

This work is part of the CRC "Progetto Tarquinia", directed by G. Bagnasco Gianni, and belongs to a research project initiated in collaboration with G. Magli of the Politecnico di Milano. It aims at exploring possible correlations between astronomical aspects and the configuration of urban spaces and monuments in Tarquinia and in the Etruscan world in general. As part of this project, we started a series of field campaigns aimed at measuring azimuths and, where it was possible, the horizon heights, of the main sacred structures in Etruria (previous samples are presented in PRAYON 1991 and AVENI-ROMANO 1994). We analyzed 28 structures that we could be certain were temples, in ten different locations. The data obtained have been inserted in a chart (Table 1), that collects information, where possible, relating to the orientation of the structures, worshipped deities and foundation chronology. The study of this sample, linked to what we know about Etruscan religion and sanctuaries, led us to a series of results (PERNIGOTTI 2019). It was noticed that most of the temples considered (19 out of 28) were oriented along the sky arc that extended between the points where the sun rises and sets at the winter solstice (Fig. 1). This means that Etruscan temples were oriented not towards sunrise during a particular day of the calendar, as is true for the majority of the contemporary sacred structures in the Greek world (BOUTSIKAS 2009), but so that their frontal faces were touched by the sun every day for multiple hours a day. On the contrary, the interiors of these structures were never lit by sunlight. Only three small groups were an exception to this rule: a group of five temples oriented towards the east, that were aligned with sunrise during two days each year (1, 14, 17, 19, 20); a group of two temples oriented north-west, whose fronts were never touched by sunlight (8, 25); and a group of two temples whose orientations towards sunset on the winter solstice was off the main range by a few degrees (2, 24).

A critical analysis of the sample
Though the sample size is too small to conduct statistical analysis, it is nonetheless possible to draw some observations from the data. As previously noted, the majority of the temples (19 out of 28) face the sky arc between the rising and setting points of the sun at the winter solstice. This constitutes **67.86%** of the analyzed structures: a significant percentage, which seems to bring out a clear preference by the Etruscans in orienting the sacred buildings towards this part of the sky. This percentage may further increase if one also adds the small set of two buildings aligned just north of the point of the sunset at the winter solstice. The slightly more northern orientation of these two temples could be explained by a small error in calculation either on the part of the Etruscan architects or in our own measurements. In this way, the number of structures would increase to 21, with a clear preference within it for the arc of the sky of the descending sun (16 out of 21, equal to 76,19%), suggesting this was the primary mode of orienting Etruscan temples. As for the two buildings aligned towards the opposite arc of sky between the sunset and sunrise points at the summer solstice, the northern orientation of these temples could be explained by the catachtonic nature of the divinities venerated both at Vigna Parrocchiale and Pyrgi, so as to align them with the portion of the sky where the sun never passes, in a way diametrically opposed to the standard orientation of other temples. The group of temples aligned following a similar framework would thus increase to 23, constituting **82.14%** of the sample. Only five sacred structures do not follow this pattern, with orientation ranging from 92° to 96°, aligned to face the rising sun, suggesting a rule of orientation different from the other temples.

A comparison with Samnite sacred structures and Greek temples of Sicily and Magna Graecia
These observations on Etruscan temples become even more significant when compared to the only two other samples known about the orientation of sacred buildings in Italy from the first millennium BCE. The first is Samnite sacred structures (DE BENEDITTIS 2009; RUGGERI 2010), the second is comprised of temples from the Greek cities in Sicily and Magna Graecia (AVENI AND ROMANO 2000; SALT 2009; MAGLI *et alii* 2016; *Idem* 2017). The analysis of Samnite structures reveals a preference for buildings oriented to the southeast, along the arc of the ascending sun, which is only in part similar to the southern orientation of Etruscan temples, with a preference for the arc of the descending sun. The Greek temples of Sicily and Magna Graecia instead are generally oriented towards the east, along the arc of the sky where the sun rises. These Greek temples can thus be compared only to the five Etruscan sacred structures with an azimuth between 92° and 96°, but are completely different from the majority of Etruscan temples. This comparison to both Samnite and Greek buildings in Italy seems therefore to reveal the unique character of the Etruscan tradition for orienting temples.

