

C₃ epimer of ergosterol. In the paper (Heilbron, Moffet and Spring⁴) of which the note cited is an abstract, the conclusion reached is that ergosterol and lumisterol differ in configuration around C₁₀ and that "no information is available concerning the relative orientation of the hydroxyl groups and the C₉-hydrogen atoms of the two sterols."

Again, contrary to the statement of Weizmann, Bergmann and Hirshberg, Windaus and Dimroth did not *demonstrate* that the secondary hydroxyl group is not influenced by irradiation but include in their paper the following statement: "Einen Anhaltspunkt dafür dass sterische Änderungen an der Hydroxyl-gruppe an C₃ vor sich gehen, haben wir nicht gefunden; wir halten diese Annahme für unwahrscheinlich."⁵

NOTE BY THE EDITOR.—Dr. Bergmann has written to the Editor that he regrets that the statement of Dr. Spring relative to the photo-isomerization of ergosterol was misunderstood and therefore inaccurately quoted in the article referred to.

(4) Heilbron, Moffet and Spring, *J. Chem. Soc.*, 411 (1937).

(5) "We have found no experimental evidence that rearrangement of the hydroxyl group on C₃ occurs spontaneously, and we believe that such a change is unlikely."

THE UNIVERSITY OF MANCHESTER
MANCHESTER, ENGLAND

F. S. SPRING

RECEIVED AUGUST 9, 1938

THE REDUCTION OF α -HALOGENATED KETONES: THE SYNTHESIS OF *dl*-PSEUDOEPHEDRINE

Sir:

The great advantage of aluminum isopropylate in the reduction of aldehydes and ketones lies in its specificity for the carbonyl group, side reac-

tions such as condensation and the like being either absent or negligible. Lund [*Ber.*, **70**, 1520 (1937)] has shown this with certain ketones with primary bromine in the α -position. This reduction without removal of the α -halogen has now been tested with α -bromo ketones which have β -hydrogen available for a loss of halogen acid. The results with open chain ketones containing secondary α -bromine show that removal of bromine, and reduction to the bromohydrin, occur in about equal amounts. Thus α -bromopropiophenone with aluminum isopropylate forms the bromohydrin in about 35% yield (b. p. 73–75° (0.1 mm.)), which in turn with methylamine yields a mixture of isomeric hydroxyamines, one of which is *dl*-pseudoephedrine, m. p. 116.5–117.0°; the hydrochloride, m. p. 162–163° (over-all yield from the bromo ketone, 10%). This was identified by comparison with an authentic sample, m. p. 116.5–117.2°, mixed m. p. 116.5–117.0°, prepared from *dl*-ephedrine kindly supplied by Dr. E. H. Volwiler, Abbott Laboratories, Chicago, Illinois, and by Dr. R. H. Manske, the Canadian National Research Council, Ottawa. Contrary to expectations, no *dl*-ephedrine was found.

Cyclic secondary α -bromo ketones, and open chain tertiary α -bromo ketones, such as 2 bromocholestanone, and α -bromoisobutyrophenone, respectively, yield products almost entirely free of bromine. This work is being continued with other types of halogenated ketones.

DEPARTMENT OF CHEMISTRY
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PHILIP G. STEVENS

RECEIVED NOVEMBER 21, 1938

NEW BOOKS

Tabellen und Vorschriften zur quantitativen Analyse. Gravimetrie, Elektroanalyse, Probierkunde der Edelmetalle und Gasanalyse. (Tables and Directions for Quantitative Analysis, Gravimetric, Electroanalysis, Assay of the Noble Metals, and Gas Analysis.) By W. D. TREADWELL, Professor in the United Technical Institute in Zurich. Verlagsbuchhandlung Franz Deuticke, Helferstorferstrasse 4, Wien, Germany, 1938. xii + 284 pp. 126 figs. 17.5 × 25 cm. Price, RM. 9.

The author states in the preface that his object is to present in the shortest possible form a selection of proved methods of analysis in order to make it possible for the

analyst already acquainted with the fundamentals to do his work more easily. The reviewer cannot imagine any publication in which could be found more information concerning analytical chemistry contained in less than 300 pages. Here is evidence showing extreme energy on the part of the author in collecting valuable data concerning, and proved directions for determining, more than the usual list of cations and anions. It also shows his skill in collating such material in a very logical manner. About 275 references to original literature are given.

In the interest of economy of space the author has collected in one chapter the description of the common oper-

ations of quantitative technique, and such descriptions are almost completely omitted in the individual processes discussed throughout the book.

This book might be divided into eight parts. The first forty-one pages deal with general methods of quantitative analysis and include directions for carrying out all the common operations of analysis. This discussion is more complete, however, than is usually found in textbooks of quantitative analysis. In addition to the usual directions included here, such as those for weighing, calibration of weights, precipitations, filtration, drying, etc., are to be found desirable directions for such procedures as the determination of specific weight, ashing of organic substances, separation by extraction and distillation, and the preparation and testing of reagents.

