

rather small because of the following circumstances.

The catalyst we used in the bromination of trimethylethylene was rather inactive because of extended previous use so that, for instance, it failed to brominate ethylene completely after the experiments on trimethylethylene. Thus the secondary reactions described in the preceding article may easily have been less pronounced in our experiments. This is, indeed, borne out by the agreement of the refractive index of our product with that calculated from atomic refractivities for trimethylethylene³ and roughly with that found by Vaughan and Rust for their high boiling fraction. It is safe therefore to conclude that the yield of monobromides in our experiments was quite small.

(3) Calcd. 1.5050 from Hückel, "Theoretische Grundlagen der organischen Chemie," 2. Auflage, 2 Band, p. 86; obsd. 1.5054 = 0.0003; high boiling fraction of Vaughan and Rust, 1.5076.

Since there was no halogen acid in the exit gases the reaction $C_5H_{10}Br_2 \rightarrow C_5H_9Br + HBr$ must have been followed quantitatively by the reaction $C_5H_{10} + HBr \rightarrow C_5H_{11}Br$. Thus these secondary reactions can be combined into one reaction $C_5H_{10}Br_2 + C_5H_{10} \rightarrow C_5H_{11}Br + C_5H_9Br$, the heat of which, according to our present information, is quite small. Hence even a considerable yield of monobromides could not have seriously affected our thermal data.

In view of all this we still believe that our estimate (200 cal./mole) of the over-all error is adequate although the observed variations of the refractive index of the product suggest that small variable quantities of the monobromides might have been present.

CHEMICAL LABORATORIES
HARVARD UNIVERSITY
CAMBRIDGE, MASS.

JOHN B. CONN
G. B. KISTIAKOWSKY
ELGENE A. SMITH

RECEIVED DECEMBER 19, 1938

NEW BOOKS

Unit Processes in Organic Synthesis. By P. H. GROGINS, Editor-in-Chief, Senior Chemist, Bureau of Chemistry and Soils, United States Department of Agriculture. Second edition. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, N. Y., 1938. xiii + 769 pp. Illustrated. 16 × 23.5 cm. Price, \$6.00.

The general plan of this second edition is essentially unchanged from that which was followed in the first edition. Every chapter has been revised and an attempt has been made to bring each into line with current developments as revealed by the technical and patent literature. Worthy of mention in this respect is the augmenting of the chapter on Diazotization to include Coupling; the chapters on Alkylation and Polymerization have been enlarged; increased emphasis has been laid on the synthesis of aliphatic compounds; a substantial number of new flow sheets has been incorporated; sections explaining the theoretical basis of halogenation and hydrogenation reactions by means of thermodynamics have been introduced.

In this book some of the more important general reactions (nitration, amination by reduction and ammonolysis, diazotization and coupling, halogenation, sulfonation, oxidation, hydrogenation, alkylation, esterification, hydrolysis, Friedel and Crafts reaction, polymerization) of commercial interest to the organic chemist are first discussed. Following this is a detailed description of the reagents, the various physical conditions as they affect the course of the reactions involved and the types of com-

pounds which may be satisfactorily prepared with these reagents. Finally, the design and construction of equipment that has been successful for the various reactions are described followed by procedures that may be used for synthesizing on a large scale one or more typical compounds of each class.

Of necessity, the general discussion of the reactions has been condensed and limited to the more important facts such as are presented in a first year course in organic chemistry. The inclusion of organic chemical theory naturally has been even more limited. In enumerating the reagents the more important of both scientific and practical significance have been included. This sort of information collected as it is in a relatively few pages and supplemented by original references is valuable to chemists and chemical engineers and may be referred to frequently by research chemists, who are using these reactions. The larger scale equipment, frequently with flow sheets, is of primary interest to the chemical engineer though a well-rounded chemist should also have some knowledge of equipment if he is studying reactions for industrial development. The examples of syntheses have been well selected and a large proportion of them are for products which have been marketed only during the past few years. The mere fact that the description of such processes in many cases is taken from patents, and hence probably does not coincide in all details with the actual operations carried out by the producer, does not detract from its value to the industrial chemist. The economic factors discussed

in connection with some of the reactions are essential for the proper training of a student. Some chapters appear to be written more from the chemical than the chemical engineering point of view.

