

Article

A Biography of an Ancient Cultural Landscape: The Sky over Tarquinia

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Abstract: This paper discusses two kinds of research implemented to federate different disciplines and knowledge in support of archaeological research and the protection of the tangible and intangible heritage of ancient Tarquinia. The first part of the work examines the results obtained from the archaeological analysis, the concrete implications on the sustainability of ancient cultural landscapes and their possible transmission over time as an expression of the culture of a community. The second part of the work presents the reading and analysis of the ancient landscape and sites through chrono-stratigraphy, especially regarding two case studies in Tarquinia: the ‘monumental complex’ and the Ara della Regina sanctuary. The work focuses on the intangible aspects of the landscape as a result of archaeological research in the archaeoastronomical field. The orientation of the sacred structures and landscapes is presented herein regarding Etruria and the two case studies. The results shed light on the city’s perception by the population, identifying it as an entity that held and sheltered every aspect of the community’s life. The preliminary results of this study have made it possible to recognise aspects of significant historical and cultural value, which are the heterogeneous expression of a solid identity to be safeguarded and developed in a sustainable way.



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1. Introduction

Archaeological research in Tarquinia was started in 1982 by Maria Bonghi Jovino on invitation from the then-Superintendent Paola Pelagatti and is actually managed by Giovanna Bagnasco Gianni. Scientific research is now continuing in collaboration with the Soprintendenza Archeologia, Belle Arti e Paesaggio per la provincia di Viterbo e per l’Etruria Meridionale, which continues to promote the activities of the University of Milan. A particular and profitable connection between Milan and Tarquinia marked the beginning of excavations. In 1957 in Rome, Carlo Maurilio Lerici created the Foundation that bears his name under the aegis of the Polytechnic University of Milan. Archaeological research began considering these results thanks to the prospecting analysis carried out up to the 80s on the Pianoro della Civita di Tarquinia [1]. Therefore, excavation and research were conceived as interdisciplinary from the very beginning, with colleagues from different disciplines committed to rendering the profile of an ancient city with its needs and answers across the board [2]. There are two sites subject to stratigraphic excavation within the 90-hectare plateau. They have always been at the centre of scientific debate: the ‘monumental complex’, with a continuity of life of more than ten centuries [3], and the polyadic sanctuary of Ara della Regina, founded in its monumental forms at least at the beginning of the 6th century BC [4]. Since 2004, the two areas under investigation have been put into a system based on the results achieved over many years, at a hermeneutic level, on the interpretation of both structures and materials. Therefore, it turned out that they should be linked to a broader network of relationships with the materials dispersed in European museums and with the archaeological aspects of the necropolis [5,6]. The strategy implemented in

this framework has strengthened interdisciplinary collaborations [7–9], first within the University of Milan itself [10,11]. Subsequently, the collaborations included the Polytechnic University of Milan in the framework of a PRIN project (2009) with the Department of Architecture and Urban Studies [12,13] and the Department of Mathematics. The first aimed to investigate how relevant the position of the two main sites was on a large scale in relation to the other structures brought to light in previous excavations and within the limits of Pianoro della Civita di Tarquinia and its fortifications [14,15]. The second started in 2012 with prof. G. Magli and aimed to explore the correlations between astronomical aspects and the configuration of urban spaces and monuments in Tarquinia [16–21].

For all these reasons, moving from the initial ‘Tarquinia Project’, a Coordinated Research Centre (C.R.C.) was created by Giovanna Bagnasco Gianni at the University of Milan in 2015: six Departments took part in it and supported archaeological research from naturalistic and I.T. perspectives, with the collaboration of colleagues from the Polytechnic University of Milan who deal with the architectural and urban planning aspects. These collaborations were set to structure skills and contributions from the scientific disciplines applied to every aspect of the research to define the ancient cultural landscape and continue on the enhancement theme path [22].

Within this framework, this paper presents the results of the two collaborations with the Polytechnic University of Milan implemented to federate the different disciplines and knowledge in support of archaeological research and the protection of the tangible and intangible heritage of ancient Tarquinia. The first part of the work examines, on a large scale, the results obtained from the archaeological analysis and the real implications on the sustainability of ancient cultural landscapes and their possible transmission over time as an expression of the culture of a community. On the other hand, the second part of the article focuses on the description of the two main case studies, the ‘monumental complex’ and the Ara della Regina sanctuary, and on the intangible aspects of the landscape as expressions and representations of a precise cultural and historic period [23]. These nonphysical characteristics result from archaeological research in the astronomical field, particularly on the orientation of sacred structures and landscapes in Etruria and Tarquinia.

