

only one in the modern technical literature of machine design, of this character, so far as we know, which includes the now well-known facts relating to the modification of the laws of solid friction by the introduction of the lubricant. The experiments of Hirn, who first discovered this modification, are alluded to, and those of Tower are given considerable attention; but, curiously enough, those of Thurston and of Woodbury in this country, which have been vastly more extensive, and which relate much more closely to the conditions of familiar ordinary practice, are not even mentioned, though they are now the basis of all rational work in the proportioning of journals, under other conditions than those of the Morin experiments, or of the comparatively rare "oil-bath" lubrication.

Elementary Dynamics of Particles and Solids. By W. M. HICKS. London and New York, Macmillan. 12°. \$1.60.

THIS closely printed text-book, in the neat standard style of the Macmillans' publications of the class, is a well-written treatise on the elements of mechanics for schools and colleges. It is substantially of the same grade, and of similar extent, with those familiar to teachers as usually adopted in the English institutions of learning. In such a case there is little opportunity for originality, and the subject admits of but little safe or profitable variation from the almost universal and standard methods of treatment. As stated by its author, the chief points of novelty are the consideration of the division of statics as a special case of kinetics, and the methods of discussion of the ideas of mass and of momentum, which are considered before taking up the ideas of force and resistance. This the author thinks the best, if not the only logical, order of procedure; and especially so, as the whole must be subject to confirmation and proof experimentally. He would establish his work on this basis, rather than upon the usual system of assumption, from experience, of general laws, and a logical construction of the science by building upon those laws. The work is well done, and, for those who prefer this method of treatment, it will be found an excellent text-book. The order of treatment is, (1) rectilinear motion of a particle, (2) forces in one plane, (3) motion of rigid bodies. An unusually rich collection of problems and examples is given.

The second part includes the study of machines and the modification of their efficiency by friction; the book being intended, as the author says, to meet the wants of mechanical engineers, as well as the classes of schools and colleges. It will hardly meet the needs of that class, however, as it is far too elementary and incomplete, as a system of applied mechanics, for their purposes. The treatment of the machines is the ancient one of studying the "six" (?) elementary machines, considering the inclined plane and the screw as different in principle, and the lever and the wheel and axle as different elementary machines. They are well treated. In the chapter on friction we have an example of the curious persistence of ancient and obsolete notions among the writers of text-books, who seem rarely to keep themselves abreast of the progress of research. The old notions of Coulomb are here made the basis of the study of friction losses of energy; and the author of the book seems entirely unaware that they have been obsolete, as respects lubricated surfaces, since the days of Hirn's investigations a generation ago. The young engineers of to-day might give such writers useful hints. The table of co-efficients of friction (six constants) is from the now almost forgotten work of Morin. They are, of course, correct for the conditions under which they were obtained, but not for other and the various usual conditions of machine operation; and no clue is given to the limitations of their application. The distinctions between friction of solids, friction of fluids, and "mediate" friction, are not alluded to.

Gems and Precious Stones of North America. By GEORGE F. KUNZ. New York, The Scientific Publishing Company. 4°. \$10.

THE author of this book is connected with the world-renowned firm of Tiffany & Co., and in his employment by this house as a gem expert has had a rare opportunity to become acquainted with the matters of which he treats in the book before us. Further, this expert knowledge has led to the employment of Mr. Kunz by

the United States Geological Survey on special investigations, which have made him the more conversant with his subject.

It may be asked, Are any gems found in North America? This question evidently presented itself to our author, as he opens his somewhat large treatise with the statement that gems are found here in great variety, but that there has been little systematic exploration for them, as the indications are not such as to justify the employment of large capital in the search. In fact, a week's yield of the granite-quarries exceeds in value the yearly output of gems the country over; and a day's yield of the South African diamond-mines is of more value than the year's yield of all gems in North America.

It is not to be supposed, however, that there is no search going on in this country for gems, or that cases are unknown in which persons for a while believe themselves the possessors of stones of great value found in their corn-field or sheep-pasture. Reports of such finds are constantly coming in, and many of them reach the jewelry house of Tiffany & Co. The stories of these deceptive stones, as told by Mr. Kunz, are interesting, and show that a book of the kind he has now brought out, if available in the libraries of the country, might quickly explain to the possessor of a green stone the differences between colored quartz and emerald.

Nine chapters are devoted to the gems of North America, in which descriptions are given of the gems, and chemical analyses to show their composition. A chapter follows on pearls, in which due attention is paid to the method of their formation. There are then two chapters on the precious stones of Canada and of Mexico and Central America. The book closes with two chapters devoted to aboriginal lapidary work in North America, and to the commercial value and uses of gems.

Aside from the gems found in this country, there is, as wealth accumulates here, a constant increase in the number of interesting gems held here by collectors, and of these Mr. Kunz has something to say.

The undoubted standing of Mr. Kunz as an authority on gems makes this work a real accession to the number of books to which one may turn for information; and, though the annual commercial output of gems is small in North America, we feel sure, especially as so many cognate subjects are treated within the book's covers, that there will be many—collectors and artisans—who will find it a help.

The execution of the book is to be praised in most respects,—the beauty of the colored plates, which are numerous and add much to its usefulness, is especially noticeable, and the general typographical appearance is excellent,—but there was evidently something wrong with the proof-reading, which left a long list of errors to be corrected in the unsatisfactory way of a list of errata.

AMONG THE PUBLISHERS.

THOSE who are interested in the uses, tests for purity, and preparation of chemical re-agents employed in chemical, microscopic, or petrographic analysis will find much valuable information in "Chemical Re-agents," by Charles O. Curtman, M.D., recently published by the John L. Boland Book and Stationery Company, St. Louis.

—Messrs. Longmans, Green, & Co. have issued a "Junior School Algebra." The author is William S. Beard, assistant master in Christ's Hospital. The book is intended for use in preparatory schools.

—"School Hygiene," by W. J. Abel, recently issued by Longmans, Green, & Co., contains simple directions respecting ventilation, eyesight, infectious diseases, and first aid in injuries. There is no attempt to explain the why and wherefore of the courses of procedure recommended. The manual is intended, as its title suggests, for use in schools, and it aims to describe what to do and how to do it, in case of diseases, accidents, etc.

—The leading articles in *Babyhood* for July are, "Fruit for Children," by J. W. Byers, M.D.; "Weaning," by D. Warman, M.D.; "The Kindergarten on the Farm" (continued series), by Adele Oberndorf; and "The Baby's Mind," by Elizabeth S. Brown,