The book contains a mass of valuable information for the chemist and chemical engineer and is organized in such a way that it is readily accessible. The authors have succeeded in including much of current industrial importance and very few omissions may be noted. The volume is a handy one for frequent reference by the organic chemist and is the best available book for unit processes in organic syntheses.

ROGER ADAMS

Qualitative Inorganic Analysis. By A. J. BERRY, M.A., Fellow of Downing College and University Lecturer in Chemistry. Cambridge University Press: The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1938. viii + 147 pp. 14 × 28.5 cm. Price, \$2.00.

Qualitative Analysis of Inorganic Materials. By WILLIAM BUELL MELDRUM, Haverford College, and EARL WILLIAM FLOSDORF, University of Pennsylvania. American Book Company, 88 Lexington Ave., New York, N. Y., 1938. xiii + 230 pp. Illustrated. 15 × 22.5 cm. Price, \$2.50.

A Course in Qualitative Analysis Based on Macro and Semi-Micro Methods. By JAMES E. BELCHER, Assistant Professor of Chemistry, and GUY Y. WILLIAMS, Professor of Chemistry, University of Oklahoma. Houghton Mifflin Company, 2 Park St., Boston, Mass., 1938. x + 265 pp. Illustrated. 23 × 29 cm. Price, \$2.40.

The titles under consideration give a very good illustration of the divergencies in teaching methods and subject matter content of present-day courses in Qualitative Analysis. In his Preface A. J. Berry mentions the need for modernizing and amplifying the backward state of Qualitative instruction in his home country. Twenty-eight pages are devoted to a brief survey of acid-base phenomena, electromotive behavior of metals, oxidation-reduction, and the colloidal state, the sensitivity of tests, types of reagents, ionization in analytical procedures, dissolving of substances, special reagents, and filter paper spot tests. The next 88 pages contain a good description of the reactions of the ordinary metals (including Tl, W, Mo, Ti, Be, Ce, Th, Zr, U, V, Li) and the acid radicals. The systematic metal analysis is covered in 13 pages and the acid radicals unsystematically in 12 pages. The metal analysis scheme is that using ammonium sulfide for dividing Group II, and precipitating the aluminum and nickel families separately. The utility of the book for the serious student is lessened by its brief treatment of the whole subject and the lack of information and emphasis on the incompleteness of many of the separations and the precision of tests.

Meldrum and Florsdorf, in their Preface, assign to Qualitative Analysis the triple duty of presenting schemes of inorganic analysis, giving training in careful laboratory manipulations, and laying the groundwork for later study of the physical chemistry of solutions. Part I of the book

(pp. 1-86) is devoted to Fundamental Principles, consisting largely of a good presentation of electrolytic dissociation, its numerous equilibria and many applications. The section on Laboratory Work (pp. 87-202) contains first a list of 25-odd experiments, then 23 closely printed pages giving the reactions of the commoner cations and anions, the rest of the section containing the systematic analysis procedures for metals and acid radicals. The metal analysis scheme deviates somewhat from those made familiar by Baskerville, *et al.*, and by Noyes, the procedure for Group III being considerably different and quite interesting. Some special tests are given, as well as methods for dissolving solids. The anion analysis is carried out by using acetic acid to liberate gases, then barium and silver as precipitants for their groups, and lastly testing for the remaining soluble anions. Typographically speaking, some parts of the book are not attractive, especially the section on reactions of ions, which must have been a compositor's and proof-readers' nightmare.

