The sixty-eight pages devoted to meat and meat products are especially worthy of note, though the apparatus described for the estimation of nitrogen (p. 32) would scarcely meet with the approval of our agricultural chemists.

The remainder of the volume is devoted to the proteoïds. The author has set for himself the very difficult task of classifying the bodies that come under this heading, and this treatment of them is probably as systematic as is possible with the knowledge we now possess of their properties.

The nomenclature of this subject is most bewildering, at present, so much so that it is necessary for a writer, in order to be understood, to give his interpretation of even the terms most commonly employed. Some writers, and even national associations, in trying to assist us, only add to our perplexity. We are glad to see, therefore, that the author of this work has striven, first of all, to promote uniformity, for instance, the term "albuminoïd" is used with the same significance as proteoïd, but it is suggested that, to prevent confusion, it be avoided whenever possible.

On the whole the volume compares favorably with the earlier volumes of the work, and cannot but do much to remove the difficulties that are encountered in the examination of nitrogenous compounds. W. D. BIGELOW.

MANUAL OF DETERMINATIVE MINERALOGY, WITH AN INTRODUCTION ON BLOWPIPE ANALYSIS. By GEORGE J. BRUSH. Revised by SAMUEL L. PENFIELD. Fifteenth edition. pp. 302. New York: John Wiley & Sons. 1898. Price, $4.00.

This book is so well known through its fourteen previous editions that it is surely superfluous for the reviewer to do anything more than to note the additions and changes which have been made, and to call attention to what appear to be defects or deficiencies.

The additions consist principally of a well-written and useful chapter on the physical properties of minerals, the greater part of which deals with crystallography, and, further, in the introduction into the tables of such well-defined mineral species as have been discovered in the twenty years since their last revision.

The most evident change has been in the reconstruction of the tables, with the dominant idea of making the chemical tests the

more decisive ones and physical tests principally subordinate. In doing this, the author has our most sincere approval ; we felicitate him on the extent to which he has emphasized this change. When reviewing Dr. Frazer's tables for the determination of minerals by physical properties,[1] we felt constrained to remark that "every true scheme of determining minerals should start with and be based on their chemical composition, bringing in physical tests afterwards, etc.," and on this ground we condemned methods based on physical properties as "starting at the wrong end, and unfit to guide in the accurate determination of minerals in general." We therefore believe that Prof. Penfield has increased the accuracy and utility of his tables in proportion as he has brought the chemical tests forward as the primary ones and relegated the physical tests to their logical subordinate position. That he is thoroughly convinced of the desirableness of this tendency may be seen from the following extracts :

"It is believed that no methods are so generally to be relied upon for giving decisive results as those based upon the identification of the chemical constituents of the minerals."

"The tables have been so developed that tests for characteristic chemical constituents furnish the chief means for identification."

Our chief criticism of the method of the tables is that the author has not made these changes radical enough, that he still holds on to some physical tests as primary ; whereas, to be consistent, he should have relegated them all to their proper subordinate position. The retention of luster and fusibility as primary divisions is the last relic of the former illogical and unsatisfactory method of classification, and it is to be regretted that the author did not perceive the desirability of retiring these from their too prominent function and thus coming at once to the logical simplicity of the chemical basis as primary.

It is in our judgment a defect of the book that many quick, decisive, and reliable blowpipe tests are not accounted at their proper value, and the recommendation usually given to make the corresponding wet test in their place. We think that the author undervalues the reliability of many flame and bead tests

[1] This Journal, 17, 353.

especially, which when carefully performed are really more decisive and satisfactory than the wet tests, besides being more quickly made and with simpler apparatus and reagents.

Another general defect is that the tables still fail to take account of some of the most common and practically inseparable impurities occurring in minerals. We cheerfully allow the truth of Prof. Penfield's remark that "it would be impossible to devise blowpipe methods to meet the contingencies arising from the various mixtures of minerals"—but does that excuse the classifier from taking into consideration the most frequently occurring isomorphous replacements which introduce foreign elements into the mineral?

To particularize: On page 246 are given the fusible minerals with metallic luster containing arsenic. The second mineral mentioned is characterized as containing both arsenic and antimony, leaving it to be implied that the thirty minerals following are free from antimony, and it is true that no antimony appears in their formulas. But it is nevertheless the fact that eleven of these thirty do often contain antimony, in amounts varying from four and eight-tenths to twenty-eight per cent., and that therefore any one of these eleven might, at times, give the reaction ascribed only to allemontite. Once again, on page 249, are given antimony compounds with lead, combined with first copper, then bismuth, silver, tin, and finally without any of these four elements. Yet, among the ten minerals in the last class, the simple fact is that six of them do at times contain enough copper (one to six per cent.) to give the reaction which would place them with bournonite, in the first class. These are only two instances of what could be illustrated in almost every division of the classification.

The question at once arises—Is an omission to take such cases into the account unavoidable? Would it be an impossible task to catalogue each mineral in every class into which its occasionally occurring inseparable impurities would unavoidably cause it to fall in practice? If that is in reality impossible, then we owe an apology to the author for dwelling on an unavoidable defect; for a defect it certainly is, since a mineral will, in general, fall into its correct place in the table only when it is the typically pure substance which the formula represents.

The adoption of the chemical basis of classification inevitably requires that variations of the composition of a mineral from the normal must be taken into account, when they affect its position in the classification. When such a classification, on the chemical basis, is *perfectly* carried out, then we will possess a theoretically perfect system of determinative mineralogy.

To sum up, then, this book is, in our judgment, the best treatise on determinative mineralogy that is yet published; but the tables have some defects of method and many deficiencies of detail, the correction of which would greatly increase their reliability. JOSEPH W. RICHARDS.

A TEXT-BOOK OF VOLUMETRIC ANALYSIS WITH SPECIAL REFERENCE TO THE VOLUMETRIC PROCESSES OF THE PHARMACOPOEIA OF THE UNITED STATES. By HENRY W. SCHIMPF, PH.G., M.D., Professor of Inorganic Chemistry in the Brooklyn College of Pharmacy. Third edition, revised and enlarged. New York: John Wiley & Sons. 1898. xxx + 522 pp. Price, $2.50.

In its present form this work consists of four parts: Part I gives a description of the apparatus, indicators, methods of work and of calculation used in volumetric analysis, and also a concise statement of the methods to be used for the inorganic substances of the U. S. Pharmacopoeia. Part II is new and gives methods for the analysis of various medicinal acids and metallic salts. Part III is devoted to sanitary analysis and includes especially methods for the analysis of water, milk, butter, starch in cereals, diastasic value of malt, glycerin, alkaloids, vegetable drugs, and surgical dressings. Part IV gives gasometric methods for the analysis of carbonates, nitrous ether, nitrates, urea, and hydrogen dioxide.

The descriptions and directions are mostly clear and satisfactory, and the methods given are usually well suited for the purposes for which they are designed. Two or three matters of detail may be criticized: magnesium chloride is now generally used for magnesia mixture instead of magnesium sulphate, as recommended (p. 241). The standards for nitrites in potable waters (p. 313) do not agree with the opinion of the best authorities and should be revised. A table of atomic weights based on O = 15.96 is decidedly out of date, but that may be the fault of the pharmacopoeia rather than of the author.

Perhaps the most serious omission in the book is the failure to