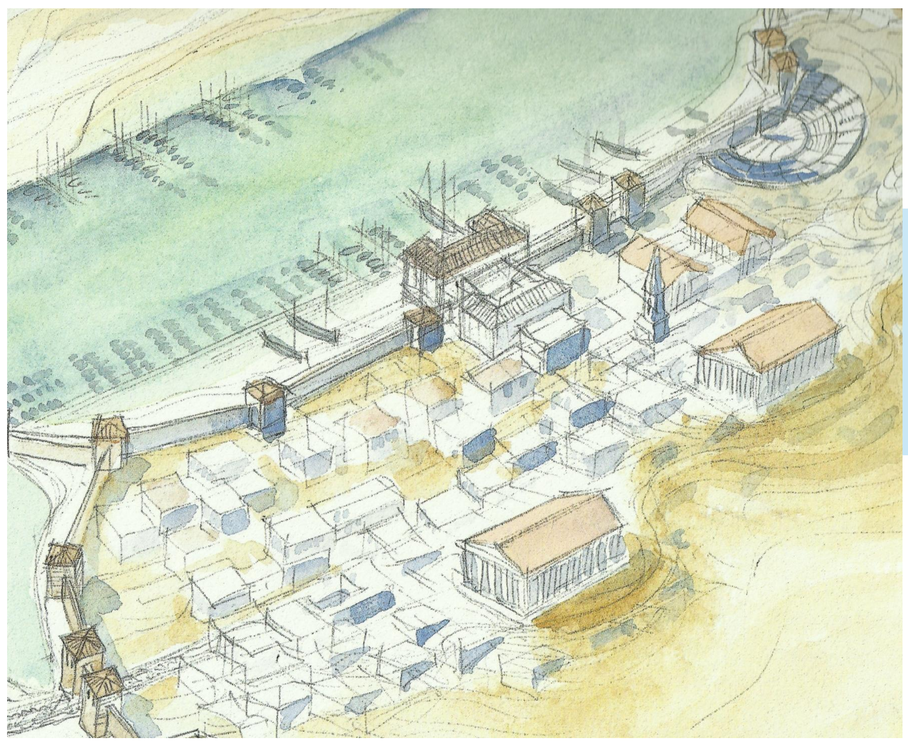
LOCATING

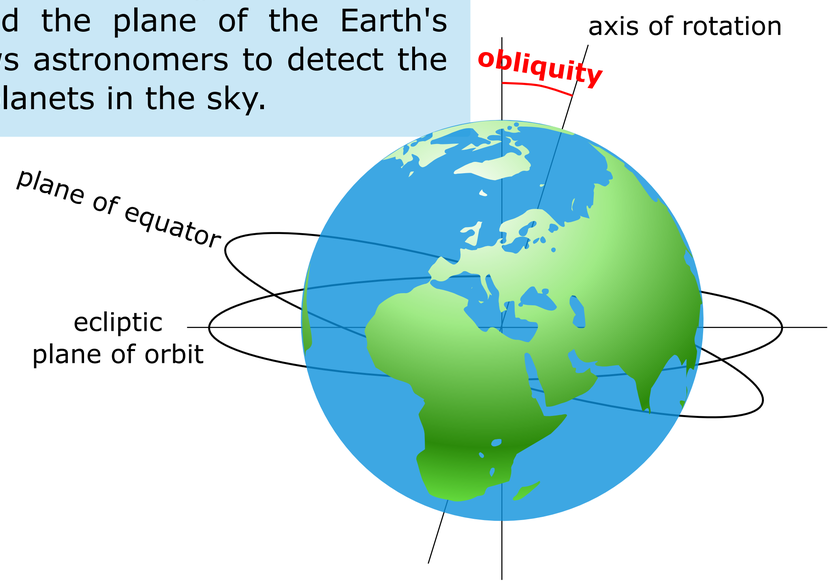
PYTHEAS MEASURES
THE OBLIQUITY OF THE ECLIPTIC



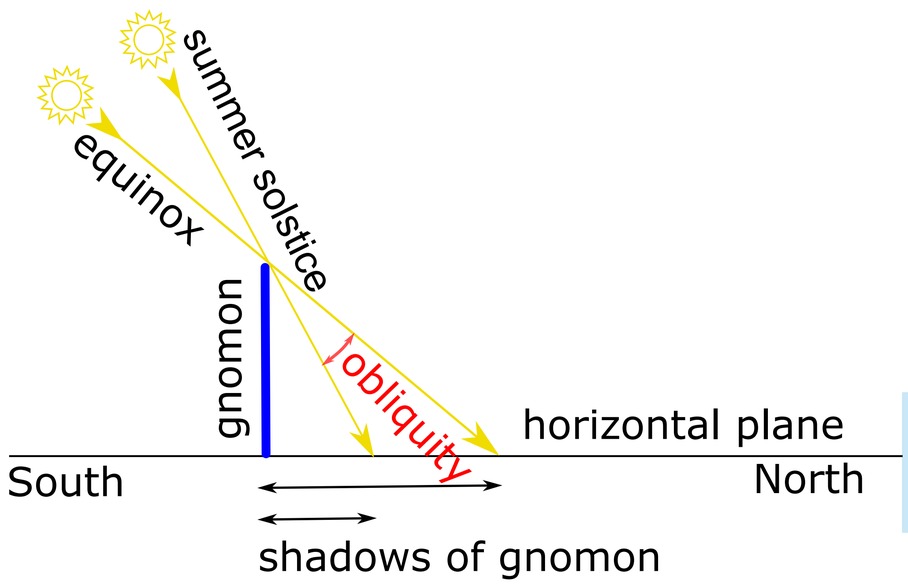
Evocation of Marseille at the time of Pytheas © J-M.Gassend

Pytheas of Marseille (about 300 BC), sailor and astronomer. He made a famous trip to the limits of Northern Europe and made several astronomical measurements.

The obliquity of the ecliptic is the angle between the Earth's orbital plane and the plane of the Earth's equator. This angle allows astronomers to detect the movement of stars and planets in the sky.



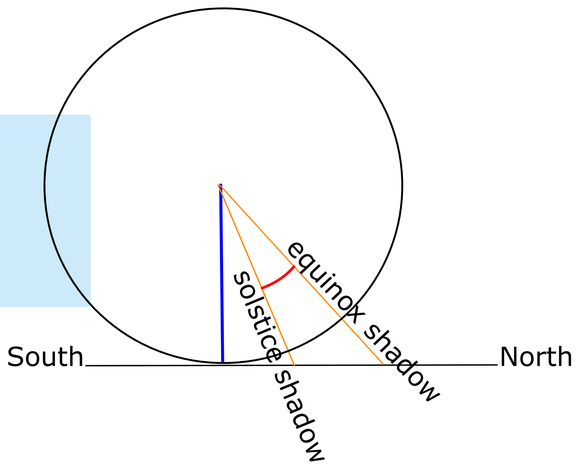
What is the process of Pytheas ?

