# The Clementine Gnomon

**Author**:
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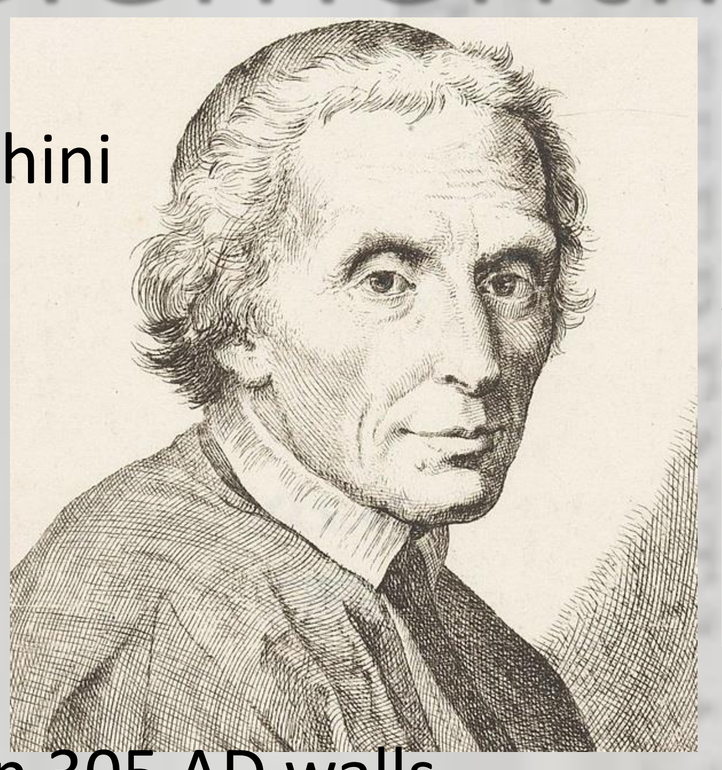
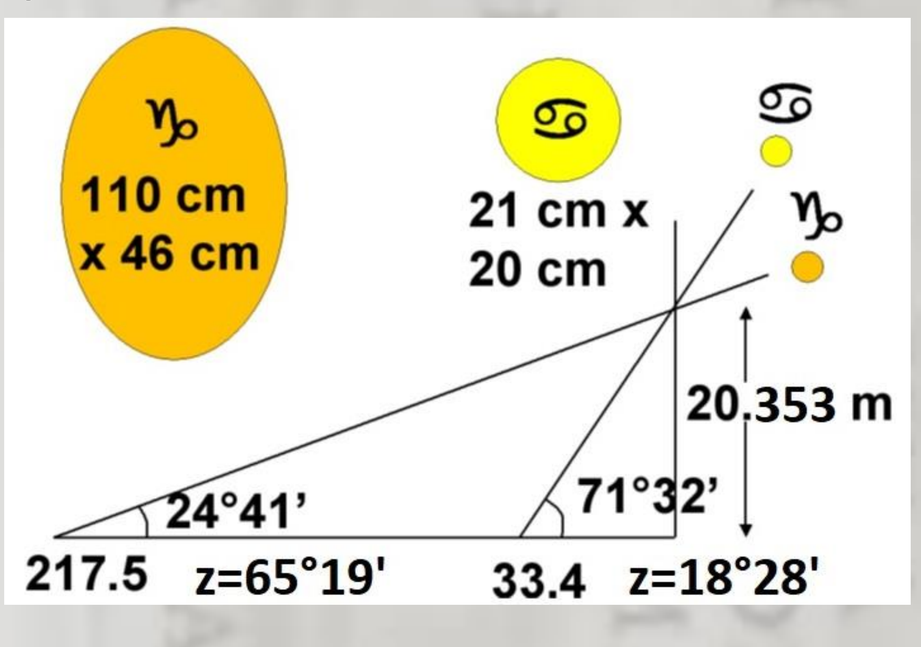
(Verona 1662-
Rome 1729)



**for**: Pope Clemens XI (1700-1721)

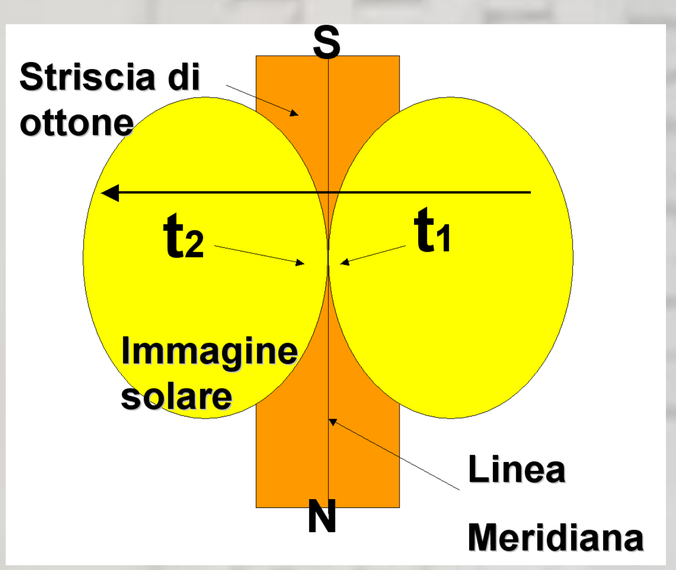

**Fact sheet**: built on 305 AD walls
A 25 mm - 1’’pinhole
at 20 m height. The line is 45 m long.
The pinhole’s latitude is 41° 54’ 11.2’’




