Readers familiar with the name of François Barréme, the arithmetical writer of the seventeenth century, who enjoyed in France much the same popularity as did Adam Riese in Germany, Edward Cocker in England, and Nicholas Pike in the United States, will be interested in the facsimile reproduction of the richly ornamented title page of his arithmetic of 1761, and in his dedicatory verses and other poetical outbursts.

FLORIAN CAJORI.

La Mathématique: Philosophie, Enseignement. Par C. A. LAISANT. Paris, Carré et Naud, 1898. 292 pp.

THIS book is intended for teachers and students of mathematics who are not specialists in this science. It deals with the philosophy and teaching of mathematics, and without much pretension to originality, presents the subject in an attractive and instructive manner. Separate chapters are given to arithmetic, algebra, calculus, theory of functions, geometry, mechanics, and to the practical application and the teaching of these subjects. The author does not discuss methods of teaching in detail, but wisely confines himself to general principles. The book gives a good general idea of mathematical instruction in France.

The author refers repeatedly to Comte's philosophy of mathematics and it is interesting to observe that he is compelled to abandon Comte's definition of mathematics, as the science which deals with "the indirect measurement of magnitudes." M. Laisant points out that Comte's definition does not include "the notion of order, which is inherent in mathematics to the same degree as measurement," and warns the reader against such a definition as carrying with it "a certain confusion which is not without danger." This point is just now of especial importance to us in the United States; for in the West certain theories of teaching arithmetic are being promulgated which assume that all mathematics deals solely with ratio and measurement and that the number concept is primarily and purely metrical. M. Laisant, in his discussion of number, does not find its origin primarily in measurement, but bases it on the cognition of a group of objects which, by mental abstraction, are considered alike. The primary number idea is non-metrical. On this point modern mathematicians are unanimous, and it is a sign of danger when the elementary teachers go in a direction diametrically opposite to the advanced workers and, misled by wrong conceptions, write textbooks which give an unnatural and one-sided develop-

ment of arithmetic. The best pedagogical results can be reached only when the elementary and the advanced teachers work together. During the seventeenth and eighteenth centuries the writers of arithmetical texts in England were not mathematicians and were out of touch with the advanced workers. That period, with its wretched arithmetical books, serves as a warning of the danger which confronts us in the West.

The author insists on greater attention, in the class-room, to the theory of approximation in computation. He tells us the story of the illustrious Dulong, who was asked, "What is the use of seven or eight decimals in the ratio of refractive indices in double refraction when the experimental determinations disagree in the third place?" Dulong replied with grave irony: "I do not see why one should suppress the last decimals; for, if the first ones are false, possibly the last ones are correct." M. Laisant might well have recommended the revival of a sixteenth century method of multiplication which begins, as in algebra, on the left, with the figure of highest denomination in the multiplier. In decimal multiplication, where only approximate results are usually needed, it is then easy to avoid the computation of the last decimals in the product. This method was favored by Lagrange and is used by E. M. Langley in his Treatise on computation.

The author has a high and, we fear, somewhat exaggerated appreciation of the mathematical research which has been carried on in the United States. That his estimate may not rest on a precise knowledge of affairs in this country is surmised from his statement that Sylvester was called to *Boston* and founded a mathematical journal there.

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