NEW BOOKS.

Laboratory Manual of Colloid Chemistry. By EMIL HATSCHEK. 135 pages. P. Blakiston's Son and Co., Philadelphia, 1920. Price, $2.00.

This is the first manual of its kind on the market and will be found very helpful to teachers of colloid chemistry. Instruction in this subject has been held back for lack of any sort of a laboratory manual although texts are reasonably numerous.

There is much merit in the book as was to be expected coming from the pen of such an authority as Emil Hatschek. Yet a more generous use of references to the literature would have improved it. Soaps deserve fuller treatment, and peptization is distinctly slighted. Nor do we find more than passing reference to that important group, the hydrated oxides of iron, aluminum and chromium. The chapter on dialysis is good although it might well include some mention of Neidle's hot dialysis.

The chapter on emulsions is far too brief, considering their great importance. It contains no discussion of the difference between sodium and calcium soaps. for example, as emulsifiers and ignores the water-in-oil type of emulsions. It would be well to have in this chapter some clear experiments illustrating the different theories of emulsification. The chapter on viscosity is good.

Much material is given on Liesegang's rings but too little importance is attached to the use of silicic acid gels as a medium for their formation. The most remarkable banding is to be secured by the use of these gels if directions in the recent literature are followed.

The book is too strictly a laboratory manual. In the present pioneer stage of laboratory instruction in colloid chemistry a moderate amount of comment would greatly increase the effectiveness of the work.

The first book of its kind must necessarily be subject to improvement but the author is to be congratulated on a very useful contribution.

HARRY N. HOLMES.

Standards and Tests for Reagent Chemicals. By BENJAMIN L. MURRAY. D. Van Nostrand Co., New York, 1920. x + 385 pp. 15 × 23 cm. $2.00 net.

In the words of the author "certain desired degrees of purity in our laboratory chemicals must be insured. Recognizing the above condition, this text has been prepared." Although the text follows very closely along the lines of other well-known texts dealing with the same subjects, the author has seen fit to make no acknowledgments whatever.

The arbitrary changing, in this book, of the limits of allowable impurities published elsewhere (such as 0.25% salts of the alkalies, earths, etc., in copper sulfate as against 0.033% in Merck's "Chemical Reagents," and 0.0343% sulfates and 0.025 chloride in sodium hydroxide, pure, as against <0.025% and <0.005% respectively in Merck) emphasizes the

fact that the "Standards" are standards chosen by the author and that therefore a more appropriate title would be "Proposed Standards."

The tests are, for the most part, tests already given in Krauch (authorized translation of the third edition, Van Nostrand Co., 1902), Krauch-Merck (authorized translation of first edition, Van Nostrand Co., 1907), and Merck (authorized translation of a second edition, Merck and Co., 1914). The reviewer regrets that the author has omitted practically all of the helpful notes and references to original papers dealing with reagents and tests, which were given by Krauch and, to a lesser extent, by Merck.

The author has substituted the term "mil" for "cc." throughout the text, which is a step in the right direction, the final step being the adoption of the correct designation "ml."

In the absence of any chemists' standard such as the pharmacists have in their Pharmacopeia, this book can well be recommended as a reference text on proposed standards and tests for reagent chemicals.

G. E. F. LUNDELL.

Introduction to General Chemistry. Second Edition, first impression. By HERBERT N. MCCOY AND ETHEL M. TERRY. McGraw-Hill Book Co., Inc., New York and London, 1920. x + 648 pp, 128 figures. 15.5 × 23.5 cm. Price, $3.00.

The book has been written for college freshmen, and has been in process of growth at the University of Chicago since 1913. The choice and arrangement of topics vary from the familiar order, beginning with a chapter upon the gas laws, followed by 5 chapters introducing the fundamental concepts of the indestructibility of matter, pure substances, elements, analysis, percentage composition, the law of definite proportions and the derivation of formulas; vapor densities are developed by methods independent of the atomic-molecular hypothesis. Chapters VII to X include descriptive matter upon the common acids, bases and salts, water and solutions, introduced chiefly "to supply the indispensable data needed later for the understanding of the ionic hypothesis." Chapters X and XI present the kinetic-molecular hypothesis and the atomic hypothesis, followed by a chapter upon the halogens and one upon chemical equilibrium. Hydrogen and oxygen are treated in Chapter XIV, followed by a discussion of oxidation and reduction. The next 5 chapters cover the topics of heat and energy, the ionic hypothesis and its applications, and electrochemistry. Several descriptive chapters are then given to nitrogen, phosphorus, sulfur and their compounds, after which are 2 chapters given to an elementary presentation of organic chemistry. The concluding 7 chapters are upon special topics,—the theory of dilute solutions, disperse systems, the atmosphere, some additional elements and their compounds, the classification of the elements, radioactivity and metallurgy.

The text is written in a style that is colloquial and straightforward.

Typographical errors are very few, and complicated or obscure statements are almost wholly missing. There are frequent references to the history of the science, and likewise to chemical warfare and war industries.

The text makes a strong appeal to college teachers by its unusually complete and well-written treatment of the laws and theories of chemistry,—what are generally comprehended in the title physical chemistry. Some of the chapters on these topics deserve especial praise. The chapter on electrochemistry is written from the standpoint of the electron theory, and presents the subject with a degree of clearness and completeness which the reviewer has not met with in other first texts in chemistry. The electron theory is not only stated and explained, but is put into a form in which it can be used and is used throughout the remaining body of the text. The chapter on radioactivity is also of a superior character, and is carried through to a clear presentation of X-ray spectra, atomic numbers, and the structure of matter. The chapter on disperse systems is of the highest order of interest, and complete to a degree not usual in common texts. It is a well-informed college teacher who will not find his information increased and his horizon broadened by reading the chapters on theory and on special topics which McCoy and Terry have written, and the material is so clearly given as to be within the intellectual grasp of college freshmen at all times. The chapters are not burdened with mathematics, but on the other hand contain lucid explanations of physical principles which are needed in their elaboration.