**What is**?
A meridian line in a *camera obscura*

**Precision**: ½ millimeter, and ½ second

**What for**: the meridian shows the local noon of Rome,
and the solar altitude

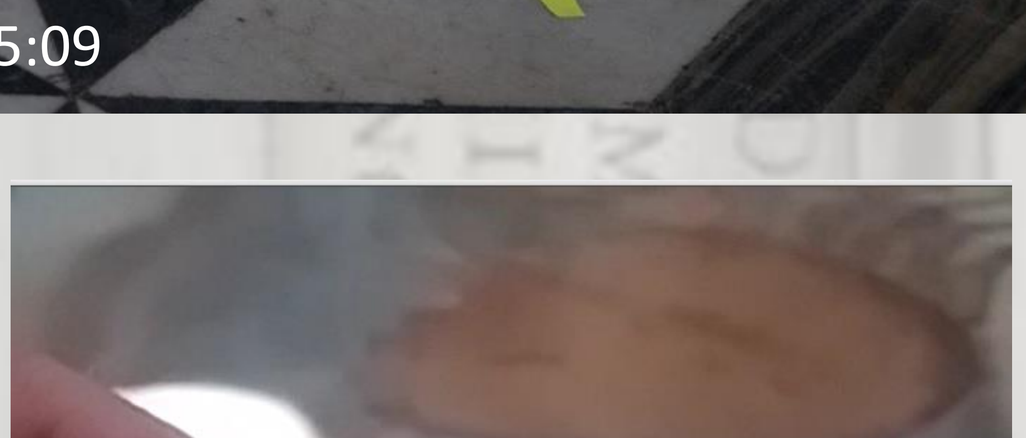



**When it works**? Between September and March the image is on the Basilica’s floor two hours before the transit. Only ½ hour during the Summer.

**The meridian passage** is after 11:59 in December; 12:14 in January; 12:22 February; 12/13:14 March; 13:07 April; 13:06 May; 13:08 June; 13:14 July; 13:10 August; 13:00 September; 12/11:53 October; 11:53 November.


**Where the Sun crosses the line**?
Between November and February it passes in front of the main altar.
In spring and summer below 90.

**How the time is measured**
Today video UTC synchronized are used to measure t1 and t2.
Bianchini used a pendulum synchronized with UT1 by Sirius transits (sidereal time).



