The Heliotropion of Meton on the Pnyx
The first Observatory in Europe

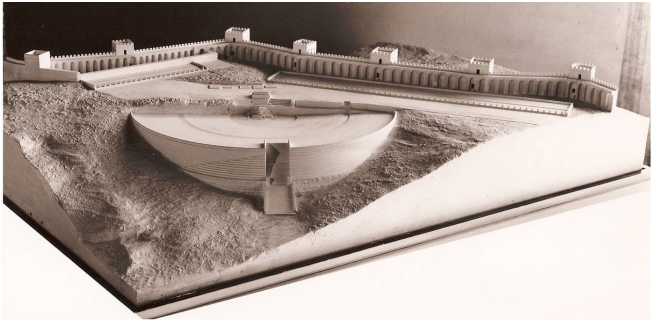
The ancient Greeks became interested at a very early stage in interpreting and understanding the Universe and their position within its realm. The constellations of the Pleiades, Ursa Major and Orion have been documented by Homer. Hesiod, in his poem Works and Days, referred to the Constellations, the Sunrise and Sunset and the lunar phases in order to create a calendar of seasons and weather events that would facilitate people in planning their daily tasks.

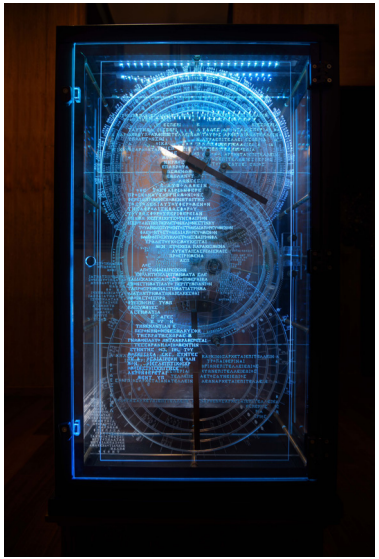
Major figures of the Greek thought advanced Astronomy, studied the natural phenomena and devised significant measuring instruments. Thales of Miletus predicted the solar eclipse of 564 BC, his student Anaximandros determined the dates of solstices and equinoxes, Eratosthenes was the first who measured the Earth's circumference, whereas Aristotle was the greatest and most systematic attentive observer of natural phenomena.

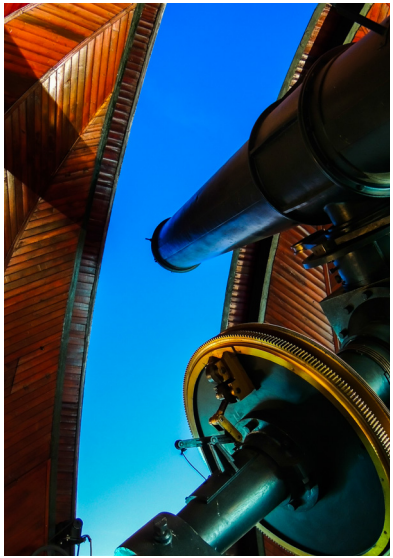
However, the figure who promoted Astronomy and laid the foundations of the Greek Calendar was Meton of Athens. He was a renowned mathematician, astronomer, geometer and engineer who lived in Athens in the 5th century BC. Meton's teacher was Phaeinos, a metic who had established his own observatory on Lycabettus Hill (Theophrastos).

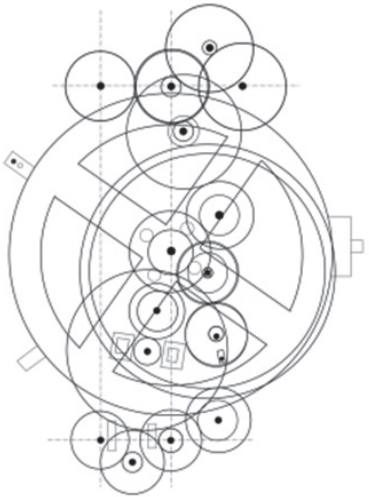
Meton introduced the Metonic Cycle, according to which 19 solar years correspond to 235 lunar months and 6.940 days. According to the Metonic Cycle, every 19 years full-moon dates are repeated with a slight deviation.

Meton was one of the most famous figures of his time. He was lampooned in Aristophanes' play Birds (414 BC) and also the work Monotropos ("The Solitary") by Phrynichos, being referred to as "geometer" and "the one who supervises the construction of fountains". Together with his student and assistant Euktemon he erected in 432 BC on Pnyx Hill, the site where the Assembly of the Athenian citizens convened, the Heliotropion, a type of sundial, the first observatory in Greek and world history. It constituted one of the earliest astronomical instruments used by man for the calculation of time, based on the position of the shadow cast by the sun over an object.









On the Pnyx, behind the **Orator's Bema**, survive the traces of a rectangular carving (5.80 x 5.15 m) that, according to scholars, formed part of the base of the **Heliotropion of Meton**. No evidence that suggests its original form has been preserved; nonetheless, it must have been a large structure, as indicated by the traces of its base and certainly had public character.

It was prominently installed on the Pnyx, a central and busy spot of the city, so as to serve the needs of the inhabitants in organizing their daily undertakings and activities. It was particularly useful to farmers who had to plan their agricultural works (sowing and harvesting) and also to fishermen and seafarers in the arrangement of their voyages.

The installation of the Heliotropion on the Pnyx is considered advantageous, as from that spot during the summer solstice the sun can be viewed rising over the top of Lycabettus Hill, whereas during the winter solstice, the sun rises over Mount Hymettus, forming an arc of 60 degrees, whose bisector is in alignment with the Acropolis rock. The exact determination of the summer solstice was significant for the ancient Athenians, since the first moon following the summer solstice signalled the start of the new year.

The Heliotropion of Meton constituted in its epoch a modern, innovative, scientific measuring instrument, but also a technological accomplishment which the democratic Athens of the 5th century BC made available to its inhabitants so that everyone would have access to works that promoted knowledge and science.

The calculations and astronomical observations of Meton formed the basis for the Greek Calendar that was introduced into Athens in 432 BC and was used until the adoption of the Julian Calendar in 46 BC. The Antikythera Mechanism, the earliest known astronomical calculator in the world, was based on the Metonic Cycle. Meton's measurements are still used even today by the Orthodox Church for the determination of Paschal dates.

In antiquity, several types of sundials already existed. The commonest of these were horizontal or upright devices, the so-called parapegmata, that calculated time during bright days with the aid of the gnomon, a vertical stick that designated the indicator of the sundial. The movement of the shadow of the gnomon determined the duration of the day, calculated the hours and provided information on astronomical and meteorological phenomena, such as the weather forecast.

In the neighbouring Hill of the Nymphs, the National Observatory of Athens was established between 1842 and 1846, a work by the architect Theophile Hansen that dominates the hilltop to this day.

In 1902, on the Pnyx, near the site at which lay the Heliotropion of Meton in antiquity, was installed the large equatorial refractor telescope manufactured by the firm Gautier (the Doridis Telescope), named after its donor, thereby perpetuating the tradition of the science of astronomy in Athens that extends from the age of Meton to the present.

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