it should first be rendered slightly alkaline with ammonia water, in order to prevent the destruction of the hemoglobin, if present, by the acids (mainly hippuric) present in the urine.

F. ALEX. MCDERMOTT.

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NEW BOOKS.

A Laboratory Manual of Inorganic Chemistry. By EUGENE C. BINGHAM, Ph.D. (Johns Hopkins), Professor of Chemistry, Richmond College, Richmond, Virginia, AND GEORGE F. WHITE, Ph.D. (Johns Hopkins), Associate Professor of Chemistry, Richmond College, Richmond, Virginia. New York: John Wiley and Sons. London: Chapman and Hall, 1911. viii + 147 pp. Price, $1.00 net (4/6 net).

This is a 12mo. volume printed on a stout paper, interleaved with blank pages, and neatly bound in dark blue cloth. The subject matter is divided into three parts: Part I, "Inorganic Preparations" (45 pp.), deals with the preparation and examination of the common gases, and of a few other substances such as bromine, iodine, potassium chlorate and sodium hydroxide. Part II, "Qualitative Analysis" (74 pp.), discusses the dry-way tests, and the wet-way reactions of and analysis for basic and acidic radicals, with the group separations. For the method of separating the metals of the iron and zinc groups the authors "are largely indebted to Messrs Noyes, Bray and Spear." Part III, "Quantitative Analysis" (11 pp.), gives detailed directions for half a dozen quantitative experiments illustrating the fundamental laws. These experiments, it is stated, may be introduced at the discretion of the instructor during the early part of the course.

The instructions throughout are admirably lucid and "have been made full, so that no good excuse may be offered for slovenly work." In Part I, the student is required to answer questions frequently but not perpetually. Part II abounds in formulas and equations and is thus not merely a set of laboratory directions to accompany a reference work, but is itself largely informative, stating what happens rather than enquiring this of the student. References to other text-books are, indeed, not frequent. The only general inorganic text cited in the list of chemical reference literature on p. 140 is that of Holleman.

The printing, unfortunately, is somewhat uneven and frequently out of alignment. A few printer's and other errors have been noticed, but the text is, for a first edition, remarkably free from errata. Without doubt, the book will prove a most serviceable one to those whose first year's laboratory teaching in chemistry requires a text of this character.

ALAN W. C. MENZIES.

Electrical Nature of Matter and Radioactivity. By HARRY C. JONES, Professor of Physical Chemistry in the Johns Hopkins University. Second Edition, Completely Revised. New York: D. Van Nostrand Co., 1910. viii + 210 pp. Price, $2.00.

As Professor Jones aptly states in the preface to the new edition, "Most of the epoch-making discoveries in connection with radioactivity were made in the earlier stages of the work, but many important contributions to our knowledge in this field have been published in the last few years." The first edition of this book was published in 1906 (review: THIS JOURNAL, **28,** 1266). To bring it into accord with the later developments occasional pages of the first six chapters have been altered while later chapters have been rewritten or extensively revized. Among the many interesting and important newer results presented are the discovery of ionium, the long-lived transformation product of uranium and the immediate parent of radium; the counting of the alpha particles of a known amount of active matter, which led to the conclusion that the alpha ray is an atom of helium carrying a double positive charge and the evidence that potassium and rubidium are intrinsically, though faintly, radioactive elements. The book shows some evidence of hasty revision; as, for example, on p. 153 where mesothorium 2 and thorium D are omitted from the complete list of thorium products. In this table the periods of mesothorium and thorium A are given as 7 years and 10.6 seconds respectively instead of $5^1/_2$ years and 10.6 hours. The incorrect statements to which attention was called in the review of the first edition have not been changed.

HERBERT N. MCCOY.

Leçons de Cristallographie. G. FRIEDEL. Paris: Librairie Scientifique, A. Hermann et Fils. 1911. 310 pp., 383 figs.