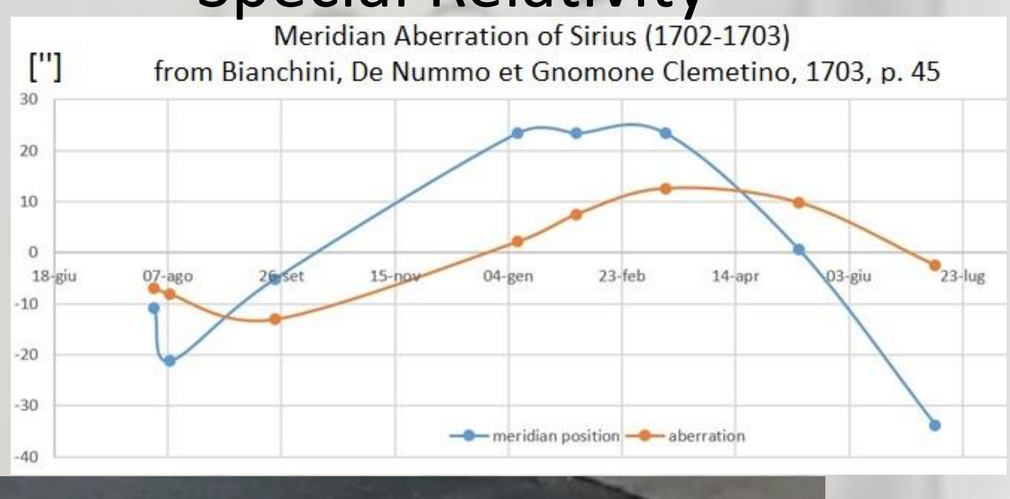
# Today’s measures and in 1700

**Winter Solstices**
2024 and 1702:
64 mm of difference:
change in Earth’s obliquity
in three centuries.

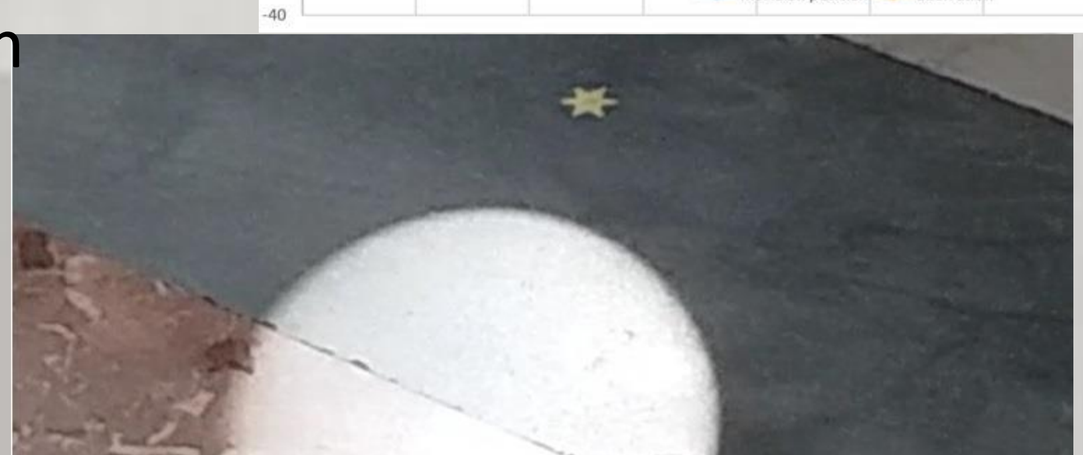

**Summer Solstices**
1703 and 2024:
10 mm of difference.

The air **local turbulence** shakes the whole image with rapid movements up to ±2.5 mm, limiting to ±0.3 seconds the time measures, enough to control the de-rotation of the Earth.

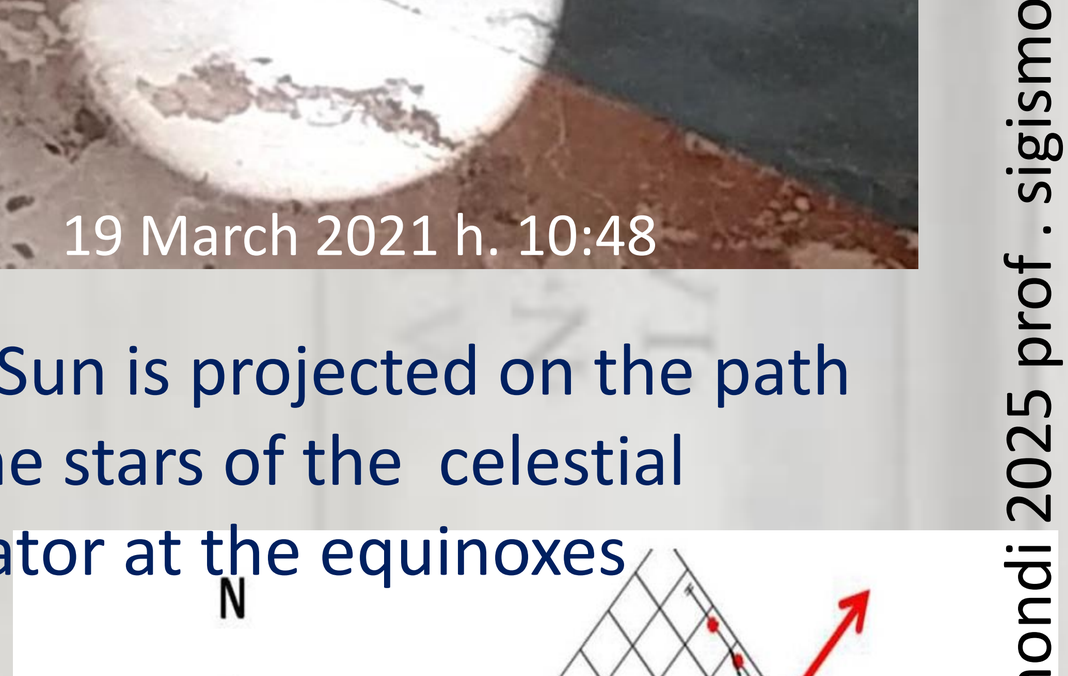
**Sirius at the meridian** in 1703 (blue) and stellar aberration effect (red): it’s Special Relativity




The largest sunspots are visible through the pinhole


The Sun is projected on the path of the stars of the celestial equator at the equinoxes




The line is deviated 5’ 11’’ East:
at the winter solstice the **transit delays 23 s**
in **summer** 11 s,
with **respect to the ephemerides**
**There are extra 2 s near the equinoxes**

Bianchini verified in 1703 the tropical year’s lenght for the Gregorian Calendar reformation (1582) within a few seconds.