From page 47 to page 96 are to be found directions for the determination of a very wide selection of cations. Besides all the common metals for which methods are given, one finds directions for the determination of many of the less familiar ones, such as scandium, cerium, yttrium, gallium, indium and the platinum metals. In this section, it is worthwhile to note that the author has seen fit to give methods of quantitative separation of cations which commonly occur together. It is interesting to see that considerable reference is made to the use of organic reagents as precipitants for many cations.

From page 97 to page 130 is a section on electroanalysis including theory, directions for the determination of eighteen separate metals by electrolysis, and methods of separating eleven of these from other ions likely to be present.

There follows from page 131 to page 142 a section on the assay of the noble metals. Here the principle of cupellation is discussed and methods are given for the estimation of all the noble metals usually determined by this method.

From page 142 to page 170 are to be found excellent directions for the separation and determination of all the common and some of the less common anions. The reviewer feels that this section alone would be sufficient to make it advisable to include this book in his library.

Pages 170 to 194 are devoted to distillation methods of separation and analysis. Here again are found worthwhile discussions not usually included in reference books of quantitative analysis.

The next section, pages 194 to 202, is devoted to elementary analysis which includes the determination of carbon, hydrogen, nitrogen, the halogens and sulfur. Both macro and micro methods are given.

The final section of the book, page 203 to page 259, is devoted to gas analysis. Not only the more common gases, but many of the less common, such as ethylene oxide, iron pentacarbonyl, nickel tetracarbonyl and butadiene, are included in the methods given. A page devoted to the determination of dust in gases shows the diversity of the subject matter covered.

The book is concluded with tables of gravimetric factors and logarithms.

The reviewer was well pleased with the editing and printing of the book. The binding of the reviewer's copy was poor.

Those who have a good fundamental training in analyti-

cal chemistry will welcome this book as being a good place to go to get information concerning methods. It is primarily a book for analytical chemists rather than for chemical analysts. It is one that should find its place in every reference library and on the desk of every analytical chemist.

CHESTER M. ALTER

Annual Review of Biochemistry. Vol. VII. By JAMES MURRAY LUCK, Editor, and CARL R. NOLLER, Associate Editor, Stanford University. Annual Reviews, Inc., Stanford University P. O., California, 1938. ix + 571 pp. 16 × 23 cm. Price, \$5.00.

A new group of authors compiled volume seven of this series, including English, German, Swiss, Danish and Australian, as well as American contributors. Subjects covered in one or more of the preceding volumes, and the authors of each include: Biological Oxidations and Reductions, by L. Michaelis and C. V. Smythe; The Chemistry of the Carbohydrates and the Glycosides, by E. F. Armstrong; The Chemistry of the Acyclic Constituents of Natural Fats and Oils, by G. S. Jamieson; The Chemistry of Amino Acids and Proteins, by M. Bergmann and C. Niemann; The Chemistry and Metabolism of the Compounds of Phosphorus, by K. Lohmann; Carbohydrate Metabolism, by H. E. Himwich; Fat Metabolism, by F. Verzár; Metabolism of Amino Acids and Proteins, by H. A. Krebs; The Metabolism of Creatine and Creatinine, by K. Thomas; The Hormones, by O. Wintersteiner and P. E. Smith; Nutrition, by H. H. Mitchell; The Biochemistry of Muscle, by E. Lundsgaard; Liver and Bile, by A. C. Ivy and L. A. Crandall, Jr.; Animal Pigments, by R. Lemberg; The Terpenes, Saponins, and Closely Related Compounds, by W. A. Jacobs and R. C. Elderfield; The Chemistry of Bacteria, by W. H. Peterson and M. J. Johnson; Growth Regulators in the Higher Plants, by P. Boysen Jensen.

The vitamin chapter of the earlier volumes was divided in volume seven into three sections as follows: The Vitamin B group, by R. A. Peters and J. R. O'Brien; Vitamin C (Ascorbic acid, Cevitanic acid), by R. A. Peters and H. W. Davenport; the Fat-soluble Vitamins, by J. C. Drummond. The discussion of enzymes was narrowed down this year to The Chemistry of the Crystalline Enzymes, prepared by J. H. Northrop and R. M. Herriott. Pepsin, trypsin and chymotrypsin, carboxypeptidase, papain and a number of redox enzymes are covered in this review. Two wholly new topics, *viz.*, Acid-Base Metabolism, by J. Sendroy, Jr., and Organic Insecticides, by F. B. LaForge and L. N. Markwood are also reviewed in the current volume.

As heretofore, this review is a veritable mine of useful information respecting contemporary biochemical progress. One senses that each contributor has made a real effort to select carefully the useful material in his field, and present it in an adequate manner. The editors have made a careful selection of contributors, and have arranged and indexed the volume in a form which facilitates its use.