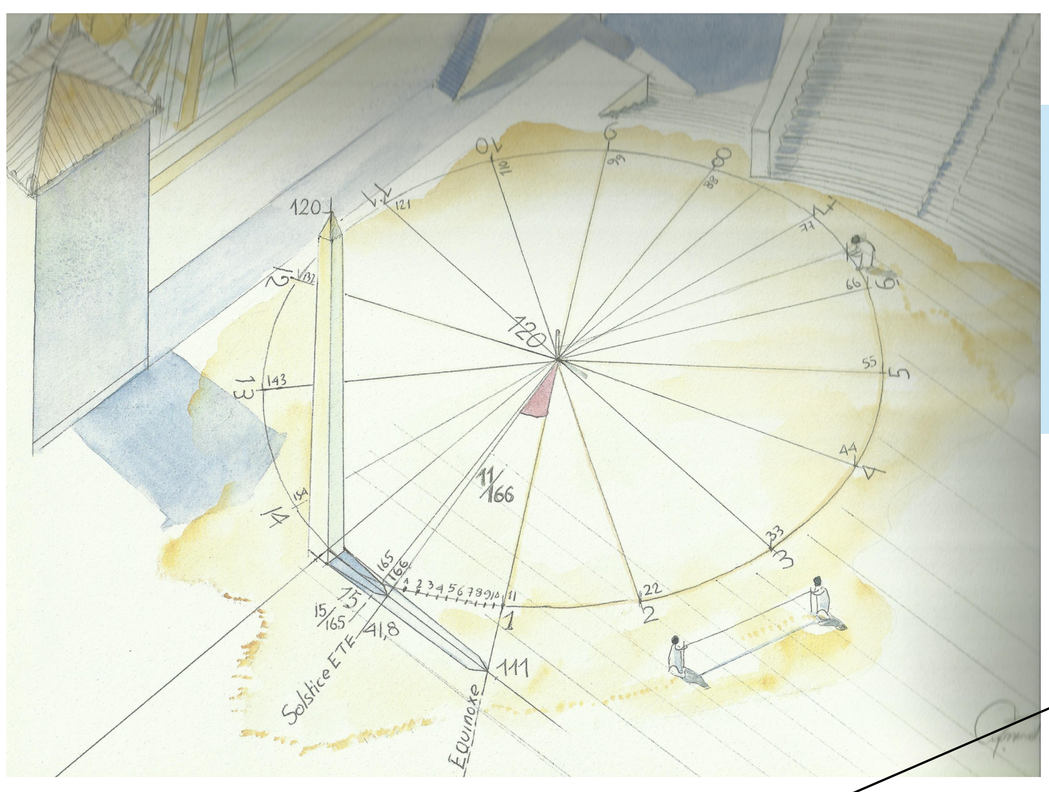


Pytheas uses a gnomon (vertical obelisk) measuring its shadow at the summer solstice and then at the equinox. The angle between the two radii is the looked-for angle.

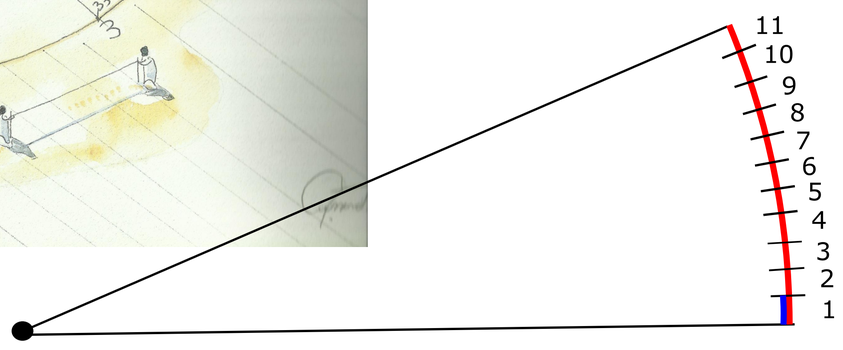
How Pytheas calculated the angle ?

The vertical figure is first transferred to the ground in order to make the measurements more easy. The angle is measured as a fraction of total circumference, which was common at the time.





The **angle** can be put 15 times in the circumference and there is a **remainder**. This remainder can be put 11 times in the angle, we neglect the second rest appearing. The circumference contains 15x11 + 1 = 166 times the rest, the angle is thus 11/166, which is 23°51', slightly higher than the current value 23°27' because of the long-term variations of the inclination of the axis of the Earth.



The writing $\frac{11}{166} = \frac{1}{15 + \frac{1}{11}}$ is what is named now a continued fraction

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