2. From the Archaeological Analysis to the Sustainability of Cultural Landscapes

One of the fields in which the collaboration was immediately highly profitable was the broad territorial scale, where a complete and defined overall picture was still challenging to delineate despite the efforts of the individual skills that had hitherto faced this problem. As mentioned above, in fact, from the urban planning point of view, it was essential to plan an investigation that would allow for studying the plateau in a chronological sequence, taking into account not only all the archaeological structures that characterise it but also its nature as a palimpsest still actively frequented by the local population. For this reason, a LiDAR acquisition method [24,25] was applied to create a three-dimensional model for subsequent investigation strategies marked by an increasingly interdisciplinary approach [26,27]. The barren hill and the pivotal buildings that have dotted its surface over the years have been synergistically examined from numerous points of view (historical, archaeological, architectural, structural, chemical and physical), with the common goal of reaching a more-specific knowledge of them and targeted enhancement. Among the most important archaeological findings are the acquisitions of the Tarquinian walls, the limits and shape of the city as it became historical, the history of research and the materiality of the relationships that linked the buildings to the largest scale [15]. This work constitutes the database and the scientific foundation for the Archaeological Map of Civita di Tarquinia, completed in 2018. These insights allow us to analyse Pianoro della Civita from a broader perspective, integrating historical–archaeological information with what emerges from the reconsideration of geophysical prospecting, the territorial analysis of modern maps and actual and past restriction plans.

The aspect on which we would like to focus attention concerns some expressions of great importance for conserving the buried archaeological heritage and its correct trans-

mission to future generations. The first point concerns the extension of the ancient city in relation to the restrictions and the current intended use. As is well known, in the early 20th century, the archaeologist P. Romanelli opened the season of research that would lead to the discovery of a large part of the fortified perimeter of—and eventually to recognise in the Civita Plateau the exceptional location of—the ancient metropolis of Tarquinia. The current investigations show that since its definition during the 8th century BC, the town's perimeter extended over about 126 hectares, enclosing Pian di Civita, Pian della Regina, the hills that overlook the Pantanaccio river and the Castellina. In the historical phase, this perimeter was surrounded by square walls, although the stability of the borders can be considered solid and persistent from the protohistoric age to Hellenism. Of course, a direct relationship cannot be established between the size of the inhabited area, its population and the land occupation. Since the first research in this sense, in fact, P. Romanelli found a significant lack of ceramic material on the top of the more peripheral hills, especially the eastern ones, as well as a highly discontinuous and varied articulation and settlement density. It took numerous attempts and a year of methodical, often inconclusive, surveys before identifying reliable remains of buildings on the wide and bare plateau. The surface collections conducted in the 1990s, even if focused on the protohistoric area, partly confirm these data [28], showing a diffusion of the inhabited clusters, variously distributed over the entire summit surface of the set of hills to be then surrounded by walls in historical times. In this sense, further information also comes from the recent reconsideration of the geophysical results acquired by the Ing. C.M. Lericci Foundation, always performed in collaboration with the University of Milan, the Polytechnic University of Milan, the Ing. C.M. Lericci Foundation and the experts of the British School at Rome.

Concerning the issue of the town extension, the prospecting shows a reduced concentration of anomalies, especially in the south-eastern area of Pian della Regina and along the slopes on the edge of the city. However, it is essential to remember that these predictive models need verification through parallel testimonial series. Furthermore, the presence of strong anomalies can be supposed and linked to a considerable building. In that case, their absence does not mean that it is impossible to find buried anthropic structures that are poorly reactive. In any case, the investigation was not completed on the entire extension enclosed by the walls. Therefore, given the extreme variability in the use of the soil and its discontinuous stratigraphic power, extending the results to non-analysed areas would be extremely uncertain. Given these premises, observing how the surface of the ancient city is included in the current regulatory plan and the current development plans of the territory, it is interesting to note how the area is treated in different terms regarding land-use and related landscape systems and areas by the archaeological, environmental and landscape rules of the UNESCO buffer zone (Figures 1 and 2).

Concerning municipal restrictions, those in 1968 with subsequent additions [29] and the following Detailed Plans connected to identify the Civita Plateau area as an Archaeological Park (Zone F2) subject to archaeological restrictions (Figure 3). The same conditions are also reported in the 2007 Regional Landscape Plan of Lazio [30] (Table C, Natural and Cultural Heritage Assets), where the entire area circumscribed by the walls is indicated as part of the archaeological settlement system and specifically as “Archaeological heritage assets” (areas) and protected according to article 10 of Legislative Decree no. 42 of 2004 [31]. However, it can be noted that in the same PTPR [30] (Table A, Systems and Areas of the Landscape), the ancient inhabited area is indicated in the west as a “Natural Agricultural Landscape”, whereas in the east as a “Value Agricultural Landscape” (Figure 2), although it is possible (even with recognised evidence) that the latter is also involved in the Etruscan and then Roman settlement of Tarquinia [15] (pp. 65–70).