C. H. BAILEY

The Standardization of Volumetric Solutions. By R. B. BRADSTREET, B.S., formerly Analytical Chemist, U. S. Rubber Products Co. Chemical Publishing Company of New York, Inc., 148 Lafayette St., New York, N. Y., 1938. v + 126 pp. 14 × 21 cm. Price, \$3.00.

The Solution of Problems in Quantitative Analysis. By SAUL B. ARENSON. Professor of Inorganic Chemistry, University of Cincinnati. Edwards Brothers, Inc., Ann Arbor, Mich., 1938. iv + 41 pp. 21.5 × 27.5 cm. Price, \$0.35.

Bradstreet's book on Volumetric Solutions begins with a brief survey of definitions, standard substances, possible sources of error, calibration of apparatus, and choice of indicators, and then offers a collection of standardization methods for many of the more common quantitative analytical reagents: hydrochloric and sulfuric acids, sodium, potassium, barium and ammonium hydroxides, thiocyanate, silver nitrate, potassium ferrocyanide, iodine, sodium thiosulfate, permanganate, dichromate, ferrous salts, arsenious oxide, potassium iodate, ceric sulfate, Wijs and Hanus solutions, Chloramine T, hypochlorites, titanous salts and various indicators (with appendix tables). For each reagent there is given a brief discussion of its advantages and shortcomings, procedure for preparing the solution, and the various accepted standardization methods. The critical discussion is brief, well documented and in most cases reasonably complete and modern. Mechanically the little book is well made but is a good example of the evils of low-cost production (without the usual argument of low purchase price), being plate-printed from not too well arranged typewritten copy, which is liberally punctuated with errors (Faulk for Foulk, Yound for Young, Hammet for Hammett, as well as plain spelling and typing errors), and inconsistent and unorthodox abbreviations.

In the second title, Professor Arenson attacks a very real problem, and in chapters entitled: Computations, Gravimetric Analysis, Normal Solutions of Acids and Bases, Normal Solutions in Oxidation and Reduction, Precipitation Titrations, he gives, in conversational conference style, discussions of methods, illustrative examples and numerous problems in each of the five groups listed. Although the scope of the work and the treatment of topics are, in general, less complete as compared with Wilkinson's text [THIS JOURNAL, 60, 1516 (1938)], this neatly lithoprinted book will be of considerable help to students wrestling with Quantitative Analysis calculations.

ALLEN D. BLISS

About Petroleum. By J. G. CROWTHER. Oxford University Press, 114 Fifth Avenue, New York, N. Y., 1938. xiv + 181 pp. Illustrated. 14 × 22.5 cm. Price, \$2.25.

This is a very carefully written little book. It is something of a relief to find that, as Mr. Crowther has demonstrated, it is possible to write about petroleum without borrowing the showmanship of the promoter, the hyperbole of the high pressure salesman, or the moronic sensationalism of the tabloids.

It may seem deadly serious to some readers, but at any

rate it is packed with information, which to the reviewer appears to be authentic and well selected. In such a small book restricted to technical and scientific information it is not surprising that there are many terse statements which merely whet the reader's appetite for more. In view of the political occurrences in Europe in September, 1938, it is of interest to note the following statements by Mr. Crowther:

"Large countries such as the United States are being integrated into units by the swift communications of air transport. The attitude of Englishmen toward other nations, and their conception of the role of England among the nations, are changing swiftly since London came within half an hour's journey of other lands."—And, "the importance of oil to industries and military forces, has given petroleum great political significance. The desire for oil is now one of the more important of the motives which guide the diplomatic and military policies of modern nations."

"About Petroleum" is well worth reading by teachers of chemistry and engineering as well as business men as showing the extent to which science of the most diverse branches has permeated and become vital to the modern petroleum industry. The research man in so-called pure science will note with satisfaction the following:

"The solution of the wider problems of the petroleum industry does not depend merely on the advance of the science of petroleum, but on the advance of pure science itself. The industry will have to inspire, for its own ultimate benefit, the creation of new branches of pure science."

B. T. BROOKS

Library Guide for the Chemist. By BYRON A. SOULE, Sc.D., Assistant Professor of Analytical Chemistry, University of Michigan. McGraw-Hill Book Company, Inc., 330 West 42d Street, New York, N. Y., 1938. xiii + 302 pp. 14.5 × 21.5 cm. Price, \$2.75.

Here is a book for students written by a teacher who realizes the special value of including among things learned in college a knowledge of where and how to look for further information as needed. A good deal of information is given about "where" but the emphasis is on "how," on which emphasis is needed. The text is primarily a "guide to the use of keys and summaries."

The early chapters reveal the general trend in the development of chemical literature. After chapters on the arrangement of a library and on card catalogs, the investigators themselves are considered (biography), then their original reports (journals), next the initial summaries of their articles (abstracts), then the periodic digests (annual reviews), followed by surveys of smaller divisions within a field (monographs) and finally by synopses as assembled in large compendiums (encyclopedias). Then specialized reference books and tables of constants, "the last step in condensation," are classified as inorganic, organic, analytical and physical and considered in this order. Finally the patent literature, government publications and the writing of reports are discussed.

