

The work is not illustrated in the sense of containing pretty pictures of complicated apparatus copied from foreign books rather out of date, but it does contain representations of many diagrams, such as the spiral of von Huth, the diagrams of W. Spring, of W. Crookes, of Flavitzky, and the "generation tree" of Wendt.

A valuable feature of this work is the "Index to the Literature Relating to the Periodic Law," containing 267 titles. The book is well indexed.

This contribution to the history of chemistry will prove of use to all those interested in studying great questions which influence the progress of science. H. CARRINGTON BOLTON.

ROENTGEN RAYS AND PHENOMENA OF THE ANODE AND CATHODE. BY EDWARD P. THOMPSON, M.E., E.E. Concluding chapter by PROF. WM. A. ANTHONY. New York: D. Van Nostrand Co. xvi + 190 pp. Price, \$1.50.

This book is a mere compilation of 210 abstracts from various scientific journals and original memoirs. Mr. Thompson makes no attempt at classification or analysis, but has done the work hastily and superficially, by his own confession, apparently to meet the popular demand for illustrated books on this subject. There are many blunders, both in fact and in style, and the book will hardly commend itself to anybody who has access to one or two of the various scientific journals. Prof. Anthony's chapter is by far the best part of the book, as it gives a succinct and intelligible resumé of the various theories that have been advanced by Roentgen's discovery. It is to be regretted, however, that Hertz's researches on radiant electricity have received such scant attention; since they are not only the direct cause of the work of Lenard and of Roentgen, but also contain much that must be taken into account in all later speculations. It would also seem to the reviewer that Prof. Anthony does not do sufficient justice to those hypotheses which involve "free energy," not directly fastened to particles of substantial matter.

MORRIS LOEB.

THE CHEMISTRY OF DAIRYING. By HARRY SNYDER. viii + 156 pp. Easton, Pa.: Chemical Publishing Co. Price, \$1.50.

This is the title of a manual of 156 pages devoted to the chemistry of the dairy, especially in respect of the manufacture of

butter and cheese, and the methods of feeding dairy cows. This book is a significant indication of the change which has taken place in the last few years among intelligent farmers and dairymen in regard to the methods of conducting their business. As a result of the education which has been given by the agricultural colleges and experiment stations, the dairy industry of this country is rapidly assuming a scientific character. The fact that a book such as the one which has been mentioned above can be printed and sold would be sufficient evidence of this, were it not seen also in the improvement in quality and the increase in quantity of dairy products. The book has been prepared with the object of furnishing useful information to a class of young men who intend to become farmers and dairymen rather than to scientific experts. The difficulty of preparing such a book is admittedly great, especially when written by a scientific man. It is hard to draw the line between a truly scientific exposition of a subject and the maudlin mouthings of kindergartens. The author is to be congratulated upon having steered his course very satisfactorily between the Scylla of science and the Charybdis of baby talk. The intelligent dairyman is furnished with useful information in regard to the character of the products with which he is working, the methods of determining, in an approximate manner, their chief characteristics and the proper methods to be pursued in selecting dairy animals and feeding them for the highest product.

Chapter 2, on milk testing, Chapter 10, on sanitary conditions, and Chapter 14, on the effects of food upon dairy products, are of especial interest to dairymen.

A good book would not be quite perfect without some minor defects, and Mr. Snyder's work has not entirely escaped. One cannot see, for instance, why he describes the fat particles as "rubber balls," on page 2, and milk sugar as resembling "confectionery sugar without any sweet taste." In describing the amount of butter-fat in the solids of cream he states, on page 46, that it is from eighty to ninety per cent., while in the table giving the average composition of cream a simple computation will show that it is only seventy-seven per cent. On page 5 it is said that butter should contain about eighty-three per cent. of butter-fat, while on page 54 that num-

ber is given as its minimum content. The spelling of lactocrite and Feser, on pages 112 and 113, might be improved, as likewise the grammar in such a phrase as "there is rarely less than 12 pounds," on page 3. These are minor defects which the author will not fail to correct in a second edition, which, from the excellence of the work, will doubtless soon be demanded.

THE CONSTANTS OF NATURE. PART V. A RECALCULATION OF THE ATOMIC WEIGHTS. BY FRANK WIGGELSWORTH CLARKE. New Edition. Revised and enlarged. City of Washington. Published by the Smithsonian Institution. 1897. 8vo. vi + 370 pp.

The first edition of this work was published in 1882. Since then, and partly, no doubt, incited by that publication, a great deal of very excellent work upon atomic weights has been done. The appearance of Professor Morley's classical work on the relative atomic weights of oxygen and hydrogen has, especially, rendered possible a new calculation based on the hydrogen unit which will command universal acceptance among chemists. The present work is carried out on the same lines and with the same painstaking accuracy as the first edition. The exact means by which the final result is obtained is given in each case. While in the selection of the final value for each element due weight is given to chemical as well as mathematical evidence, there is also given for each the result of the purely mathematical combinations obtained by weighting each observer's value in accordance with the probable error. The comparative worthlessness of the probable error as showing the value of an atomic weight determination, and the necessity of considering chemical evidence as well, in spite of the objectionable "personal equation" introduced, is well shown by the fact that the probable error for oxygen as given by Professor Clarke in 1882 was 0.0035, while the present value differs from that then given by more than twenty-four times that amount.

The present work is, undoubtedly, the best available summary of our knowledge of atomic weights. W. A. NOYES.

TABLES FOR IRON ANALYSIS. BY JOHN A. ALLEN. vii + 85 pp. New York: John Wiley and Sons. Price \$3.00.

The author states in his preface that serious discrepancy only exists in the atomic weights of magnesium and silicon, and, in