

into English factories, but very likely it is true. The only American machine described is one of the earlier forms of water-cooled mills; and the practical, technical points which one would like to find in a book of this sort, such as the values of different styles of dressing millstones for various kinds of work, the points of excellence to be aimed at in making particular paints, the nature and effect of the vehicles used, and the like,—such things as these are very scantily touched upon. It seems remarkable that no mention is made of the practice of mixing oil with wet white lead without preliminary drying, a practice of great commercial importance. In general, the information conveyed to the reader seems to be of the sort obtainable from the makers of paint machinery, rather than from experts in paint manufacture; accurate and useful as far it goes, but lacking in real knowledge of the subject. The book is one which should be of interest and use to the beginner but is not complete enough to serve the advanced manufacturer.

A. H. SABIN.

LEÇONS SUR LA THEORIE DES GAZ. L. BOLTZMANN; traduites par A. GALLOTTI. Paris: Gauthier-Villiers. 1902. Price, 8 francs.

Boltzmann is one of the three great mathematicians to whom the development of the kinetic theory of gases is mainly due. The present volume contains a translation of the first half of his lectures, originally published in 1896 and 1898, and gives a systematic account of the mathematical results attained by the joint labors of Maxwell, Clausius and Boltzmann.

Professor Gallotti's translation is clear and accurate; some sentences are even more perspicuous than in the original. Professor Brillouin has furnished an historical introduction and some comments on certain steps in the mathematical discussions of the author.

EDWARD W. MORLEY.

THE MANUFACTURE OF MINERAL AND LAKE PIGMENTS. BY DR. JOSEF BERSCH. TRANSLATED BY A. C. WRIGHT. London: Scott, Greenwood & Co. 1901. 476 pp. Price, \$5.00 net.

This admirable book was evidently written by a thorough chemist who is also a practical color-maker. Not many technical points escape mention and the book is valuable not only for reference but for daily use. The chapters on "Black Pigments," "Vermilion," and "Ultramarine," are especially valuable, as presenting an intelligible account of processes on which very little practical information is available.

It is, of course, impossible to write a book which nobody can find fault with; for example, our author gives barium chromate as a pigment under the name of "Permanent Yellow," and omits any mention of strontium chromate; the former is a very inferior color, not known in this country, while the latter, known under the same name and also as "Perfect Yellow," is one of the most beautiful pigments known and, in spite of its low opacity, is considerably used. Also in the chapters devoted to "Metallic Pigments" and "Bronze Pigments," no mention is made of metallic aluminum, one of the most valuable and widely used pigments in this class.

The part of the book devoted to "Lakes" is, in the judgment of the reviewer, hardly up to the standard of the rest of the book, not because of what it contains but what it leaves out. The author seems to have felt less interest in this subject and has treated it less in detail, but it seems to be correct as far as it goes. The book, as a whole, is very satisfactory.

A. H. SABIN.

THE ELEMENTS OF PHYSICAL CHEMISTRY. Second Edition. By J. Livingston R. Morgan. New York: John Wiley and Sons. 1902. 13 x 19 cm. x + 352 pp. Cloth. Price, \$2.00.

This book does not differ essentially from the first edition, which appeared in 1898, so that it would be superfluous to give an outline of its contents. The author states that he has endeavored, (1) to bring the subject matter up to date, (2) to make, wherever possible, the relations clearer than before, and (3) to make the book more useful to those studying the subject without an instructor. The changes made consist of a number of minor omissions and additions; a transposition of the chapter on the rôle of the ions in analytical chemistry, so as to form a part of the chapter on chemical change; and the addition of a final chapter containing problems for drill work.

The author has exerted himself to correct the numerous mistakes contained in the first edition; and yet, the new edition is by no means free from errors. It is impossible to cite all of these in detail here, but a few must be given by way of illustration. Thus on page 70 is the statement, "The surface-tension x of a liquid is the force in grams, dynes (or milligrams) which is necessary to form a surface one centimeter (millimeter) in length." The theory ascribed to Brühl on page 268 is simply the Nernst-