This book was written as a text-book for engineering students and not as a scientific treatise. It presents, in a somewhat extended form, the first lectures in mineralogy given by the author at the National School of Mines at Saint-Etienne, France. Notwithstanding its somewhat elementary character the book offers many interesting thoughts to an advanced crystallographer, but being written in French it is not adapted to English-speaking students. The introduction (pages 1 to 6) discusses the definition of matter whose properties are scalar or vectorial (continuous or discontinuous). Crystallized matter is that which has discontinuous vectorial properties. Under the heading homogeneity a crystal is defined as the entire homogeneous mass of crystallized matter. The first of the two parts of the book is concerned with *the study of the crystal* including geometrical crystallography (pp. 7–125) and physical crystallography (pp. 126–223). The second part of the volume considers *the complex crystallin structures and their transformations*, dealing with twinning, mechanical deformations, liquid crystals, regular and irregular groupings (pp. 225–273), isomorphism (pp. 274–285) and polymorphism (pp. 286–298). A 7-page appendix contains remarks on the structure theory of Schönflies.

WALDEMAR T. SCHALLER.

Tables for the Determination of Minerals by means of their Physical Properties, Occurrences, and Associates. EDWARD HENRY KRAUS AND WALTER FRED HUNT, 1911. McGraw-Hill Book Company, New York. 254 pp. Price, $2.00 net.

This excellent manual for the "determination of minerals at sight" includes "250 of the most common minerals, classified [by display type] into three groups, which may be designated as (1) very common, (2) common, and (3) not common, but important." The physical properties are described in the introduction and a glossary defines all the terms used in the introduction and in the tables.

The minerals are divided into two groups, according to luster (metallic and non-metallic). The second subdivision is by color, each of which (except for the colorless class) is separated into two smaller sub-divisions on the basis of the streak. The last division is by hardness under which the minerals are separated according to a hardness of calcite or less (1 to 3), harder than calcite but not harder than feldspar (3 to 6), and harder than feldspar (over 6).

To allow for the different phases some minerals show one finds the same mineral placed under several different headings. For example, hornblende, augite, siderite, biotite, garnet, etc., are given under the metallic mineral (with the description of their luster as submetallic or metalloidal) as well as under the non-metallic. Included with minerals are ozocerite' lignite, asphalt, bituminous coal and anthracite coal, given under both metallic and non-metallic luster.

An excellent feature of the tables is that under the individual mineral names is given the page reference to three books (Kraus, "Descriptive Mineralogy" (1911); Dana, "Textbook of Mineralogy" (1898); Moses and Parsons, "Mineralogy" (1909)) where more detailed descriptions of the minerals can be found.

The book is well printed and carefully compiled and should prove of much value to students in the study of minerals by their physical properties.

WALDEMAR T. SCHALLER.

Qualitative Chemical Analysis. By J. I. D. HINDS, Professor of Chemistry, University of Nashville. Easton, Pa.: Chemical Publishing Company, 1910. vii + 265 pp. Price, $2.00.

This volume includes under five parts the following heads: I. Principles and Methods; II. Basic Analysis; III. Acidic Analysis; IV. Complete Analysis of an Unknown; V. Reagents and Tables. The last two are very well arranged. Part III, or Acid Analysis (73 pp.), is based upon Boettger's classification for acids but, according to the author, "the systematic method for their separation and identification is a new arrangement." The laboratory methods in Part II (109 pp.) are those of older texts carefully brought to accord with modern ideas. Part I (49 pp.) introduces a comprehensive discussion of the principles involved in

qualitative analysis. The connection, however, between this part and the main work—or the actual laboratory methods—is exceedingly weak, with the consequence that Part I stands entirely aloof from the text proper. Theoretical considerations brought into Part II, and often highly involved by reason of a discontinuity of treatment in Part I, must suffer from a pedagogical standpoint. One or two structural formulas are attempted for which experimental evidence up to the present day is entirely lacking. Very few typographical errors are to be found, but the manner of writing certain formulas, such as the hydroxides, if not overlooked in proof-reading, is far from scientific from the standpoint of clearness. Ammonium hydroxide, fortunately, receives a true hydroxide formula in most cases. The action of ammonium sulfide on ferric salts is given on p. 102 as that of a reduction followed by precipitation of ferrous sulfide. This is not in accord with the recent work of Stokes (THIS JOURNAL, **29**, 304). Altogether the text is well put up and the essential features clearly brought out. The introduction of cross references would add much to its serviceability as a laboratory guide. WILLIAM J. HALE.

