of a terrestrial meridian.* But Posidonius erred in supposing that both cities were on the same meridian.

ERATOSTHENES † approached much nearer to the truth. He knew that the Sun at Syene (the modern Assouan),‡ on the occasion of the summer solstice, did not cast any shadow at the bottom of the wells, when it was at the meridian ; while at Alexandria, and at the same epoch, the Sun passed 7° 12′ to the south of the zenith. In fact, a gnomon, or style, elevated vertically in the centre of a concave hemisphere, projected at noon its shadow over the fiftieth part of the circle. He therefore arrived at the conclusion that the distance of Alexandria from Syene was 5000 stadia, or the fiftieth part of a meridian circle, and that the circumference of the entire meridian, consequently, was 5000 × 50 = 250,000 stadia.

[This number Eratosthenes altered into 252,000, that his result might give an exact number of stadia for the degree—namely, 700 ; which should, of course, have been 694$\frac{4}{9}$. According to Pliny, these figures are equal to 31,000 Roman miles, and he supposes the stadium to be the eighth part of a Roman mile ; and that Eratosthenes employed the Olympic stadium. In such a case, the degree of Eratosthenes is more than 79 miles, or upwards of 10 miles too great. But it is quite as probable that he employed the Egyptian stadium ; only, unfortunately, as before said, of the Egyptian stadium we possess no measurement.

Plutarch (*de Plac. Phil.* ii. 31) states that Eratosthenes computed the Sun to be 804,000,000 stadia, and the Moon 780,000 stadia, from the Earth ; while Manobius represents that he made the diameter of the Sun 27 times that of the Earth.]

We owe to Ptolemæus the collation and co-ordination of all the measurements of the Earth's magnitude attempted before his time.

The caliph AL-MAMOUN,§ a prince of enlightened sympathies and great natural powers, whose memory will always be cherished in the history of science, essayed, at a later period, to verify all these ancient estimates. He caused the length of a degree to be measured. The geometers whom he entrusted with this task selected for the scene of their operations the plain of Sennaar, in Mesopotamia. They formed themselves into two bodies, one of which proceeded northward, and the other towards the south. After they had retired one degree from their point of departure, they measured the distance traversed ; it was 56$\frac{2}{3}$ Arabic miles. Thus, according to this calculation, the length of a degree = 56$\frac{2}{3}$ Arabic miles. What then is the

* ["His calculations were actually made in Spain, and not at Rhodes."—See *Strabo*, ii. p. 119].

† [Eratosthenes, of Cyrene, was born about 275 B.C., and died in B.C. 196, at the age of eighty, of voluntary starvation, having lost his sight, and grown weary of life. Fragments of his works have been collected by Bernhardy, in his "Eratosthenica."]

‡ [Lat. 24° 5′ 28″ N.; Long. 32° 59′ E.]

§ [The caliph Abul Abbas Abdalla Al-Mamoun, of the Abbaside dynasty, and son of the famous Hârûn Al-Raschid, was born at Bagdad in 786. He ascended the throne, 4th October 813. His reign, though disturbed by revolts and intestine convulsions, was productive of great benefit to the Arabian empire. He was a liberal patron of learning, and expended a sum equal to £187,500 on the translation of the works of the Greek philosophers into Arabic. He also founded observatories at Bagdad and Kasuin (near Damascus). Al-Mamoun died 9th August 834.]