Belcher and Williams have produced a wire-bound book of letter-size pages, which combines theory, laboratory directions and notebook. Seventy pages are occupied by a survey of Valence and Atomic Structure, Formulas, etc., Types of Reactions, Oxidation-Reduction, Electrode Potentials, Theory of Solutions, Ionization, Chemical Equilibrium, Application of Equilibrium to Qualitative Analysis, Colloids, Mathematical Operations. Part II (90 pp.) contains the reactions of the cations and anions (including many of the less common reactions), directions for experiments illustrating them, and blank form pages for recording observations. Each characteristic test reaction is numbered for easy reference. Part III (88 pp.) gives the systematic scheme, essentially that of Fresenius, modified to a semi-micro basis, and using many of the newer reagents and confirmatory tests. The anion analysis method uses calcium, barium, zinc and silver as group separation reagents. Ingeniously designed flow sheets present the schemes at a glance, and the blank form pages both here and in Part II show much careful thought and planning to achieve economy of space in making reports.

ALLEN D. BLISS

Electromagnetics. A Discussion of Fundamentals. By ALFRED O'RAHILLY. Professor of Mathematical Physics, University College, Cork. Foreword by Professor A. W. Conway, F.R.S. Cork University Press: Longmans, Green and Co., 114 Fifth Avenue, New York, N. Y., 1938. xii + 884 pp. Illustrated. 15.5 × 23 cm. Price, \$12.50.

Probably the most significant thing about this formidable book of 900 pages is the mere fact that in this stage of development of physics it should be possible to write such a book at all. It is easy to think that the physics of the classical era was, with regard to the experimental facts known in that time, a completed structure, adapted to fulfill the purpose for which it was constructed, and acceptable to all those sufficiently qualified to be able to comprehend the argument. This book will be a disconcerting revelation to any with such illusions. The author is apparently well qualified for this part of his task. The

range of his reading must have been immense, judging by the impressive bibliography. He paints a most interesting and vivid picture of the various currents in the historical development, bringing out the conflict of views on fundamentals and showing how views have prevailed before they had fairly won the right to prevail. One's estimate of the relative merits of various traditional figures in the development of electrodynamics will probably be revised by this presentation—in particular, Weber emerges as a figure of unrealized stature.

The author does not spare his criticism or hesitate to let it be known where in his opinion the proper solution lies. With much of the criticism one can have a general sympathy. There is enough room for difference of opinion so that in a book offering as many quotations as this it is almost certain that anyone would often take sides with the author. Personally it does seem to me that there is much in present-day physics to justify severe criticism. It is a scandal that an International Congress should have to decide a question of the meaning of fundamental units by a majority vote. It seems to me obvious enough that the conventional attitude toward "dimensions" is still infested with mysticism. The point of view which regards relativity as natural and inevitable still has for me many hard sayings. But, nevertheless, when it comes to specific criticisms and the particular solutions, I often had the uneasy feeling that the footing of the author was not altogether sure. Reference is made a number of times to my own writings, a good fraction of the time favorably, but more often not—and so often with failure to understand my point of view that it makes me wonder whether the author may similarly have failed to get the point of view of others. It was something of a shock to read, page 422, that the author believes that relativity theory demands that a wave expanding spherically with the velocity of sound should remain spherical under a Lorentz transformation, or rather under the transformation of Voigt, as the author prefers to call it in the interests of strict historical accuracy. This vital misconception seems to color a good deal of his unfavorable attitude toward relativity. I would not accept the fundamental definitions on which he bases his entire treatment of electrostatic and electromagnetic units—in the electromagnetic system unit quantity of electricity is not defined in terms of force exerted between static charges, but as the quantity deposited by unit current in unit time. I think it can be agreed that his treatment of dimensions has succeeded in getting rid of a good deal of traditional mysticism, but I think there is still mysticism left in his fundamental operation of "ratiofication" between "conspicuous" "magnitudes," and I can see nothing but mysticism in the statement (page 759) "the determinateness or measurability of a Length is independent of the procedure of measuring it." His treatment of the force formulas of Liénard and Ritz, and the whole question of electromagnetic mass, would have gained much in clarity if there had been a definition of the meaning of force—not an easy matter. We can have only sympathy with his desire to divorce the significance of physics from what people say about it, but I think he goes too far in his constant insistence on the decisive role of the *equations* of physics, as when he says (page 374) "the only scientifically relevant and effective