Sacred building	Worshipped deity	Foundation cronology	Azimuth	Horizon height	Declination
Veto					
1 Tuscanic temple (Portonaccio)	Hercle, Rath	500 BC	96°	1.9°	-3.177°
2 Sacellum of Menerva (Portonaccio)	Menerva	540/530 BC	244.5°	4.6°	-15.374°
3 Oikos (Piazza d'Armi)	Uni?	late VII cent. BC	217°	1.5°	-35.141°
Pyrgi					
4 Temple B	Uni/Astarte	510 BC	232°	0°	-27.221°
5 Temple A	Thesan - Cavatha?	470 BC	234°	0°	-25.223°
6 Sacellum Alpha	Cavatha	c. 350 BC	228°	0°	-29.811°
7 Sacellum Beta	Cavatha/Demetra - Suri	530 BC	228°	0°	-29.811°
8 Sacellum Gamma	Cavatha - Suri	450 BC	314°	1.64°	32.345°
Vulci					
9 Tempio grande	Menerva	V cent. BC	190°	-0.81°	-47.431°
10 Sacellum of Ercole	Ercole	II cent. BC	207°/208°	0.6°	-40.369°
11 Fontanile di Legnisina	Uni	V cent. BC	214°	0.95°	-36.923°
12 Carraccio dell'Osteria	Demetra-Vei	V cent. BC	150°	5.8°	-34.602°
Roselle					
13 Temple C	Aiser	VI - V cent. BC	200°	5.67°	-38.217°
14 Casa con recinto	Female Divinity	c. 650 BC	92°	0.95°	-0.821°
Orvieto					
15 Belvedere temple	Tinia Calusna	early V cent. BC	137°	1.16°	-31.565°
16 Cannicella	Vei - Hercle/Fauno	late VI cent. BC	150°	0.84°	-38.773°
17 CdF temple A	Thuschva, Kore/Persefone?, Dioniso?	early IV cent. BC	96°	2.27°	-2.858°
18 CdF temple C	Maternal Divinity	late VI cent. BC	218.5°	3°	-32.593°
Tarquinia					
19 Ara della Regina	Hercle?	early VI cent. BC	95°	0.71°	-3.219°
20 Edificio beta	Uni Xia	VII cent. BC	97°	1.23°	-4.344°
Marzabotto					
21 Temple of Tinia	Tinia	early V cent. BC	178.5°	10.66°	-35.003°
22 Temple A		late VI cent. BC	181°	6.37°	-39.302°
23 Temple C		late VI cent. BC	181°	6.37°	-39.302°
Volterra					
24 Temple B	Papa - Xia	250 - 200 BC	239.7°	-1.456°	-22.577°
Cerveteri					
25 Vigna Parrocchiale (tuscanic temple)	Vei - Tinia	490-480 BC	317.5°	2.49°	36.114°
26 S. Antonio (temple 1)	Hercle	490-480 BC	206.5°	\	\
27 S. Antonio (temple 2)	Rath? Hermes?	490-480 BC	211.5°	\	\
Faleri Veteres					
28 Celle	Juno Curitis	V cent. BC	154°	\	\