The book is filled with interesting tables compiled in a manner which should be effective for students. These are often not complete but the book does not pretend to be a complete catalog of source material. The tables on yearbooks and on monograph series are good examples.

The inclusion of an early chapter on biography was a happy thought, for chemical literature is largely a record of the achievements of earnest investigators, many of them great men, and such a beginning should help to inspire student interest. There is great value in becoming acquainted with the masters.

Another pleasing feature of this book is the author's practice of including at the beginnings of chapters pertinent "sayings" of others. These lend an authoritative kind of emphasis and seem appropriate in a book on literature even though it be scientific literature.

The author has a knack of writing short, simple definitions, such as "An abstract is essentially an annotated reference." Any lack of precision is remedied by surrounding discussion.

"Experiments have settings." The author's discussion of this fact reveals a good comprehension of the limitations of words and combinations of words in records as well as of the limitations of those who use words in making the records. This understanding adds much value to Doctor Soule's discussion of indexes and their use. This portion of the book could well be expanded, however, for an understanding of the characteristics of indexes and of their use is of primary importance in literature searching. The book would gain in value if its own index provided a better example. It is a pretty good index as indexes go but it has too many of the characteristics of word indexing as opposed to subject indexing. For example, there is a group of alphabetically arranged entries under the heading "Patent" and then a little farther on a similar group under the heading "Patents," the only difference apparently being that the singular word was used part of the time in the text and the plural part of the time. There is some scattering, as an entry "Government publications" in the G's and a separate entry "Publications, foreign government" in the P's, entries under "Periodicals" and a separate entry "Journal appraisal," etc. The inclusion of word-for-word book titles in the index has largely been responsible for such a scattering as that indicated by the following index entries:

Analytical chemistry, conductometric
 Conductometric analysis
 Electrometric analysis
 Quantitative analysis, electrolytic methods
 Electrolytic analysis
 Potentiometric analysis
 Potentiometric titration

Perhaps the use of italic letters for book-title entries, if they are not to be grouped under headings designating subjects, would improve the situation. The use of more cross references would be helpful.

Patents are discussed at length, both as to their legal aspects and as to their role as scientific literature. Directions for making patent searches are also given. These are particularly thorough chapters.

Your reviewer finds himself wondering a little whether he has a touch of Jehovah complex when it comes to things American or the author has a modicum of complex of the bovine variety so that the grass looks a little greener to him on the other side of the fence—or ocean. Perhaps neither is true.

Your reviewer yields to no man when it comes to the making of curious mistakes (other kinds, too) and so hesi-

tates to refer to one in a book which seems to be quite free from mistakes but cannot resist mentioning that the journal he edits is referred to by Doctor Soule as a "bi-monthly appearing on the tenth and twentieth."

The first sentence in this book's preface is: "The literature of chemistry is probably more adequately classified, more thoroughly indexed, and more consistent in terminology than that of any other science." Even so the searching of chemical literature is a complex and difficult matter. None can afford to neglect to learn where and how to look and Doctor Soule's book should prove to be very useful indeed in helping students to learn this art. Doctor Soule has done a good job.

E. J. CRANE

- (I) *Le Rapport entre la Spectroscopie et les Réactions initiées par la Lumière.* (Spectroscopy and Photochemical Reactions.) By W. ALBERT NOYES, JR.
 (II) *The Determination of the Mechanism of Photochemical Reactions.* By PHILIP A. LEIGHTON.
 (III) *The Photochemistry of the Halogens.* By GERHARD K. ROLLEFSON. Hermann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris, France, 1937-1938. 45 pp. 72 pp. 53 pp. 16.5 × 25.5 cm.

These three booklets, published under the direction of the first-named author, outline the present status of the subject. The first discusses typical primary photochemical processes from the standpoint of the spectral characteristics of photolytes. With a minimum of mathematics it achieves an exposition of modern theory which is at once sound and clear. The next deals with secondary reactions evoked by atoms, free radicals and excited molecules resulting from primary acts. Ammonia and hydrazine, halogens reacting upon the ethylenic linkage, oxygen and ozone, are critically discussed to illustrate the possibilities of kinetic reasoning as well as the pitfalls involved. The third supplies a coherent interpretation of the chief photochemical reactions of the halogens, including the author's extensive work upon them.

Pending the expected appearance of two, more comprehensive, books on the subject, these contributions are of very real value to French and American readers alike.

GEORGE S. FORBES

The Metabolism of Living Tissues. By ERIC HOLMES, M.A., M.D., Fellow and Tutor of Downing College and University Lecturer in Biochemistry. Cambridge University Press: The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1937. xi + 235 pp. 13 × 19 cm. Price, \$2.25.

Sir Frederick Hopkins in a foreword to this book points out that its "primary aim... is to provide an adequate survey of all that is most significant in our present knowledge of the dynamic side of biochemistry. Its author has had a wide experience as a teacher of the subject, and writes with a full understanding of the needs of the student. In my opinion he here supplies a need which is real."