portion of a book on physics is its quantitative formulae, what we have called its algebra." It seems to me that he protests too often and too much that physics has nothing to say to philosophy (*e. g.*, page 853). Surely it is impossible to draw a hard and fast line between any two human activities, as the quantum physicist painfully realizes when he tries to analyze what he means by the observer. Possibly the reason for this curiously uncompromising position is suggested by the footnote on page 854: "Miss Stebbing, however, exemplifies the current delusion that, while physics is impregably barricaded with mathematical sandbags, theology is a pleasant no-man's-land. She thinks any amateur can saunter up to St. Augustine to discuss predestination, blissfully ignorant of the enormous specialist literature on the subject." I also think the book would have gained if the undertone of polemic had been less insistent. After all, Maxwell and Einstein are neither fools nor villains, and to write as if they are, however much the author may be carried away by the conviction of his own correctness, can do his cause no good.

Nevertheless, in spite of all this, the book is well worth studying even if merely for the sake of awakening consciousness of the many doubtful and unsettled places still remaining in the structure of electrodynamics. I suspect that the quantum theorist, who is notoriously having difficulty in getting electrodynamics to fit satisfactorily into his scheme, would find a re-examination of some of the classical fundamentals not unprofitable.

P. W. BRIDGMAN

The Chemistry of the Amino Acids and Proteins. Edited by CARL L. A. SCHMIDT, M.S., Ph.D., Professor of Biochemistry, University of California. CHARLES C. THOMAS, 220 East Monroe Street, Springfield, Illinois, 1938. xxiv + 1031 pp. Illustrated. 17 × 26 cm. Price, \$7.50.

Chemistry of the Proteins. By DOROTHY JORDAN LLOYD, M.A., D.Sc., F.I.C., Director of the British Leather Manufacturers' Research Association, and AGNES SHORE, B.Sc., A.I.C., London School of Medicine for Women. Second edition. Introduction by SIR FREDERICK GOWLAND HOPKINS. P. Blakiston's Son and Company, Inc., 1012 Walnut Street, Philadelphia, Pennsylvania, 1938. xi + 532 pp. 101 figs. 14 × 21.5 cm. Price, \$5.50.

The almost simultaneous publication of these two books on the chemistry of amino acids and proteins is indicative of the increased interest among chemists, biologists and biochemists in these important natural products. Indeed the large volume of new work is so impressive as to render necessary presentations which in certain fields shall replace, in others supplement, such books as that of Mann on the "Chemistry of Proteins" and of Mitchell and Hamilton on "The Biochemistry of the Amino Acids," and such monographs as that of Schryver on the "General Character of the Proteins," Osborne's "The Vegetable Proteins," Levene's "Hexosamines and Mucoproteins," Kossel's "The Protamines and Histones," or Plimmer's "Chemical Constitution of the Proteins,"

written from the point of view of analytical or organic chemistry; or such works as Robertson's "Physical Chemistry of the Proteins" or Loeb's "Proteins and the Theory of Colloidal Behavior" and Pauli and Valkò's "Kolloidchemie der Eiweisskörper" written from the point of view of physical chemistry.

The first edition of Jordan Lloyd's book, published in 1926, reflected the fundamental training in the Biochemical Laboratory at Cambridge University, in which Sir Frederick Hopkins made such important contributions to protein chemistry as the discovery of tryptophane, the crystallization of egg albumin, and the characterization of Bence Jones Protein.