Of the descriptive chapters, that upon nitrogen and its compounds is exceedingly well done, and the chapters on organic chemistry are fuller than is usual. There are also good chapters upon the halogens, phosphorus and sulfur, giving all the information usually put before freshmen under those headings. With the forcing of the metals and their compounds into the background, however, the reviewer is not in sympathy. Where, if not in the freshmen course, is the student to acquire the extensive knowledge of properties of materials which every good chemist must have? And what of the student whose chemistry stops with this course? Though it must be conceded that any college first text in chemistry is a compromise between being all principles and all description, yet the point at which the ratio is put is of supreme importance. It is to be wished, therefore, that McCoy and Terry's chemistry might have a systematic treatment of the alkali metals, of the alkaline earths, and of the various groups of heavy metals, concerning all of which the information in the present book is scattered and not extensive. As examples, the manufacture, properties and manifold uses of sodium carbonate and bicarbonate might well have more than the few lines accorded them; and it is hardly true that "silver is so familiar a metal that we need not de-

scribe its properties," at least if we wish the student to know more than that it is white and expensive.

The text under review stops far short of the ambition expressed by a recent writer, who desires that we might have in chemistry a book like a college text in physics, a body of principles instead of a catalogue of facts. But there is in this text and some others a tendency, conscious or unconscious, to go some distance in that direction. If the habit should fix itself upon the present generation of text-book writers in chemistry who have themselves acquired their foundation under an older system, the logical result might well happen; if the freshman course becomes as thoroughly reduced to principles as the college work in physics, it might well acquire the same standing in our colleges—taken by those who must, elected by a few, and pursued by almost none.

McCoy and Terry's text could have its descriptive matter, especially that of the metallic derivatives, expanded and systematized without becoming over-bulky and without detracting from its very obvious merits.

ARTHUR E. HILL.

Chemical Calculation Tables. Second edition revised. By HORACE L. WELLS, Professor of Analytical Chemistry and Metallurgy in the Sheffield Scientific School of Yale University. John Wiley & Sons, Inc., New York (Chapman and Hall, Ltd., London), 1919. v + 43 pp. 15.5 × 24.5 cm. Price $1.35.

This book contains about 20 pages of data very useful to chemists and a 5-place table of logarithms with double thumb index. Much care has been taken to insure its accuracy. Individual opinions may differ as to what should be included in a book so limited in size. The gravimetric factors are not always well chosen and the analyst will need to supply many more. For example, nickel is commonly weighed as the salt of dimethylglyoxime, and lead as PbO_2, but no mention is made of factors involving these compounds. No date is give for the table of atomic weights. The stiff red cloth covers in which the book is bound do not seem well suited in color or style for a book of this kind which is used at the laboratory desk. The book will, on the whole, be found very convenient.

H. H. WILLARD

Les Colloides. By J. DUCLAUX. 18 × 12 cm. pp. vii + 288. Paris: Gauthier-Villars et Cie, 1920.

Most people nowadays consider a colloidal ferric oxide solution as consisting of suspended particles of ferric oxide stabilized by an adsorbed salt, ferric chloride for instance. The author prefers to look upon it as a salt with iron as cation and an anion consisting of the ferric oxide plus the chlorine. If one postulates that the amount of chlorine in the anion can vary considerably and if one also postulates that the anions behave like suspended particles, the two views lead to similar conclusions so far as cases of this type are concerned. The disadvantage is that Duclaux

is forced to treat adsorption from solution by a solid as a fundamentally different phenomenon from the formation of a colloidal solution. This does not trouble him because he likes antitheses and still holds to Graham's distinction between colloids and crystalloids, though admitting that the distinction is not absolute.

The subject is treated under the following general heads: General methods of making colloidal solutions; general properties of colloidal solutions; optical properties and filtration; constitution of colloidal particles; colloids and the ionic theory; adsorption; colloids and adsorption; physical properties in living organisms; osmotic pressure in living organisms; colloids in living organisms; technique of the study of colloids.

While the author, like most authors, is convinced that he has explained everything, his apparent success is due chiefly to the general vagueness of the discussion. Dyeing is cited as a case of adsorption, p. 138; but there is no reference to the effect of acids, alkalies, or salts. When discussing coagulation by salts, p. 229, he takes the ground that one cannot tell whether the precipitation is due to the sodium ion or the chlorine ion. On p. 197 he states that the permeability of tissues depends on their structure, which is undoubtedly true; but which is not distinctly helpful.

There are some interesting facts in the book which were entirely new to the reviewer. In 1810 a lot of mercury in the hold of an English ship escaped from the containers. Inside of three weeks two hundred men on board suffered from mercury poisoning and all the animals died, p. 172. In the dried venom of the cobra, p. 183, the zinc content is about 15% of the total mineral matter. This means a specific concentration, because iron which is much more abundant than zinc, is not concentrated in the venom. The case is analogous to the concentrating of potassium and iodine in sea-weed, to the taking up of lime by soft shell crabs, and to the concentrating of phosphate by mistletoe.

The author is not much impressed by the terminology of the biological chemists. He considers the precipitation of arsenious sulfide by barium chloride adsorbed by something, and points out, p. 241, that if we had the two reagents enclosed separately in gelatine capsules which suddenly became permeable, we should call the arsenious sulfide an arseniogen before it was precipitated and an arsenine after it was precipitated while the adsorbed barium chloride would be called an arsenine ferment.

WILDER D. BANCROFT.