"The Metabolism of Living Tissues" cuts across the boundary sometimes set up between physiology and biochemistry. The tools of modern biochemical research are

described in general terms. Three early chapters are devoted to enzymes, oxidations and oxidation-reduction potential, while two of the concluding chapters are concerned with hormones and vitamins. Other chapters deal with metabolic processes in the liver, in the kidney, in voluntary and cardiac muscles and in the nervous system.

The lucid explanation of the dependence of intermediary carbohydrate metabolism on coordinated functions of liver, muscles, adrenals, pancreas and pituitary should prove useful to students of physiology. Placing the emphasis on living tissues rather than on dead materials should stimulate the interest of students of biochemistry. It is among the books recommended for undergraduates in biochemical sciences at Harvard.

It is devised for the young student rather than for the research worker. There is a detailed subject index but no references to literature are given; hardly half a dozen biochemists are named, and two of these names, Hagedorn and Jensen, are spelled incorrectly. Otherwise there are almost no typographical errors.

DAVID B. DILL

Experiments in Organic Chemistry. By LUCIUS JUNIUS DESHA, Professor of Chemistry, and LARKIN HUNDLEY FARINHOLT, Associate Professor of Chemistry, Washington and Lee University. McGraw-Hill Book Company, Inc., 330 West 42d Street, New York, N. Y., 1938. xi + 233 pp. 24 figs. 14.5 × 21 cm. Price, \$1.75.

As the authors state in their preface, "The purpose of this manual is to provide a program of laboratory work closely correlated with Desha's textbook *Organic Chemistry*. It is justified by the distinctive order of presentation adopted in that text. . . ." This consists of a parallel study of aliphatic and aromatic compounds, which is especially advantageous for a laboratory course. The manual contains almost no descriptive material, but specific references to the textbook head each experiment. The result is a concise set of directions for most of the syntheses commonly included in a beginning laboratory course and for an unusually large number of small scale tests. Among these the experiments entitled "General Methods of Forming Double Bonds," "Rearrangements" and "Tautomerism" seem new and especially interesting. There is no introductory chapter on manipulation, but each operation is described in the first experiment in which it is used.

Throughout the book emphasis is placed on the identification of organic compounds; a final chapter (23 pages) describes the standard procedure and refers the student to the small scale tests of the earlier parts. These include the preparation of most of the derivatives commonly used. It has recently been recognized that such material can be profitably included in a beginning laboratory course. However, in this manual so much emphasis is placed upon identification that the synthetic side of the subject is somewhat overshadowed. This is apparent not in omission of synthetic material, but in the absence of all descriptive matter and study questions which would serve to orient a particular compound, emphasize the side reactions in its preparation and present the limitations of the general reaction being studied. References to a textbook written

primarily from a theoretical viewpoint do not throw much light on this practical aspect of the problem. This constitutes the principal shortcoming of an otherwise well planned and well written book.

THOMAS L. JACOBS

Gmelin's Handbuch der anorganischen Chemie. (Gmelin's Handbook of Inorganic Chemistry.) Edited by R. J. MEYER. Eighth edition. System-Number 63, Ruthenium. Issued by the Deutsche Chemische Gesellschaft. Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany, 1938. 124 pp. 17 × 25 cm. Price, RM. 16.50.

The publishers of the Gmelin Handbook state that this volume on Ruthenium constitutes the first installment of the complete Monograph on the platinum group metals, and that subsequent installments will follow in rapid succession. This is certainly welcome news to the inorganic chemist, as several decades have passed since the appearance of the corresponding volume in the last edition of the Gmelin Handbook. The "system number" of ruthenium (63) is not exceeded by those of any other elements except the members of the platinum group, so that practically all the compounds of ruthenium, with their chemical elements, are included in this volume.

ARTHUR B. LAMB

A Manual of Radioactivity. By GEORGE HEVESY, Copenhagen, and F. A. PANETH, London. Second edition, completely revised and enlarged. Translated by Robert W. Lawson, Sheffield. Oxford University Press, 114 Fifth Avenue, New York, N. Y., 1938. xvi + 306 pp. 54 figs. 16 × 24 cm. Price, \$5.50.

Much has happened in the field of nuclear chemistry since the appearance of the first English edition of this book in 1926 (*THIS JOURNAL*, 49, 305 (1927)). This is reflected in the excellent revision and expansion of the present second edition.

It is not only the subject matter in this field which has been enriched by the discovery of artificial radioactivity and of two new fundamental particles, but the entire philosophy of elements has undergone a remarkable revolution. A theory of nuclear stability and disintegration has been perfected. The new artificially radioactive elements are already more numerous than all of those previously known in the three natural families. Several new types of disintegration have been found among the new elements.

All of this, however, fits into the framework of the periodic system and the displacement law as it existed since 1913 and to which one of the authors made substantial contributions.