The present, second, edition, written in collaboration with Miss Agnes Shore, is nearly twice as large as the first, although the field it covers is somewhat more restricted, since "the applications of protein chemistry to technology and industry have, with much regret, been omitted." This gives a striking indication of the rapid increase of knowledge in this field within the last twelve years. The first part of the book covers the analytical chemistry and reactions of amino acids, peptides and proteins, the synthesis of peptides, the action of proteolytic enzymes, and the nature of the linkages in the protein molecule. It is perhaps the simplest introductory treatment in this field at present available in any treatise. The latter parts of this book include a discussion of much of the recent work on the physical chemistry of the proteins. Though comprehensive, the inclusion of old and new material in juxtaposition leads to a lack of clarity and simplicity. The bibliographies appended to each chapter are very useful.

The compendium initiated and edited by C. L. A. Schmidt reflects a well conceived plan. Many of the chapters are excellent and are written with authority by investigators who have contributed substantially to the field. The chapters on "The Relation of the Amino Acids to Products of Biochemical Importance," on "Electrochemistry of Amino Acids and Proteins," and on "Combination of Amino Acids and Proteins with Acids, Bases, Heavy Metals, and Other Compounds" have been written by Schmidt. So also have the sections on "The Preparation of Amino Acids and Proteins," on the "Properties of Crystals," "Magnetic and Diamagnetic Properties," "Thixotropy," "Melting and Decomposition Points of Amino Acids," "The Hofmeister Ionic Series," "Antagonism of Ions," and "Liesegang Rings." The chapter on "The Constitution and Synthesis of the Amino Acids" is by Dunn; "The Isolation of the Amino Acids from Proteins" and "Methods of Analysis and Reactions of the Amino Acids and Proteins" by Calvery; "Peptides, Peptidases, and Diketopiperazines" by Greenstein; and "The Chemical Constitution of the Proteins" by Block.

The chapters on "Molecular Weights of the Proteins," "Optical Properties of Amino Acids and Proteins," and "Membrane Equilibria," as well as the sections on "Viscosity of Protein Solutions," "The Properties, Structure, and Swelling (Imbibition) of Protein Gels" and "Hydration (Bound Water) of Proteins in Solution" are by Greenberg. "The Coagulation of Proteins" is considered by Anson, "Surface Tension and Films" by Gorter, and "Elasticity of Proteins" and "Cohesion of Proteins" by Van der

Dussen and Maaskant, while "Anisotropy" is discussed by Edsall who also contributes the chapter on "Dipolar Ionic Structure and Solubility of Amino Acids, Peptides and Proteins." The chapter on "Amphoteric Properties of Amino Acids and Proteins" is by Hitchcock; that on "Some Thermodynamical Considerations of Amino Acids, Peptides, and Related Substances" by Borsook and Huffman; on the "Relation of Proteins to Immunity" by Heidelberger; and on "The Role of Proteins in Nutrition" by Jackson. There is of course a considerable variation both in the method of presentation and in the detailed nature of the treatment depending upon the author of the chapter.

This volume is largely written from the point of view of the physical chemist. It includes a considerable amount of theoretical and experimental material often presented in such great detail as to render certain chapters of more value to the young investigator than to the student. It is the most substantial and modern treatment of certain of the fields considered, that is at present available and unquestionably will replace the earlier studies of Robertson and of Loeb, written, respectively, eighteen and sixteen years ago. Indeed comparison of the subjects treated in these earlier volumes with the present state of knowledge regarding them is an index of the rapidity with which the chemistry of the proteins has developed.

EDWIN J. COHN

A Course of Study in Chemical Principles. By ARTHUR A. NOYES, Late Professor of Chemistry, California Institute of Technology, and MILES S. SHERRILL, Professor of Physical Chemistry, Massachusetts Institute of Technology. Second edition, rewritten. The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1938. xxv + 554 pp. Illustrated. 15 × 22 cm. Price, \$5.00.

