

MISCELLANEOUS.

BOOK REVIEWS AND NOTES.

A HISTORY OF JAPANESE MATHEMATICS. By *David Eugene Smith* and *Yoshio Mikami*. Chicago: The Open Court Publishing Company, 1914. 8vo. pp. v, 288. Price \$3.00 net.

Not many years ago the typical English attitude towards foreign philosophies of life and customs of life was of the crudest simplicity—the philosophy was heathen and the customs were uncivilized. The doubt whether “civilized” is or is not a laudatory epithet: and the conviction that the doctrine of life which has produced the east and west ends of London, for instance, cannot belong to the last stage of human progress has profoundly modified this attitude.

The marvelous capacity of adopting western ideas which the Japanese have shown has produced very humanly, though not perhaps very logically, a profound respect for the native civilization of Japan. But the evidences of this civilization are disappearing fast, partly like the flora of St. Helena, under the competition with methods developed under conditions of greater stress, partly from such fortuitous circumstances as the frequency with which books and manuscripts have disappeared in the flames to which the wooden dwellings of old Japan are so liable. Thus Smith and Mikami are sure of appreciative readers of their well timed effort to record a very characteristic development of the Japanese genius.

In considering the relative progress of European and Japanese mathematics there are two topics in which the Japanese made greater progress than the West. First comes the idea of a negative number. This appears in the second century B. C. and was probably even more ancient (p. 48) and is embodied in the use of red (+) and black (—) pieces on the *sangi* board or abacus. It is not too much to say that the educational mathematics of the West has not yet gained so firm a grasp of the use of the negative number as the Japanese had in the seventeenth century. The second important advantage gained by the Japanese was the method (equivalent to Horner's method) for the solution of numerical equations. The *sangi* or *soroban*, the abacus which the Japanese still employ, gave useful aid. The question whether the abacus in elementary education may not prepare us for the day when a calculating machine will cost less than a bicycle is an open one. The Japanese at present keep to the *soroban*, with such a reason in mind.

The conspicuous deficiency in the earlier Japanese mathematics seems to have been in formal geometry. This too is a feature of pedagogic interest.

Have the violent opponents of systematic or formal geometry in this country always taken a wide and far reaching view of the position? Several geometrical problems involving arithmetical results of great complexity, were dealt with and the numerical value of π received much attention.

The same tendency towards keeping back methods while disclosing results which has been so injurious to the progress of western mathematics operated in Japan, and it is not at all clear by what methods the very accurate values of π were obtained.

For instance an ingenious rule was as follows. Start with any fraction (e. g., $\frac{3}{1}$). If it is less than π add 4 to the numerator and 1 to the denominator. If it is greater than it add 3 to the numerator and 1 to the denominator. Continuing this progress a series of fractions are obtained ultimately approaching π , though of course any one is not necessarily better than its immediate predecessors.

The series of fractions

$$\frac{3}{1}, \frac{7}{2}, \frac{19}{3}, \frac{13}{4}, \frac{16}{5}, \frac{19}{6}, \frac{22}{7}, \frac{25}{8}, \frac{29}{9},$$

may be shown by successive horizontal and vertical steps and the movements zig zag across the line whose slope is π . The method obviously presupposes a knowledge of the value of π .

It is known that, despite all difficulties and prohibitions, some intercourse with Europe took place during the seventeenth century, but opinions have differed as to the amount of mathematical knowledge, if any, which reached Japan from the West. The authors have collected the available materials for forming an opinion, but in their judgment the question requires closer investigation. The authors' final summary of the place of Japanese mathematics in general history of human thought is that "the mathematics of Japan was exquisite rather than grand." "When we think of Descartes's *La Géométrie*, of Desargues's *Brouillon Projet*, of the work of Newton and Leibniz on the calculus, . . . we do not find work of this kind in Japan. But in execution the work was exquisite in a way which is unknown in the West. For patience, for the everlasting taking of pains, for ingenuity in untangling minute knots and thousands of them, the problem-solving of the Japanese has never been equaled."

The authors have conferred a real service on all mathematics by the loving care with which they have set out the story of mathematics in Japan.

C. S. JACKSON.

CHINESE AND SUMERIAN. By C. J. Ball, M. A., D. Litt. London: Oxford University Press, 1913. Pp. 151. Price 2 pounds 2 shillings net.

Prof. C. J. Ball, Assyriologist in the University of Oxford, England, has summed up his labors on the connection between the Chinese and the Sumerian languages in an elaborate book containing plates and comparative collections of words which go very far in establishing the common origin of both systems of writing. The theory of a connection was proposed many years ago, first by A. Terrien de Lacouperie, but the proposition of the latter was not sufficiently supported by facts and may be characterized as a bold guess, whereas Professor Ball's theory is well grounded, and we do not see how any one in the face of the diligent comparisons of Sumerian and Chinese characters, can

entertain any further doubt. A mere glance through the sign-list in which the old forms of Chinese characters (called *ku wên*) are compared with Sumerian congeners or prototypes is convincing and henceforth we may regard the theory as established.

The connection between Sumerian and Chinese being proven, it becomes probable that the ancient Chinese civilization started in prehistoric times from the ancient Sumerian in lower Mesopotamia, the same root from which western culture has sprung. A tribe of Sumerians must have left their home in the valley of the Euphrates and Tigris, and must have wandered east into the fertile fields of China, where they settled and developed a culture of their own. The cause of the emigration may have been the intrusion of the Semites, who gradually adopted the Sumerian civilization and crowded out the original inhabitants as it appears in a peaceful competition, presumably by outnumbering them and adopting their religion, as well as their mode of living.

Professor Ball's investigations will lay the basis for further research in the line of comparative studies of the prehistoric ages, and the interconnection of the several branches of human civilization. The volume before us is large quarto, and considering the difficulty of presenting the tables in a sign list the price of two guineas is not too high.

CLEAR GRIT. A Collection of Lectures, Addresses and Poems by *Robert Collyer*. Edited by *John Haynes Holmes*. Boston: American Unitarian Association, 1913. Pp. 328. Price \$1.50 net.

This collection contains a few lectures which were delivered to many thousands of people from the public lyceum platforms throughout the country, and a number of more informal addresses given to Dr. Collyer's own congregation on various Sunday evenings. Their subjects are largely of general human and literary interest: Cathedrals, Westminster Abbey, Martineau, The Pilgrims, The Human George Washington, The Human Heart of Martin Luther, Robert Burns, Charles Lamb: Genius and Humor, Hawthorne, Whitier, Thoreau and the like. There are only half a dozen poems included. One of these is a hymn written for the dedication of the new Unity Church in Chicago after the great fire of 1871. The first and last stanzas are as follows:

"O Lord our God, when storm and flame
Hurled homes and temples into dust,
We gathered here to bless thy name,
And on our ruin wrote our trust.

"Thy tender pity met our pain,
Thy love has raised us from the dust;
We meet to bless thee, Lord, again,
And in our temple sing our trust."

The volume is accompanied by a beautiful portrait of Dr. Collyer as frontispiece.