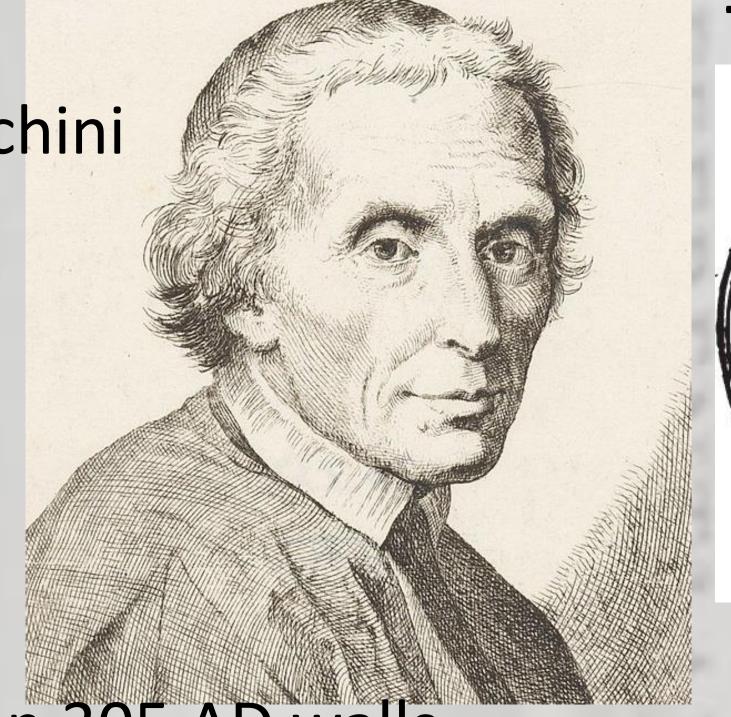
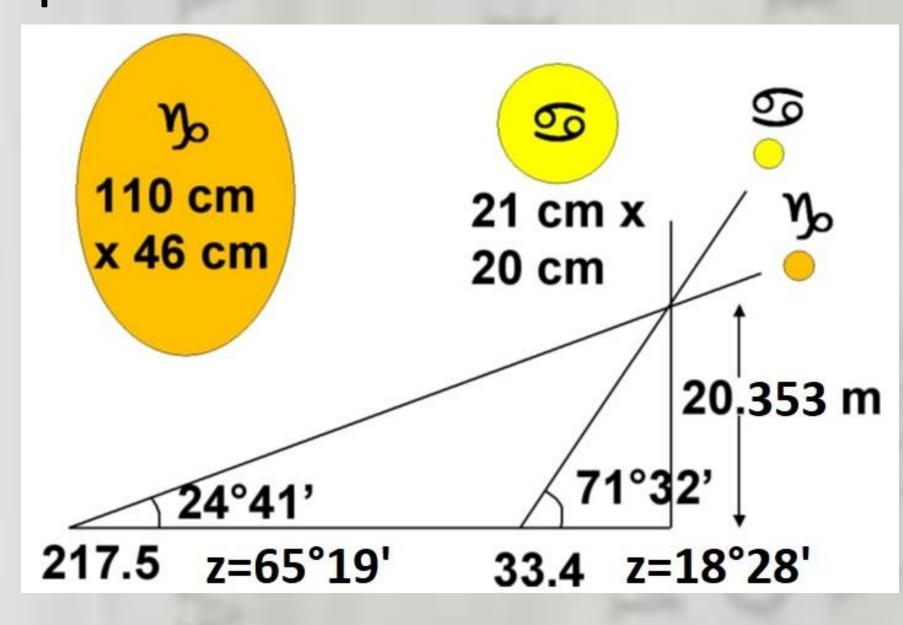
The Clementine Gnomon for: Pope Clemens XI (1700-1721)

Author: Francesco Bianchini (Verona 1662-Rome 1729)



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"



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.

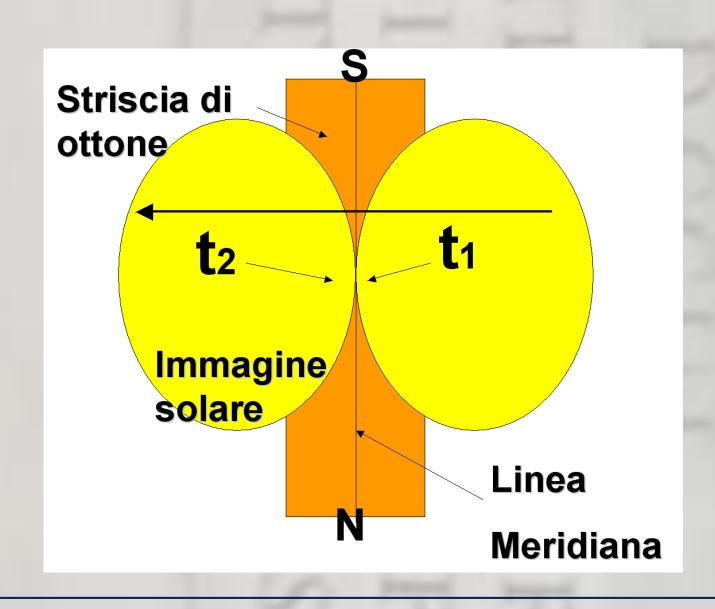


What is?