Four entire new chapters have been added and enough other new material to increase the total length from two hundred and fifty to four hundred pages. Nevertheless, the book has retained its character of a very readable and useful manual of radioactivity.

Some literature references have been added at the end of chapters, which is a very acceptable innovation, but still falls short of the value derived from complete literature

references. The historical survey at the end has been retained and brought up to date. The more recent progress in all of the important fields is recorded. The tables of isotopes—radioactive and stable—and of the artificial radioactive elements and their properties are excellent.

S. C. LIND

Lehrbuch der Pharmakologie, Toxikologie und Arzneiverordnung. (Textbook of Pharmacology, Toxicology and Prescription Writing.) By Dr. med. EMIL STARKENSTEIN, Professor in the Dutch University in Prague. Verlag Franz Deuticke, Helferstorferstrasse 4, Wien I, Germany, 1938. xi + 758 pp. Illustrated. 17.5 × 25.5 cm. Price, RM. 20; bound, RM. 23.

This textbook is intended for medical students studying pharmacology. After a brief introduction in which the topics of general pharmacology, general toxicology and the place of pharmacology in practical therapeutics are discussed, the so-called special pharmacology is taken up and treated on the basis of physiological systems more or less in accordance with the scheme first used by Gottlieb and Meyer in their well-known textbook. The treatment of the various topics appears to be quite satisfactory and to take in account recent advances; a more complete account is given of the chemistry of the digitalis glucosides than is found in current textbooks and the sections on the hormones and vitamins are particularly good. No references are given, which detracts in many ways from the value of the book. The book will not appeal to American students, and will serve only as a textbook for a limited group.

E. K. MARSHALL, JR.

Inorganic Colloid Chemistry. Volume III. The Colloidal Salts. By HARRY BOYER WEISER, Professor of Chemistry at The Rice Institute. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y., 1938. viii + 473 pp. 74 figs. 15.5 × 24 cm. Price, \$6.00.

Weiser's three volumes constitute the readiest and most modern and complete reference works to the information extant with regard to the various inorganic colloids. They are so clearly and pleasantly written, and so well and thoroughly documented, that any of them serve as a text, although necessarily incomplete, from which to gather the theories and applications of colloid science arising from the materials studied. Many important theories are discussed for their own sake. Interesting accounts are also given of many technical materials, such as plaster of Paris, inorganic pigments, halides in photography, soil colloids, base exchanging silicate gels, and cements. "The first portion of each section is concerned with a critical survey of the conditions of formation and the general characteristics of the individual salts in the colloidal state; and the second portion, with the principles underlying their applications." It is to be hoped that as the subject advances we may look forward to further revisions of the three volumes.

Throughout the text divergences of opinion are quoted. In many cases the reader must ask why no investigator

has established the facts in question which would be decisive. Presumably the answer lies in the enormous extent of the field compared with the number of available workers in any part of it. Students will note the many opportunities thus afforded for further useful research.

Professor Weiser has rendered an important service in compiling and discussing the information so far obtained with regard to all inorganic substances, elements (Vol. I), oxides and hydroxides (Vol. II), and now in the present Vol. III all remaining inorganic compounds in the colloid condition.

J. W. MCBAIN

Les Classiques de la Découverte Scientifique. Gauthier-Villars, Éditeur, 55 Quai des Grands-Augustins, Paris VI^e, France, 1938. 13.5 × 19 cm. *Les Métaux Légers: Aluminium, Glucinium, Magnésium, Métaux Alcalins* Mémoires de Henri Sainte-Claire Deville, Heroult, Bussy, Gay-Lussac, Thénard. Préface par LÉON GUILLET. xix + 166 pp. *La Dissolution.* Mémoires de Lavoisier, Gay-Lussac, Loewel, Gernez, Lescoeur, Raoult. Préface par HENRY LE CHATELIER. xvii + 148 pp. *Détermination des Poids Moléculaires.* Mémoires de Avogadro, Ampère, Raoult, van't Hoff, D. Berthelot. Avant-propos par R. LESPIEAU. xvii + 165 pp. *Halogènes et Composés Oxygénés du Chlore.* Mémoires de Scheele, Berthollet, Gay-Lussac et Thénard, Davy, Balard, Courtois, Moissan, Millon. Avant-propos par A. DAMEIX. xiv + 147 pp. Price, each, 21 francs.

The great majority of chemists read only the current or recent literature; unlike their literary brethren they know the classics of their field only by repute or in the abstracts found in textbooks. This series of Famous Scientific Papers makes accessible quite a few historically important papers collected into handy sized volumes each dealing with a broad topic. The Académie des Sciences has done the chemical world a real service by supporting this collection, which is planned to include 15 volumes. Some of these have already been reviewed in the JOURNAL.