To fully understand their value, it is better to specify the meaning of these definitions and the landscape quality objectives indicated by the PTPR [30] for the two landscape systems. “Natural Agrarian Landscape” refers to the territories with prevalent agricultural management located in natural areas of high environmental value. The main objective is the integral conservation of the landscape and, thus, of the traditional agrarian use by

preventing territorial transformation. “Value Agricultural Landscape”, on the other hand, refers to areas of agricultural use characterised by landscape quality, with a prevalent agricultural productive function and permanent crops or arable crops of great extension, depth and homogeneity. In this case, the objective of landscape quality is to keep the rural character and the compatible agricultural and productive function. Of course, the indications of the type of landscape and the archaeological restrictions are not in conflict with each other: the former defines the legislative borders within which to move, while the latter further restricts the field. However, this meant that starting from the 1960s (i.e., when the archaeological restriction was enacted), only pastoralism could be practised in the west. In the east, regular ploughing could be carried out and the individual land conductors had the duty to stop if buried archaeological remains emerged. Even with due caution, these activities still constitute incisive actions for the subsoil, which in the long run have irreparably compromised what is known in this area about the defensive structures and the city itself. If, at the time of P. Romanelli, it was still possible to discern parts of the walls, city gates, wells for water supply and other remains of masonry buildings, today no piece of evidence has survived under the repeated mechanical actions. Sections of the city walls and the other stone constructions have been completely pulled out to facilitate the use of agricultural vehicles. As evidence, numerous large aggregations of blocks and rubble are at the places mentioned by Romanelli, piled up at the edges of the fields and near the hill’s eastern side [15] (pp. 10, 64–67, 74).

