Notes on the History of Science.

I.—EARLY EASTERN SCIENCE.

Had the Chinese been less exclusive and less superstitious, doubtless they would have been the civilizers of the world. It was among them that were developed the earliest forms of scientific observation far in advance of any other people. But instead of superstition being dissipated as time went on, it increased, owing to that exclusiveness on account of which they remained or ages almost entirely isolated from the rest of the world.

The most ancient written monuments possessed by the Chinese are the "Kings," ancient sacred books in which are found the secrets of their civilization. Chin-Noung, a divine laborer who succeeded Fou-Hi, B. C. 3,218, taught the use of the plough to his people, and introduced the manufacture of common salt from sea water. He is credited with the invention of Medicine, and the authorship of an immense book on Plants. This wonderful prince is the first astronomer of whom we read; having, it is said, measured the earth, and found it one-eighteenth greater from East to West than from North to South.

Now, there is darkness over the discoveries of this peculiar people for nearly five hundred years, till under Hoang-Ti, a prince who flourished about 2,785 B.C., when they held communication with their neighbors, and imported many articles of use and luxury hitherto unknown. The ancient books say that this prince discovered an instrument which always pointed to the North, alluding evidently to the mariner's compass. He established the decimal system for linear and superficial measurement, and founded the first College of Astronomy, in which eclipses were studied, and time measured by clepsydra. For ages astronomy flourished, and with astonishment we learn that the Chinese *savants* had an exact knowledge of the Julian period as early as the reign of Yao, 2,357 B. C., who was himself a devotee to the science. The improvements in agriculture which were begun a thousand years before were not neglected; the cultivation of crops was not left to the caprice of the cultivator, but the Government, through the "Minister of Agriculture," directed the cultivation and watched the production of the land. We read of Chun, a successor of Yao, directing his minister, Heou-Tsi, to extend the cultivation of corn, rice, panis (a sort of millet), sorghum, peas, beans, hemp and cotton. Heou-Tsi was instrumental in introducing new methods of culture, and in perfecting the old.

Natural history was not neglected, for we find a book on it, the Chan-Hai-King, consisting of two hundred and sixty volumes, which is attributed to Yu, who reigned 2,200 before our era. In it the descriptions are often exact and picturesque, the style simple, but like all other relics of ancient science it is sadly mixed up with fables and superstitions; it is a report of the progress of science for the three preceding reigns. It is probable this book is not of such great antiquity, but it is certainly much anterior to anything in Europe.

The Chinese had a knowledge of anatomy from a very early date, but their books are full of errors, although they carried with them the spirit of very minute observation. Circulation of the blood was also known, and they calculated the rate at which it flows in the arteries under various circumstances of modes of life, age, sex and disposition. They have left a number of treatises on the pulse, which they studied, and certain conditions of which they considered sure diagnostics in various diseases. The Government at all times patronized advancement in science, especially in the "Healing Art." Many ages before our era a governor in a province having captured forty brigands, caused them to be put to death, by having their abdomens opened, all for the cause of science; painters being deputed to picture their viscera, and medical men to use the knives of execution. That called by the Chinese the modern period of medicine, dates back to 200 B. C. Many ages prior to this Tcha-tchin introduced into Europe the practice of medicine as known at his time. But at last a time arrived when letters were persecuted. In the year B. C. 221, Tsing-chi-hoang-ti sent forth a proscription ordering all books to be burned, except those on Anatomy, Physiology and Medicine.

The cultivation of tea dates far back, and the properties of the silkworm, known first in Europe in the time of Pliny the Naturalist, were known two thousand years previous in China.

Annals, written in the time of Yao, a little more than 2,300 before our era, contain a description of the Deluge. By reference we see that this was written shortly after the date assigned to it by Archbishop Usher, B. C. 2,349.—They regarded it as a partial inundation, and not as a universal cataclysm, of which they appear to have had no idea.

"The scientific course of pursuit among the Chinese is positive; they stop before what appears to them impossible, and their theories, although mixed with prejudices, have always a positive side."

