THE HISTORY OF ARITHMETIC.



RITHMETIC, one of the most useful sciences evolved by the human mind, has been gradually developed from the knowledge of the

elements of simple numbers till it has now become a science and one of our most useful branches of education. Some of the greatest minds of antiquity have been attracted to it by the fineness of its reasoning processes; it has filled such men as Pythagoras and Aristotle with enthusiasm, and has enlisted their masterly genius in its study and perfection.

It is not the object of this article to go into the philosophy of Arithmetic, but mainly to note those who have contributed to the development of this science, and as far as possible to give a short account of their respective contributions. The writer is chiefly indebted for his facts to "Brook's Philosophy of Arithmetic," an excellent and comprehensive treatise on this subject.

The much vexed question as to who were the originators of Arithmetic in practically its present form has been settled, and the honor given to the Hindoos. It has of course, in the process of evolution which has brought it to its present perfection, undergone a great many varied and important changes, but nevertheless to the Hindoos belongs the glory of having first introduced Arithmetic to the notice of man. They, however, lay no claim to this honor but attribute it to a special revelation from the Deity.

The main source from which our knowledge of Hindoo mathematics has been drawn, is the *Lilawati*, an arithmetic by Bhascara who lived about the twelfth century. This author frequently quotes Bramahgupta who lived in the seventh century, and some of whose works are still extant; the latter author himself refers to Arya-bhatta, a writer on Algebra and Arithmetic of the fifth century, and probably of a much earlier period. Aryabhatta is considered the most ancient of the uninspired writers of the Hindoos, It is thus clearly established that the Hindoo Algebra and Arithmetic date earlier than Diophantus, a Greek mathematician of Alexandria who wrote at least four centuries prior to the introduction of these sciences among the Arabs and seven centuries before their introduction into Europe.

The Arabs themselves do not claim even the invention of the numerals which, in fact, they adopted only in the twelfth century, but ascribe it to the Indians, and there is little doubt that the Brahmins were the original inventors of numerical symbols and also of the denary system. The Arabs used the Greek numerals which were merely the letters of the Greek alphabet. They, however, had the honor of being the medium through which the science was introduced into Europe.

The denary scale according to which all numbers are built up by tens is easily understood now, but many centuries elapsed before this system became established; and even to-day we find in French the scale of twenty used for all numbers above sixty; soixante-dix, soixante-dixnenf, quatre-wingts. In English there is a slight trace of this in three score and ten. It is thought even by high authorities that the scale of twelve would be more convenient than the present one, which is said to be " an unfortunate one both for science and art."

The earliest writers in mathematics of whom we have any definite knowledge are the Greeks. This must not be understood to conflict with the statement regarding the priority of the Hindoo writers; we have no *definite knowledge* of the writings of the latter before the work of Aryabhatta and the Greek Diophantus wrote about the same time; besides Arya-bhatta is merely by Brahmagupta mentioned as a writer of the fifth century of whose works none are extant. The Greeks made considerable progress in the cultivation of