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



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.

at icra.it

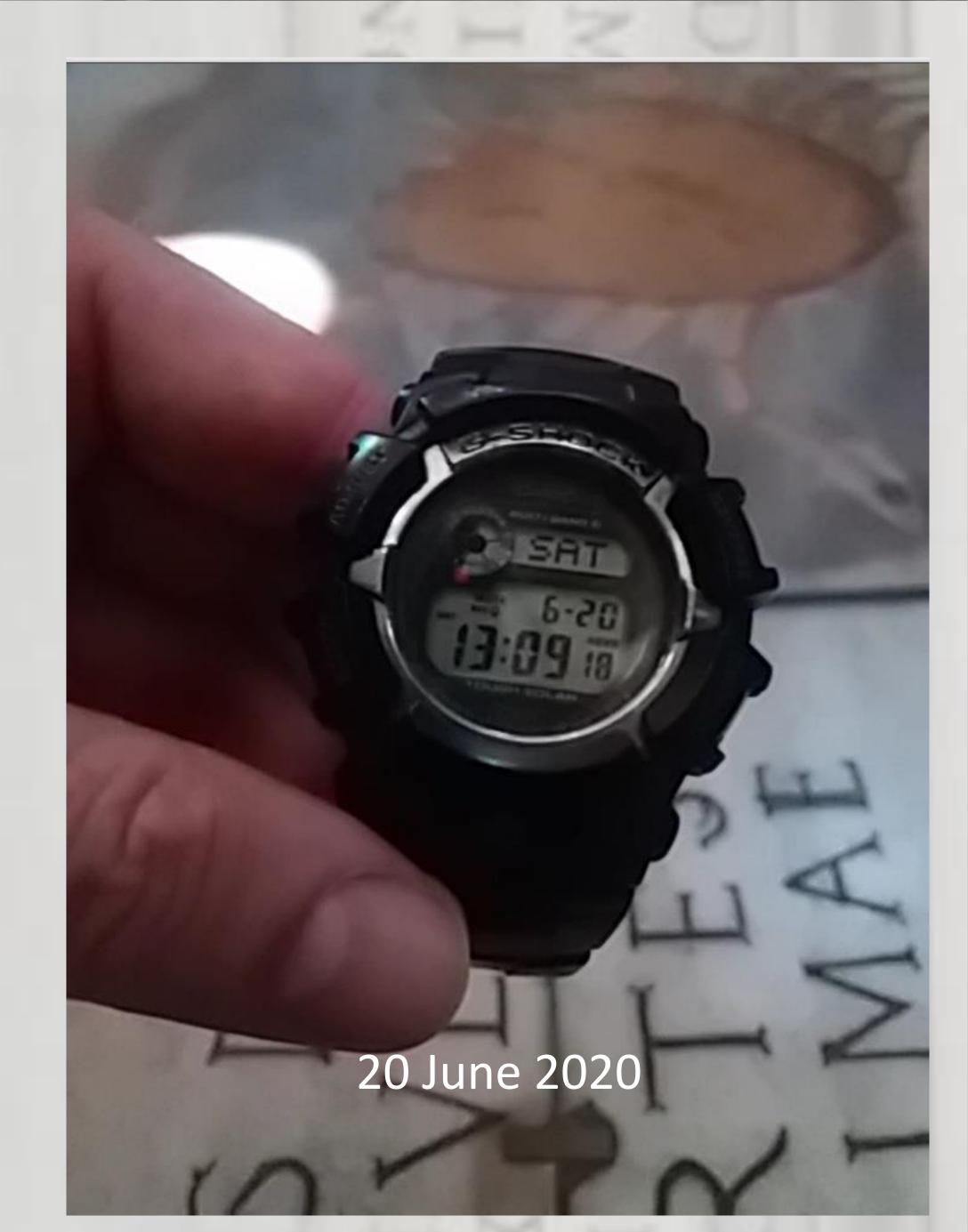
21 December 2024 h 12:05:09

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).