Their philosophy is essentially pantheistic. It is comprised in the Y-King, a book of the "Unity," on which Koang-fu-Tse, 580 B. C., is the last commentator. It considers the monad combined with itself as constituting the diad and triad, and even all phenomena. All combinations are reduced to two principles: the "Yang, light or movement, and the Yu, darkness or quiet," and the whole called "Reason," which recalls the "Absolute" of modern philosophy. Leibnitz did not know that the Y-King contained part of his system, twenty-five centuries before he invented his monads.

As Hindoo literature has been studied for only sixty years by us, and as the difficulty of deciphering the Sanscrit manuscripts is very great, its richness is little known. Of an encyclopædic collection, known as the Vedas, only fragments remain; but these carry us back to 1,400 B. C., and comprise treatises on Medicine, Surgery, Botany, Mineralogy, History of Animals, Astronomy, and Mechanical Arts. The theory of atoms, revived later by the Greeks, belonged to their physical school called Kanadas. We owe to the Hindoos the numerical signs which we call Arabic ciphers. The Arabs borrowed Algebra from the Hindoos, who from remote time had been deeply occupied in numerical calculations. Again, the invention of the game of Chess is ascribed to them. We known nothing of their external intercourse, nor of the cause of the decadence of science among them.

Their ancient philosophy, according to the school of Brahma—Mimansa, is pantheistic, and shows an attentive observation of natural phenomena and evolution of species. Life is an emanation and death an absorption. All phenomena are accomplished in the breast of the Infinite. Speaking of Brahmin Cosmology, Manou says, "Alternately asleep and awake, constantly he creates all that moves and all that does not, afterwards he annihilates and dwells himself unchangeable; there are worlds developed without end, creations and destructions; Brahma does all this for pastime, himself the greatest Creator."

The Babylonians and Assyrians have a strong similarity to the Hindoos in their religion, in the division of the people into casts, and in what written knowledge they possess being deposited in the archives of the religious orders. They must have had a considerable knowledge of physical science, having built large and beautiful cities, splendid monuments, gigantic towers, large canals, hanging gardens. They were masters of the commercial world; they lived for the present (necessity or luxury as the case might be), and like commercial communities in all ages have not left one great thought to perpetrate their memory.

The Chaldæans cultivated Astronomy and made it part of their religion, confounding it with Astrology. As early as B. C. 700, they observed and studied the eclipse of the moon. Medicine was cultivated, and from them, it is said, Hippocrates obtained some excellent notions of Therapeutics.

Scientific knowledge among the Medes and Persians was little more advanced than among their sister nations. However, there is left the remains of an encyclopædia of religious thought, the "Zend-Avesta," in which are found some treatises on numerical philosophy, medicine, influence of planets on man's life, on quadrupeds allowed to be eaten, tableaux of the infirmities to which man and beasts are subject, and essays on humanity. Zoroaster, the Mede and supposed founder of the Magian religion, has left some ideas of the formation of mountains by elevation; this being the earliest mention of geological speculation of which we have record apart from the Mosaic cosmogny.

The Egyptians, the descendants of a colony from Upper Ethiopia or one conquered by the Ethiopians, had the doctrines of the Indus deeply impressed on them. They were divided into five castes. Scientific instruction was mysteriously confined to the temples, and everything tended to keep the masses in darkness. But we must admire the high state of civilization and deep study existing among them when we consider their public institutions, vast works and gigantic monuments built under the direction of their chiefs. The art of embalming, pursued so long, required a profound knowledge of anatomy, initiated those practising it into an intimate acquaintance with the viscera, muscles, and bones. The present system in Britain of requiring pharmaceutical preparations to be made according to prescribed formulæ, had its origin, slightly modified, among the ancient Egyptians. Their physicians were allowed to use only those remedies recognized by law, and if one did not comply, and the patient died, then the man of the healing art, if captured, was put to death

From both the animal and vegetable kingdoms the Egyptians took emblems of adoration and contempt. In their hieroglyhics