

The Horologium on the Campus Martius reconsidered

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Some 20 years after critically addressing the spectacular new results on the so-called Horologium of Augustus, I was pleased to be invited to join the continuing debate about this monument. This extraordinary solar instrument still poses multiple problems. I will limit my deliberations to those aspects that strike me as a physicist, familiar with ancient astronomy.

The meridian line and its markings

It is important to keep in mind that virtually all we know of the Horologium's Augustan lines and markings is the description by Pliny (*NH* 36.72-73). The modern depictions of a giant sundial that we keep seeing are no more than reconstructions based on fantasy and intuition. The meridian line discovered in the excavations of E. Buchner and F. Rakob dates to the Flavian period, at the earliest.¹ Nonetheless, scholarship is almost exclusively concerned with speculations about the Horologium of Augustus.

What has been unearthed is a *c.*6.7 m long segment of a meridian line constructed in just the way Pliny describes it: a straight line of bronze running precisely N-S and marked with short cross-lines. On the E side appears the annotation in Greek of Aries-Taurus, on the W side Leo-Virgo — that is, signs of the zodiac, along which, in antiquity as today, the course of the sun over the year is mathematically divided into 12 sections of equal length of 30° each. By no means are we dealing with Greek “months” or “day lines”. The preserved cross-lines marking the 30°-sections make it clear that the excavated sections reach from 14° Leo to 11° Virgo on the E side and, on the W side, respectively, 19° Aries to 16° Taurus.² The limit between the zodiacal signs of the W and the E sides is marked by a common, uninterrupted line. Thus, the signs Aries-Virgo and Taurus-Leo are positioned symmetrically to each other, which in turn indicates that we are dealing here with the zodiacal method of counting of astronomers such as Hipparchos, Geminus, and Ptolemaios (still the common one today), which positions the main points of the sun's course, the solstices and equinoxes, at the start of each sign of the zodiac — not at the eighth degree of the sign, as in Roman practice on which Vitruvius, Varro, Pliny, and others draw. (This method of counting would place the limit of Leo and Virgo on the sixteenth degree of Taurus on our meridian line, that is at the letter H of the annotation ΘΕΡΟΥΣ ΑΡΧΗ.) We may well assume that the meridian line of the Augustan instrument was carried out in a similar way. From an enlarged version of Buchner's documentation I took the measures for the position of the cross-lines with a precision of *c.* ± half a millimeter, although the degree of precision in the drawing could not be verified.

From the data thus gained one can determine both the height and position of the gnomon-obelisk.³ Based on these results I subsequently calculated the exact subdivisions of the zodiacal degrees and compared them with the documented measurements. A gnomon

1 For the excavated evidence, see Buchner 1994, fig. 85; id. 1996a, fig. 23; Haselberger, above, fig. 7. All abbreviations here are as in Haselberger (pp. 70-73 above).

2 For the ancient astronomical basis, see Geminus, *Eisagoge* 1.1-40.

3 Schütz 1990, 455-56.