Unlike the Alembic Club Reprints or the Ostwald's *Klassiker* no translations were specially prepared for these volumes, only such material was used as was already available in French. Consequently few non-Gallic writers are included and the impression is gained that this project is, in part, an attempt to glorify the achievements of the French chemists. Some of the volumes give a rather complete coverage, others contain obvious gaps. Nonetheless these collected essays are extremely interesting and valuable; many little known facts can be gleaned from their pages. Students and teachers will profit from reading these records of fundamental discoveries related by master chemists.

Each volume has a good preface by a competent authority; full page likenesses of most of the writers are given along with brief biographical sketches. The printing is nicely done on fairly good stock, the covers are paper. These economies are reflected in the extremely modest price. It would be a boon if an American or English publisher could put out comparable volumes at this price level.

RALPH E. OESPER

Molecular Beams. By R. G. J. FRASER, Ph.D., Imperial Chemical Industries, Limited. Chemical Publishing Company of New York, Inc., 148 Lafayette Street, New York, N. Y., 1938. ix + 70 pp. 22 figs. 10.5×17.5 cm. Price, \$1.25.

In this monograph the author reviews briefly the most significant work published in this field since the appearance in 1931 of his longer monograph on Molecular Rays for the Cambridge Series of Physical Chemistry. The present booklet is, however, not merely a report of new work; it is a highly condensed outline of the entire field with a description "in something like adequate detail of its more fruitful areas only."

The chapter headings are "Molecular Beams," "Gas Kinetics," "Magnetic Moments," and "Electric Moments." The most important extension beyond the 1931 treatment occurs in the third chapter, in which the notable contributions of I. I. Rabi and co-workers, and those of O. Stern and collaborators, are reviewed under the sub-title "Nuclear Spins and Magnetic Moments." The author's own recent contribution to the molecular ray study of free radicals receives brief notice in the first chapter, and his contribution to the study of molecular scattering by the method of crossed beams is set forth in the second chapter. There are approximately sixty references to the literature of date more recent than 1931.

As to the presentation, the author's aim would seem to be at preciseness of statement together with utmost economy of words; and his style approaches to the happy state referred to in the dedicatory note: namely, that of being (like the molecular ray itself) "unidirectional and collision-free."

T. E. PHIPPS

Dipole Moments. Their Measurement and Application in Chemistry. By R. J. W. LE FEVRE, D.Sc., Ph.D., F.I.C., Lecturer in Chemistry, University College, London. Chemical Publishing Company of New York, Inc., 148 Lafayette Street, New York, N. Y., 1938. v + 110 pp. 28 figs. 10.5×17.5 cm. Price, \$1.50.

Two books on dipole moments now appear after a period of several years during which only reviews in journals or chapters in larger works have been devoted to the subject in English. Actually, the present small volume has no greater content than might be expected of a chapter in a treatise, but, without attempting completeness, it deals with the major methods and problems of the subject. It presents the fundamentals of the theory of dielectrics and the methods by which the dipole moment is calculated. A general outline of the experimental methods for obtaining the data necessary for the calculation of the moment includes a detailed account of the method of dielectric constant measurement used by the author. An excellent summary of the various attempts to treat the solvent effect in dipole moment measurements is followed by the longest chapter of the book, which describes classical examples of the solution of structural problems through dipole moments and discusses the relation of moment values to various recent questions of molecular structure. The book closes with brief chapters on "Intramolecular Rotation and

Flexibility of Molecules" and "Some Anomalous Dipole Moments" and a table of moment values selected for the most part from the appendix to the "Transactions of the Faraday Society," Volume 30, 1934.

The presentation of the material is smooth, clear and authoritative and should prove admirable for a senior, a graduate student, or an older chemist wishing to find out something about dipole moments. The investigator directly concerned with the determination or interpretation of moments will probably find, by the slight exertion of reading an easily readable book, useful comments or references to recent literature which may have escaped his attention, but cannot expect an exhaustive treatment of any particular topic, as reference is made to only a fraction of the dipole moment papers in the literature. Frequently, only the work done in England on a particular problem is mentioned when it is sufficient to show the argument and, not unnaturally, the problems investigated in England are emphasized. It is rather surprising to an American reader to note the seemingly scrupulous care with which use of the word "resonance" and mention of Pauling's work in this field are avoided. Although there is mention of "canonical structures," "mesomerism" appears to replace the phenomenon of "resonance." One should not, however, attempt a detailed criticism of so brief a book, for within the limitations imposed by its small size, it may be regarded as extremely successful.

CHARLES P. SMYTH

Crystal Chemistry. By CHARLES W. STILLWELL, Ph.D., Research Chemist, Dennison Manufacturing Company. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, N. Y., 1938. x + 431 pp. 72 figs. 14.5×21 cm. Price, \$4.50.

The study of crystalline substances has today reached such large proportions that it is coming to be treated in several independent parts: for example, first the concepts and language of crystal geometry; second, the several techniques for its study and their practical applications; third, the compilation of the geometrical constants of known crystals; fourth, analysis of these results, their bearing on the general subject of the atomic structure of matter, and their correlation with physical and chemical properties. In the absence of single volumes or treatises which cover all of these divisions, books like the present one, which belongs in the fourth category mentioned, are to be welcomed.