A Course in Qualitative Chemical Analysis. By CHARLES BASKERVILLE and LOUIS J. CURTMAN. 14 × 22 cm. pp. xi + 200. New York: The Macmillan Co., 1910.

The relation of qualitative to quantitative analysis has been emphasized in a way eminently practicable and highly commendable. Terse and somewhat didactic descriptions of reactions furnish a good groundwork for a well arranged system of analysis for the commoner metals and acids. By means of excellent explanatory notes the difficulties met with in an analysis are pointed out, and adjustments of procedure are made apparent.

There are relatively few typographical errors. Minor inconsistencies are evident in the table for preliminary examination, the treatment of alloys and the table of solubilities, where reference is made to a few of the rarer metals and certain less common organic acids. The "Fresenius" table of solubilities leaves much to be desired.

Theoretical explanations are left entirely to the discretion of the instructor. This total lack of theoretical explanations will restrict the general usefulness of the book. For the majority of students throughout the entire country who are pursuing courses in chemistry, qualitative analysis serves chiefly as a complement to the beginning courses in general chemistry. A book which makes qualitative analysis solely the precursor of quantitative analysis, lacks balance. WILLIAM GABB SMEATON.

Alembic Club Reprints No. 18. Sketch of a Course of Chemical Philosophy. By STANISLAO CANNIZZARO (1858). Edinburgh: The Alembic Club. Chicago: The University of Chicago Press, 1911. Price, 43 cents, postpaid.

The Alembic Club Reprints are intended to supply for English the same place as Ostwald's Klassiker der exakten Wissenschaften for German.

This outline of a course of lectures delived by Cannizzaro at the University of Geneva and published in *Il Nuovo Cimento*, **7**, 321–66 (1858) is an especially happy selection for such a purpose. These lectures contributed very effectively toward the acceptance of Avogadro's Law, and every chemist will find profit in reading them. W. A. N.

Die direkte Einführung von Substituenten in den Benzolkern. By DR. A. F. HOLLEMAN, Professor of Chemistry at the University of Amsterdam. Leipzig: Veit and Co. 516 pp. Price, 20 Marks.

This book by Prof. Holleman is, first of all, a compilation of the scattered data on the subject of direct substitution in the benzene series. The subject is covered through the trisubstituted derivatives. The first section deals with mono-substituted derivatives, the second with the methods available for the quantitative determination of the amounts of each constituent in a mixture of isomers, the third with the introduction of a second substituent into the benzene ring, and the last with the introduction of a third substituent. Several chapters are given to résumés of the facts and general discussions of the theories concerning substitution. In these chapters Prof. Holleman is at his best, for his criticisms of the rules and theories of substitution are exceedingly clear and just. His conclusion that our knowledge of the facts of substitution in the benzene series is still too fragmentary to serve as the basis of any satisfactory theory of substitution is perfectly clear after a study of the book.

