

recent, and a regulated calculation of time extends (according to Edward Biot) as far back as 2700 years before Christ.\* Under the reign of Tscheu-Kung, the brother of Wu-Wang, the meridian shadows were measured in two solstices, upon an eight-foot gnomon, in the town of Layang, south of the Yellow River (the town is now called Ho-nan-fu, and is in the province of Ho-nan), in a latitude of  $34^{\circ} 46'$ .† These measurements gave the obliquity of the ecliptic as  $23^{\circ} 54'$ ; that is,  $27'$  greater than it was in 1850. The observations of Pytheas and Eratosthenes at Marseilles and Alexandria are six and seven centuries later. We possess the results of four observations of the obliquity of the ecliptic previous to our era, and seven subsequent, up to Ulugh Beg's observations at the observatory of Samarcand. The theory of Laplace corresponds sometimes in plus, sometimes in minus, in an admirable manner with the observations made during a period of nearly 3000 years. The knowledge transmitted to us of Tscheu-Kung's measurement of the shadow-length is so much the more fortunate, as the manuscript which mentions it escaped, from some unknown cause, the fanatical destruction of books commanded by the Emperor Schi-hoang-ti of the Tsin dynasty, in the year 246 before Christ. Since the commencement of the fourth Egyptian dynasty with the Kings Chufu, Schafra, and Menkera—the builders of the Pyramids—falls, according to Lepsius, twenty-three centuries before the solstitial observation at Layang, it is indeed very probable, from the high degree of civilization of the Egyptian people and their early regulation of a calendar, that even at that time the length of shadows had been measured in the valley of the Nile; but no knowledge of this has come down to us. Even the Peruvians, although less advanced in the perfection of calendars and intercalations than the Muyscas (mountain inhabitants of New Granada) and the Mexicans were, possessed gnomons, surrounded by a circle marked upon a very level surface. They stood in several parts of the empire, as well as in the great temple of the Sun at Cuzco; the gnomon at Quito, situated almost under the equator, was held in greater veneration than the others, and crowned with flowers upon the equinoctial feasts.‡

\* *Cosmos*, vol. ii., p. 114, 115, and notes.

† Laplace, *Expos. du Système du Monde*, 5th ed., p. 303, 345, 403, 406, and 408; the same in the *Connaissance des Temps* for 1811, p. 386; Biot, *Traité Elém. d'Astron. Physique*, tom. i., p. 61; tom. iv., p. 90-99, and 614-623.

‡ Garcilaso, *Comment. Reales*, part i. lib. ii., cap. 22-25; Prescott