Here is a second edition which demands more than perfunctory notice, since fifteen years' advance in scientific knowledge and method has been used to recreate the entire fabric of the book. By omission of the starred paragraphs it becomes a very thorough two-semester course. Complete, it requires three semesters, as well as some additional preparation in mathematics and in physics.

A systematic presentation of thermodynamics, skillfully applied to physico-chemical processes, is now introduced almost at the start and employed to advantage in subsequent chapters. The treatment of atomic physics deserves a few additional pages. Much attention is now paid to deviations from the more simple generalizations concerning gases, liquids and solutions. The electrochemical section, naturally, has been greatly amplified, and in no respect falls short of expectations. The calculation of free energy and related quantities from spectroscopic data appears at the end.

The problems, always inseparable from the discussions, appear in greater variety, but still call for a grasp of principles rather than facile substitutions. Clarity and pedagogic insight pervade the whole work. It is a notable addition to the texts already available.

GEORGE S. FORBES

Fortschritte der Biochemie. III. Teil (1931-1938). (Advances in Biochemistry.) By FELIX HAUROWITZ, Dr. med., Professor of Physiological Chemistry at the German University of Prague. Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany, 1938. xi + 167 pp. 3 figs. 15.5 × 22.5 cm. Price, RM. 9.00; bound, RM. 9.75.

This little book by Professor Haurowitz provides within a brief compass many of the outstanding developments in biochemistry during the past eight years. Necessarily, each of the topics considered is quite abbreviated, and not a few, such as the alkaloids and bacterial metabolism, are omitted altogether. It is amazing, nevertheless, to observe what a large amount of material the author has succeeded in condensing within these comparatively few pages. After a brief introduction to recent developments in physics and physical chemistry, the author takes up the proteins, fats, carbohydrates, minerals, and purines, including both their chemistry and metabolic behavior. The newer knowledge of the enzymes, vitamins, hormones, and immune bodies is competently described. At the end of the book there is a brief mention of some advances in experimental technique. A few errors of minor importance have crept in: the formula for tyrosine on page 29 and the statement on page 59, line 23, are incorrect.

On the whole, the book is well organized and highly useful to chemists and biologists who wish to have a good summary of recent biochemical developments.

JESSE P. GREENSTEIN

Handbook of Chemical Microscopy. By ÉMILE MONNIN CHAMOT, B.S., Ph.D., Professor of Chemistry, Emeritus, and CLYDE WALTER MASON, A.B., Ph.D., Professor, Chemical Microscopy and Metallography, Cornell University. Volume I. Principles and Use of Microscopes and Accessories. Physical Methods for the Study of Chemical Problems. Second edition. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y., 1938. xvi + 478 pp. 165 figs. 15 × 23.5 cm. Price, \$4.50.

This excellent work is still the standard textbook in English on the subject of chemical microscopy. It is a tribute to the authors that it has not been necessary after eight years to make major changes in the arrangement or treatment of Volume I, which deals with the principles, general methods and tools of microscopy. The book, however, has been brought up to date by giving references to important new work appearing since the first edition, and, where necessary, this new material is incorporated in the text. The number of references has increased by at least one-third so that the advanced workers in chemical microscopy can also profit by reading this volume again. The reader will find the following sections revised: the study of crystals, fibrous materials, illumination, photomicrography, fluorescence, microscopy and particle size. The part dealing with fluorescence microscopy is sanely written—at present this subject is a fad in some centers. An excellent bibliography is given at the end of this section. The material on particle size now appears in a new chapter and this important subject now re-

ceives more adequate treatment. By the judicious cutting out of old material the inclusion of the new has not substantially increased the size of the new volume.

The authors have always been keenly alive to the fact that their subject is a very practical one. The technical man will be pleased to find that many of the changes make the book a greater help to those who have graduated from college and are making chemical microscopy a useful tool.