As a compilation of facts and literature references the work is a valuable addition to the literature of the benzene series. If this were all the book contained it would be only a reference work, to be used as the need for some definit fact arose, but there are portions of the book which are very readable and which have, therefore, considerable pedagogical value. The chapters on "The Quantitative Determination of Isomers in the Presence of Each Other," and on "The Theories of Substitution" are two chapters of this sort. As a teacher of organic chemistry the reviewer welcomes every book of this type which appears. There is a point in the development of students, just as they are beginning to go beyond the limits of ordinary text-books, when the literature of organic chemistry seems appalling in its complexity. To get hold of a book at this stage which takes some definit thread from the tangled mass and straightens it out is a great relief both for teacher and pupil. Chapters in Prof. Holleman's book will serve admirably this purpose. These chapters are so closely connected with the others, which deal with the great accumulation of facts on the subject of substitution, that they are not apt to give the student a false feeling of mastery of the entire subject when he has read them. The reviewer can heartily recommend Prof. Holleman's work, both as a conveniently and systematically compiled reference book, and as a valuable book for advanced students to read

in part, when they are making a detailed study of the benzene series.

L. H. CONE.

V. v. Richter. Traité de chimie organique. Par R. ANSCHÜTZ et G. SCHROETER. Premiere édition francaise. Traduite d'apres la onzième édition allemande par R. GAULT, Tome premier. Série acyclique. Paris: Beranger; 1910. pp. xxiv + 884.

It seems rather surprizing that a French translation of this well known and very successful text-book has been so long in making its appearance. The third American edition, by Professor (now Provost) Edgar F. Smith, was published eleven years ago. This French edition is commended to the translator's compatriots in an introduction by Professor Haller. The book is in attractive form, with good presswork and careful proof-reading, and should be welcomed by all French chemists.

MARSTON TAYLOR BOGERT.

Die Beziehungen zwischen Farbe und Konstitution bei organischen Verbindungen Unter Berücksichtigung der Untersuchungsmethoden. By DR. H. LEY, a. o. Professor an der Universität Leipzig. s. viii + 246. mit 51 Figuren im Text. und 2 Tafeln. Leipzig: Verlag von S. Hirzel, 1911. Price, 8 Marks, bound.

In this book the author discusses the subject of color in organic compounds as related to their chemical constitution. The subject matter has in part appeared in recent volumes of the *Zeitschrift für angewandte Chemie* and the *Jahrbuch für Radioaktivität und Elektronik*, and has been used in the author's lectures at the University of Leipzig.

If one stops to consider, one finds that the very rapid development of organic chemistry as a pure science, and the great interest taken in it during the latter half of the last century, were due more to the scientific investigations of the structure of the dyes, by Hofmann, Baeyer, Fischer and others than to all other causes combined. When we further consider the present vast commercial value of the artificial dye industry, and the great mass of literature on the subject, we must welcome any successful attempt to collect and arrange the most typical examples of color formation; the re ation of the atomic groups to color production; and the working out of theories to account for this phenomenon in a rational manner, and in accordance with our modern ideas of light and atomic structure. This the author has undertaken to do and has within a small compass presented clearly and concisely our present knowledge of the subject, and given many suggestions for further practical studies.

The book is in two parts: In the first part the author discusses color as determined by the absorption spectrum of the compound, and the physical conditions which modify the latter. The chromophore and auxochrome theories, old and new, as modified by our changing idea of valence and atomic structure, are reviewed and developed.

In Chapter VIII absorption phenomena are considered from the physical

rather than the chemical standpoint. A satisfactory explanation of color must rest on phenomena which are intra- or inter-atomic, and be applicable to all colored substances, inorganic as well as organic. It must tell us *why* some simple metallic salts are colored, as well as, for instance, the more complex phenolphthalein salts. The author favors Starks' theory of the electronic structure of atoms, and uses it to explain the color effects which accompany the introduction of the chromophore and auxochrome groups in the molecule. The phenomena of fluorescence are likewise referred to electronic disturbances within the atoms of the compound, thereby affecting the absorption spectrum.

While Baly and Desch's theory of color, as due to "Isorropesis," serves to explain the faint color of some simple compounds, it fails in others, as the metal salts, and methyl iodide, which show selective absorption.

Most cases of color are explained by the author by assuming that the electron, in its electromagnetic field, is the center of color emission within the molecule of the colored compounds.