This book, like Hassel's book of the same name (reviewed in *THIS JOURNAL*, 57, 964 (1935)), interprets the results of crystal structure studies for chemistry students. It is intended as a text or as a point of departure for a more thorough study of the field, and may be expected to prove useful in modernizing courses in inorganic chemistry.

The volume begins with a discussion of the sizes of atoms and ions, and how they vary with environment in crystals. There follow two valuable chapters, one on the structures and properties of the elements, with a treatment of the metallic state, the other on the nature of alloys. In the next three chapters on the structures and properties of binary and ternary compounds, the subject of ionic and covalent bonds is taken up. The principles thus outlined

are applied in the following chapters on silicates, including a discussion of inorganic glasses; on Werner compounds; on isomorphism, mixed crystals and polymorphism; and on organic crystals. The two concluding chapters on natural and synthetic fibers are of technical as well as general interest.

As illustrating what is in the book, on p. 330 there is an interesting rationalization of the composition of dental enamel; on p. 390 the mechanism of the permanent wave is explained. Throughout the book is much of the fertile work of V. M. Goldschmidt, which is otherwise quite inaccessible.

As illustrating what is not in the book, on p. 178 it is not indicated that CsCl has the NaCl structure at high temperatures, nor that the potassium halides have the CsCl structure at high pressures. From the lack of mention of silicate glass fibers in the last chapters one might conclude, contrary to common sense, that they are not fibers at all because they lack the internal structure of the fibers included in the discussion. There is much on the thermodynamic and mechanical properties of crystals, but nothing on their optical properties.

The style is generally stimulating, sometimes obscure. The index is rather brief. The format is the excellent one of the International Chemical Series.

C. D. WEST

BOOKS RECEIVED

October 15, 1938–November 15, 1938

- R. B. BRADSTREET. "The Standardization of Volumetric Solutions." Chemical Publishing Company of New York, Inc., 148 Lafayette St., New York, N. Y. 126 pp. \$3.00.
- OSCAR L. BRAUER. "Chemistry and its Wonders." American Book Co., 88 Lexington Ave., New York, N. Y. 760 pp. \$2.00.
- OSCAR L. BRAUER. "Exploring the Wonders of Chemistry." American Book Co., 88 Lexington Ave., New York, N. Y. 246 pp. \$0.48.
- ÉMILE MONNIN CHAMOT and CLYDE WALTER MASON. "Handbook of Chemical Microscopy." Vol. I. Second edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 478 pp. \$4.50.
- ARNOLD EUCKEN. "Lehrbuch der chemischen Physik. I Band. Die korpuskularen Bausteine der Materie." Second edition. Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C 1, Germany. 717 pp. RM. 38; bound, RM. 40.
- JOHN T. FOTOS and JOHN L. BRAV. "German Grammar for Chemists and Other Science Students." John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 323 pp. \$2.25.
- C. C. HEDGES and H. R. BRAYTON. "The Application of Chemistry to Agriculture." D. Appleton-Century Co., 35 West 32d St., New York, N. Y. 238 pp. \$2.00.
- KARL JELLINEK. "Kurzes Lehrbuch der physikalischen Chemie." Vol. I. Æ. E. Kluver, Deventer, Holland. 314 pp. Dutch fl. 8.50.
- WOLFGANG LANGENBECK. "Lehrbuch der organischen Chemie." Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 537 pp. RM. 15.
- PHILIP A. LEIGHTON. "The Determination of the Mechanism of Photochemical Reactions." Hermann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris, France. 72 pp.
- HANS MEYER. "Analyse und Konstitutionsermittlung organischer Verbindungen." Verlag von Julius Springer, Linkstrasse 22–24, Berlin W 9, Germany. 886 pp. RM. 57; bound, RM. 59.70.
- GERHARD K. ROLLEFSON. "The Photochemistry of the Halogens." Hermann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris, France. 53 pp.
- VLADIMIR ROJANSKY. "Introductory Quantum Mechanics." Prentice-Hall, Inc., 70 Fifth Ave., New York, N. Y. 544 pp. \$5.50.
- ERICH VINCKE. "Vitamine und Hormone und ihre technische Darstellung. III. Darstellung von Hormonpräparaten (ausser Sexualhormonpräparaten)." Verlag von S. Hirzel, Königstrasse 2, Leipzig C 1, Germany. 162 pp. RM. 7.50.
- ROBERT P. WALTON. "Marihuana, America's New Drug Problem." J. B. Lippincott Co., 226 South Sixth St., Philadelphia, Pa. 223 pp. \$3.00.
- CONRAD WEYGAND. "Organisch-chemische Experimentierkunst." Johann Ambrosius Barth, Salomonstrasse 18B, Leipzig C 1, Germany. 772 pp. RM. 43; bound, RM. 45.