L. T. HALLETT

Analyse und Konstitutionsermittlung organischer Verbindungen. (Analysis and Constitution Determination of Organic Compounds.) By Dr. HANS MEYER, Professor of Chemistry in the German University at Prague. Sixth edition. Verlag von Julius Springer, Vienna, 1938. xx + 886 pp. 207 figs. 17 × 26 cm. Price, unbound, RM. 57; bound, RM. 59.70.

The new edition of the first volume of Meyer's "Lehrbuch der organisch-chemischen Methodik" has been expanded by more than 150 pages to include the numerous new contributions in this field during the last seven or eight years. The text is concise and clear, and is supplemented by many figures illustrating apparatus of special design. Literature citations are very numerous and have been carried to 1938.

The volume is divided into three parts: I (291 pages), methods of purification and criteria of chemical purity, elementary analysis, determination of molecular weight; II (70 pages), determination of the parent structure; III (464 pages), detection and quantitative determination of functional groups. An excellent index (41 pages), containing more than 5000 entries, renders the subject matter readily accessible.

The first part contains a new section on chromatographic adsorption analysis, new semi-micro and micro methods, and determination of heavy water. Particular attention has been given to the semi-micro procedures.

The second part contains an excellent discussion of methods of oxidative degradation, and includes new reagents such as lead tetraacetate and periodic acid.

The third and largest part, devoted to the detection and quantitative determination of functional groups, gives an unusually competent and complete survey of methods in these fields. The author has not attempted to include in this volume systematic procedures for qualitative identification or separation of individuals from mixtures but has reviewed practically all qualitative tests and quantitative methods for all organic functional groups. All of the important reagents for the preparation of derivatives for identification are included but tables of physical constants of derivatives are not given; these appear in the discussion of individual compounds in the second volume of the series.

This volume is extremely useful as a reference work on all phases of organic analysis and is a most convenient and reliable source of information for general and specific procedures. It is an excellent supplement to the current manuals of qualitative organic analysis and is a substantial aid to advanced students and research workers.

JOHN R. JOHNSON

Thorpe's Dictionary of Applied Chemistry. Vol. II. B1—Chemical Analysis. By JOCELYN FIELD THORPE, C.B.E., D.Sc., F.R.S., F.I.C., and M. A. WHITELEY, O.B.E., D.Sc., F.I.C. Fourth edition. Longmans, Green and Company, 114 Fifth Avenue, New York, N. Y., 1938. xxiii + 711 pp. Illustrated. 16 × 23.5 cm. Price, \$25.00.

The first volume of the Fourth Edition of this "Dictionary" was reviewed in the November, 1937, number of THIS JOURNAL. The general editorial policies there described have been followed in the second volume and the quality has been maintained, although the expansion has been relatively greater than in the first volume. The 711 pages of this second volume of the Fourth Edition cover the same part of the alphabet which required 322 pages in the Third Edition. A substantial fraction of the expansion is due to a long article of 170 pages on Chemical Analysis which did not appear at all in the Third Edition. Structural formulas of organic compounds are numerous and clearly printed, although these formulas might have been printed on a smaller scale without sacrifice in clarity and with a substantial saving in the number of pages. The Fourth Edition is very different from the third in that all of the encyclopedic articles and most of the brief definitions have been completely rewritten and many new entries have been added. This book clearly belongs in every chemical reference library.