In the chapter on Color Changes Conditioned by Molecular Rearrangements in Chemical Structure, one finds discussed the work of Hantzsch and others, on the chromoisomers of nitrophenols, nitroketones, nitroaldehydes, aminoazobenzene and triphenylmethane derivatives, and a discussion of the theory of indicators.

A short chapter is devoted to colored "inner complex" salts, utilizing Werner's valence theories to explain the color formation.

In the perusal of the literature on this subject of color, one can not fail to note the inadequacy of our present structural formulas for showing the delicately balanced inter-relations of the atoms, and the electromagnetic changes which must be continually operative within the molecule of the simplest colored substances.

The second part of this work is devoted to a description of the spectroscopic apparatus and method of studying color phenomena and color changes in the laboratory. It is apparent that spectroscopic methods are rapidly gaining in value, as a practical means of determining structure in organic compounds.

The book is a valuable résumé of our present knowledge of color as related to the structure of organic compounds, and the application of modern ideas of valence and the electronic structure of atoms as a cause of color. It contains many references to the original literature, and should be on the shelves of every chemical library. RICHARD SYDNEY CURTISS.

Practical Physiological Chemistry. By PHILIP B. HAWK, M.S., Ph.D. Third Edition, Revised and Enlarged. Philadelphia: P. Blakiston's Son and Co., 1910. Price, $2.50.

A third edition following so soon after the second is sufficient to show the favor with which this very useful book has been received. The

new edition differs from the second, reviewed in THIS JOURNAL, **31**, 607 (1909), by certain corrections and by the addition of some new quantitative matter. This is a decided improvement since a quantitative experiment teaches, as a rule, much more than a qualitative one. The many admirable features of the work and its main defects have been mentioned in the former review. The reviewer uses this work in teaching his classes but finds it advizable to require a good deal more quantitative work and also the isolation, in a fairly pure state, of several physiologically important substances. ALBERT P. MATHEWS.

RECENT PUBLICATIONS.

Allen's Commercial Organic Analysis. 4th Ed. Edited by H. Leffmann and W. A Davis. Vol. IV, Philadelphia: Blakiston. $5.00

APPELL, P., AND DANTHEVILLE, S.: **Précis de Mecanique rationnelle.** Introduction à l'étude de la Physique et de la Mécanique appliquée. Paris: 8°, 719 pp., 20 M.

BAKHUIS, H. W.: **Die heterogenen Gleichgewichte vom Standpunkt der Phasenlehre.** 3 Heft; Die ternären Gleichgewichte. 1 Teil. Braunschweig: F. Vieweg & Sohn. 10M.

BEADLE, C., AND STEVENS, H. P.: **Rubber Production and Utilization of the Raw Product.** New York: J. Pitman. 8°.

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DEERR, N.: **Cane Sugar.** London: N. Rodger. 20 s.

DIETRICH, W.: **Ueber Oxy.-und Methoxyderivate des Phenylxanthyliums und des Phenyl Phenopyryliums.** Ueber einige Kondensations-produkte mit 1-2 Naphthenchinon-4-sulfosäure. Berlin: Emil Ebering. 8°, 1.30 M.

DON, J., AND CHRISTHOLM, J.: **Modern Methods of Water Purification.** New York: Longmans. 16°, 368 pp., $4.20.

EDER, J. M.: **Ausführliches Handbuch der Photographie.** 1 Bd., 4 Teil. 3 Aufl Halle a S. 12M .

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FORSTER, E.: **Ueber einige Methoden, Quicksilber in den Kern der Anthranilsäure und ihrer Derivate einzuführen.** Dresden: E. Ebering. 8°, 1.30 M.

FOWLER, G. J.: **An Introduction to Bacteriological and Enzyme Chemistry.** London: E. Arnold. 8°, 7s, 6d.

FRITSCH, J.: **Fabrication du ciment.** Paris: H. Desforges. 8° 25 Fr.