Table 1 Summary table about the orientation of Etruscan temples

Concluding remarks

In light of these observations, I believe that it is possible to confirm that to determine the general orientation of Etruscan temples was the movement of the sun, with a clear preference for that sky arc that extended between the points where the sun rises and sets at the winter solstice, and in particular towards the arc of the descending sun, placed to the south-west. The questions to ask now are therefore what could have been the factors that influenced the disposition of the Etruscan temples towards this determined part of the sky and, within this distribution, what could have been the guidelines for the individual orientations. As regards the first question, we can certainly note the importance of the south within the *etrusca disciplina*, in particular for the orientation of priests during divination practices (MAGGIANI 1984; *Idem* 2009). Although such a ritual influence cannot be excluded, it must be emphasized that we should have expected a sample of distribution of the orientations much more concentrated around the north-south cardinal axis. Another consideration that should be acknowledged is instead very functional: the Etruscan temples, in fact, have a strong frontality, underlined both by the access stairway to the podium, present only on the front side, and by a *pars antica* (the front part of the building) clearly differentiated from the *pars postica* (the rear one). Between these two, only the *pars antica* appears to be open to the outside, usually through a pronaos formed by one or two rows of columns (Fig. 2-3). The choice of orienting the temples towards the arc of the sky that sees the sun pass every day for several hours a day could therefore depend on the practical will to illuminate the front part of the temple, that had to be the true center of the building and in front of which there was usually the altar, seat of the rituals, inside an area destined to the gathering of the faithful. As far as the individual orientation, it has already been noted that a link between the azimuth of the temples and the associated deities could exist (PERNIGOTTI 2019). In fact, it can be observed that: all temples dedicated to Uni have a very similar orientation (between 214° and 228°); both temples of Carraccio dell'Osteria and Cannicella, dedicated to Vei, have the same orientation (150°); temples 1, 17, 19, 20, with identical orientations (95°-96°), show a strong link to Hercle; the temples dedicated to Menerva and Tinia have different orientations but the former are always turned towards the south-west, while the latter are turned towards the south-east. The next step is to try to understand the reasons for this possible link. I believe that, in order to do this, a contextual analysis of the individual sites is necessary, in line with what has recently been proposed also for the Greek world (BOUTSIKAS 2009; for the Etruscan world and the case of the Ara della Regina at Tarquinia, see BAGNASCO GIANNI *et alii* 2013). A study that synthesizes the data of the orientation of the temples with the fundamental ones of the archaeological, epigraphic and literary record, related not only to the sacred building, but also to the space that surrounded it, with its rites, cults, myths, as well as with its topographical and geographical aspects.

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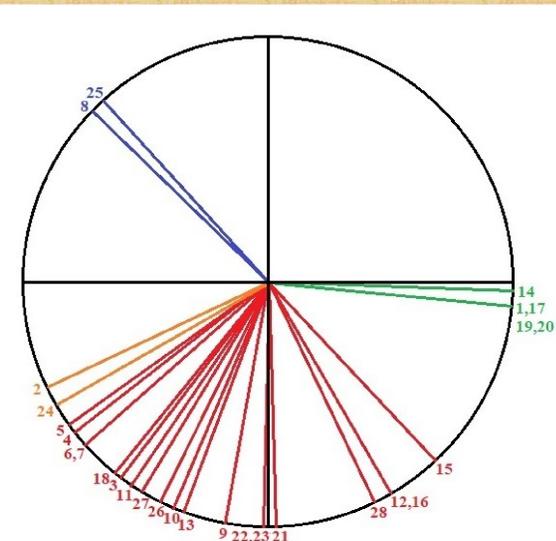


Fig. 1 The azimuths of Etruscan temples (after PERNIGOTTI 2019)

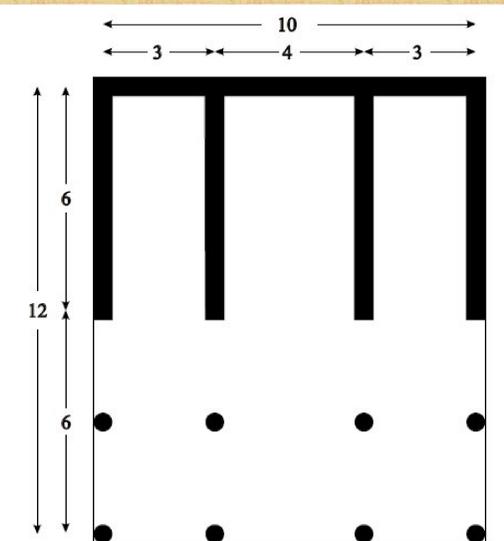


Fig. 2 Plan representing the *tuscanae dispositiones* (after POTTS 2016)



Fig. 3 Reconstructive model of Temple A of Pyrgi (after *Rasenna. Storia e civiltà degli Etruschi.*)