) Costantino Sigismondi 2025 prof. sigismondi

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

Meridian Aberration of Sirius (1702-1703)

["] from Bianchini, De Nummo et Gnomone Clemetino, 1703, p. 45

20

10

18-giu 07-ago 26-set 15-nov 04-gen 23-feb 14-apr 03-giu 23-lug

-10

-20

-30

-40

The largest sunspots are visible through the pinhole

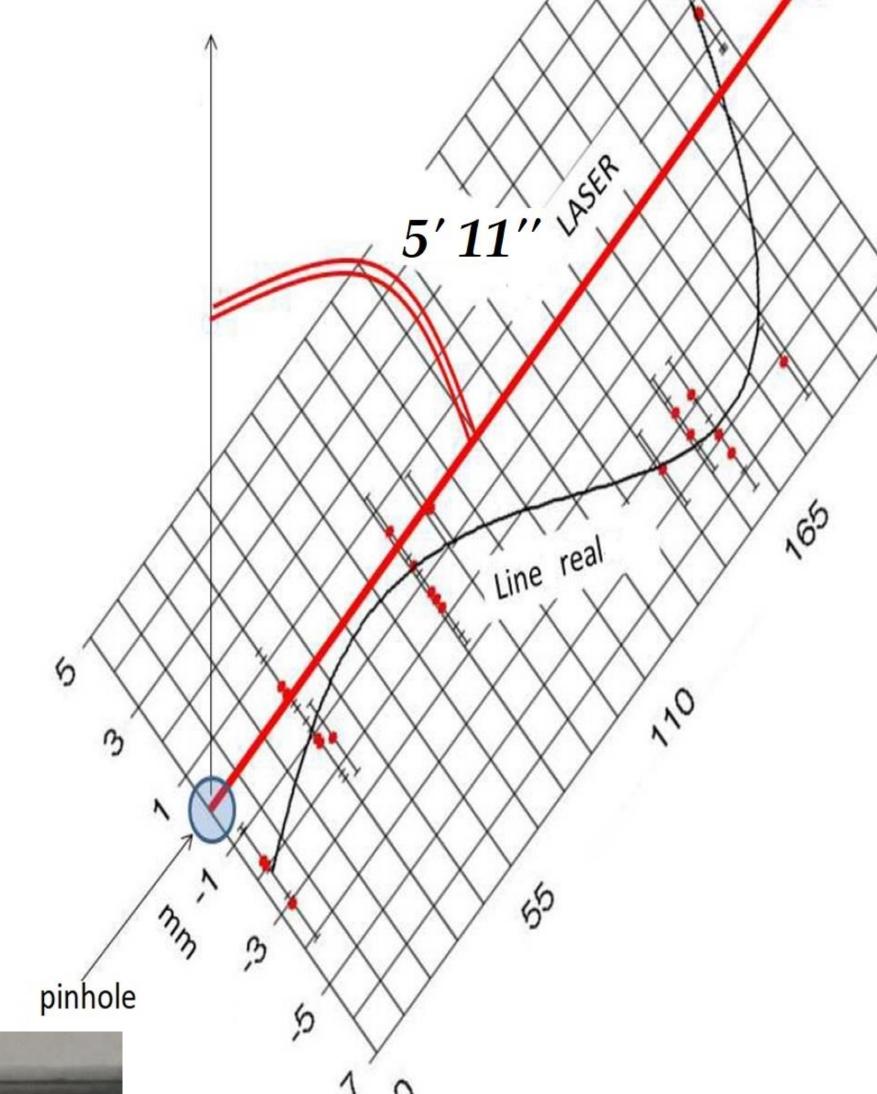


The Sun is projected on the path of the stars of the celestial equator at the equinoxes,

19 March 2021 h. 10:48

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.



MDECIII MDCCIII MDCCIII MDCCIII SABB-DIE XXII-DEC DIE XXI MART FERIA QVARTA DIE DOM-XXIII- SEPT DIE XXII- IVN- FER- VI-HOR · XI · M · XIV · P·M·N HOP-IX MINVT-III POST MED-NOCT HOR-VIIII-M-IV-P-MER-HORIS VIII-M-XLV-P-M-N-SOLSTITIVM BRVN AEQVINOCTIVM VERNVM AEQVINOCT- AVTVMN SOLSTITIVM AESTIV IN ASTERISMORVM IMAGINIBUS N LINEA MERIDIANA ADNOTATAE CONSIGNATAE IN MILLE SUBDIVIS · NEBVIOSAE OBSERVATI

Costantino Sigismondi 2025 prof. sigismondi at icra.it