American chemists as it would otherwise have been. It is hoped that these defects will be remedied in future editions.

L. E. WARREN

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### BOOKS RECEIVED

August 15, 1935-September 15, 1935

- J. J. CARLBERG. "Bestämning av pH-Värdet I Utspädda Bikarbonatlösningar vid Olika CO<sub>2</sub>-Tryck." Helsingfors University, Helsingfors, Finland. 79 pp.
- G. H. CARTLEDGE. "Introduction to Inorganic Chemistry." Ginn and Company, 15 Ashburton Place, Boston, Mass. 609 pp. \$3.00.
- G. H. CARTLEDGE and H. M. WOODBURN. "Laboratory Exercises in Inorganic Chemistry." Ginn and Company, 15 Ashburton Place, Boston, Mass. 149 pp. \$1.00.
- H. JERMAIN CREIGHTON. "Principles and Applications of Electrochemistry. Vol. I. Principles." Third edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York. 502 pp. \$4.00.
- HORACE G. DEMING. "General Chemistry. An Elementary Survey Emphasizing Industrial Applications of Fundamental Principles." Fourth edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York. 774 pp. \$3.50.
- HOLGER JÖRGENSEN. "Die Bestimmungen der Wasserstoffionenkonzentration (pH) und deren Bedeutung für Technik und Landwirtschaft." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 264 pp. RM. 15; bound, RM. 16.
- FRANZ KRZYL. "Adsorptionstechnik." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 132 pp. RM. 8.50; bound, RM. 9.50.
- DOUGLAS MCKIE and NIELS H. DE V. HEATHCOTE. "The Discovery of Specific and Latent Heats." Edward Arnold & Co., 41-43 Maddox St., London W 1, England. 155 pp. 6s., net.
- LISE MEITNER and MAX DELBRÜCK. "Der Aufbau der Atomkerne. Natürliche und Künstliche Kernumwandlungen." Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany. 62 pp. RM. 4.50.
- LINUS PAULING and E. BRIGHT WILSON. "Introduction to Quantum Mechanics with Applications to Chemistry." McGraw-Hill Book Co., 330 West 42d St., New York City. 468 pp. \$5.00.
- HANSJÜRGEN SAECHTLING. "Hochpolymere organische Naturstoffe. Der Feinbau pflanzlicher und tierischer Gerüstsubstanzen und des Kautschuks." Verlag Friedr. Vieweg & Sohn, Braunschweig, Germany. 124 pp.
- RALPH L. SHRINER and REYNOLD C. FUSON. "The Systematic Identification of Organic Compounds. A Laboratory Manual." John Wiley and Sons, Inc., 440 Fourth Ave., New York City. 195 pp. \$2.25.
- "Gmelins Handbuch der anorganischen Chemie. System-Nummer 53, Molybdän." Verlag Chemie, Corneliusstrasse 3, Berlin W 9, Germany. 393 pp. RM. 64.