GRINNELL JONES

BOOKS RECEIVED

November 15, 1938–December 15, 1938

- KARL BECHERT and CHRISTIAN GERTHSEN. "Atomphysik. I. Allgemeine Grundlagen. II. Theorie des Atombaus." Walter de Gruyter, Woyschstrasse 13, Berlin W 35, Germany. 149 + 174 pp. RM. 1.62 + 1.62.
- RICHARD BERG. "Die analytische Verwendung von O-Oxychinolin ("Oxin") und seiner Derivate." Ferdinand Enke Verlag, Hasenbergsteige 3, Stuttgart W, Germany. 114 pp. RM. 11; bound, RM. 12.40.
- SIDNEY T. BOWDEN. "The Phase Rule and Phase Reactions. Theoretical and Practical." The Macmillan Co., 60 Fifth Ave., New York, N. Y.
- E. HIRSCHLAFF. "Fluorescence and Phosphorescence." Chemical Publishing Company of New York, Inc., 148 Lafayette St., New York, N. Y. 130 pp. \$1.50.
- K. HOLEY, EDITOR. "Blätter für Geschichte der Technik." Vol. V. Verlag von Julius Springer, Linkstrasse 22-24, Berlin W 9, Germany. 138 pp. RM. 6.
- WENDELL M. LATIMER. "The Oxidation States of the Elements and their Potentials in Aqueous Solutions." Prentice-Hall, Inc., 70 Fifth Ave., New York, N. Y. 352 pp. \$3.00.
- C. B. NEBLETTE. "Photography. Its Principles and Practice." D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 590 pp. \$6.50.
- HUGH NICOL. "Plant Growth Substances." Chemical Publishing Company of New York, Inc., 148 Lafayette St., New York, N. Y. 108 pp. \$2.00.
- JAMES F. NORRIS and RALPH C. YOUNG. "A Textbook of Inorganic Chemistry for Colleges." Second edition. McGraw-Hill Book Co., Inc., 330 West 42d St., New York, N. Y. 803 pp. \$3.75.
- HEINRICH REMY. "Lehrbuch der anorganischen Chemie." Vol. I. Second edition. Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C 1, Germany. 806 pp. RM. 24; bound, RM. 26.
- H. J. SCHUMACHER. "Chemische Gasreaktionen." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 487 pp. RM. 33.75; bound, RM. 35.25.
- GEORGE SMITH. "An Introduction to Industrial Mycology." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 302 pp. \$5.20.
- JOCELYN FIELD THORPE and M. A. WHITELEY. "Thorpe's Dictionary of Applied Chemistry. Vol. II. B1—Chemical Analysis." Fourth edition. Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 711 pp. \$25.00.
- F. TWYMAN. "Spectrochemical Analysis in 1938." Adam Hilger, Ltd., 98 St. Pancras Way, London N. W. 1, England. 68 pp. 4s./6d.
- HERMAN ULICH and KURT CRUSE. "Kurzes Lehrbuch der physikalischen Chemie." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 315 pp. RM. 12.
- L. ZECHMEISTER, Editor. "Fortschritte der Chemie organischer Naturstoffe. Eine Sammlung von zusammenfassenden Berichten." Verlag von Julius Springer, Linkstrasse 22-24, Berlin W 9, Germany. 371 pp. RM. 28.
- "Abridged Scientific Publications from the Kodak Research Laboratories. Vol. XIX, 1937." Eastman Kodak Co., Rochester, N. Y. 296 pp.
- "Gmelins Handbuch der anorganischen Chemie. System-Nummer 25, Caesium." Lieferung 2. Verlag Chemie G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany. 164 pp. RM. 21.75.
- "Gmelins Handbuch der anorganischen Chemie. System-Nummer 27, Magnesium." Teil B, Lieferung 3. Verlag Chemie G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany. 92 pp. RM. 14.25
- "Gmelins Handbuch der anorganischen Chemie. System-Nummer 39, Seltene Erden." Lieferung 1. Verlag Chemie G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany. 122 pp. RM. 12.
- "Index to the Literature of Food Investigation. Vol. 10, No. 1, June, 1938." British Library of Information, 270 Madison Ave., New York, N. Y. 94 pp. \$1.35.
- "U. S. Patents Owned by Universal Oil Products Company as of September 1, 1938." Universal Oil Products Co., 310 South Michigan Ave., Chicago, Ill. 330 pp.