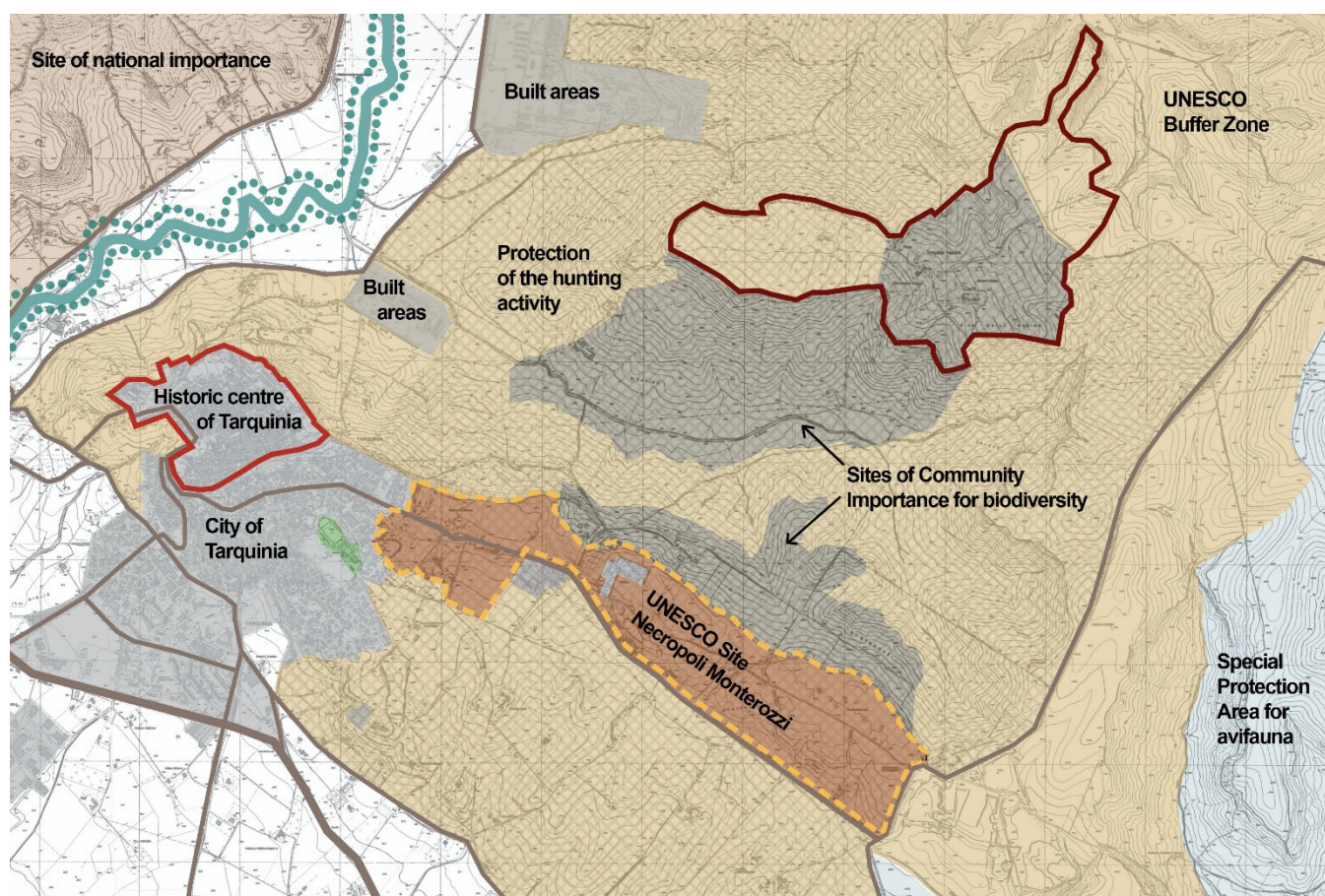


Figure 1. Definition of restricted areas according to the European directives for biodiversity protection (Directive 79/409 and Directive 92/43). The colours indicate the boundaries of the different areas.

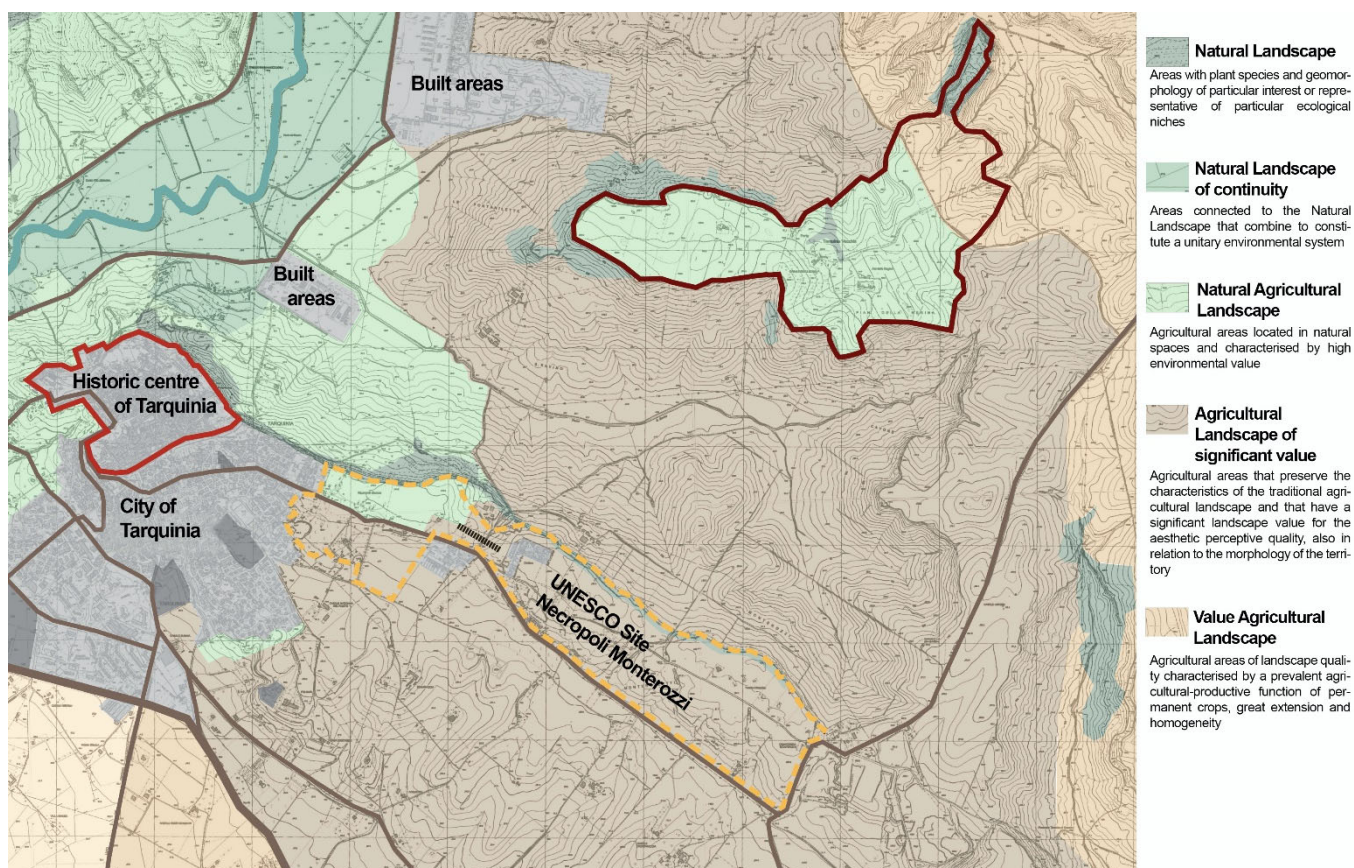


Figure 2. Identification of the natural and agricultural landscape systems from the PTPR (Regional Landscape Plan of Lazio, 2007, Table A, Systems and Areas of the Landscape).

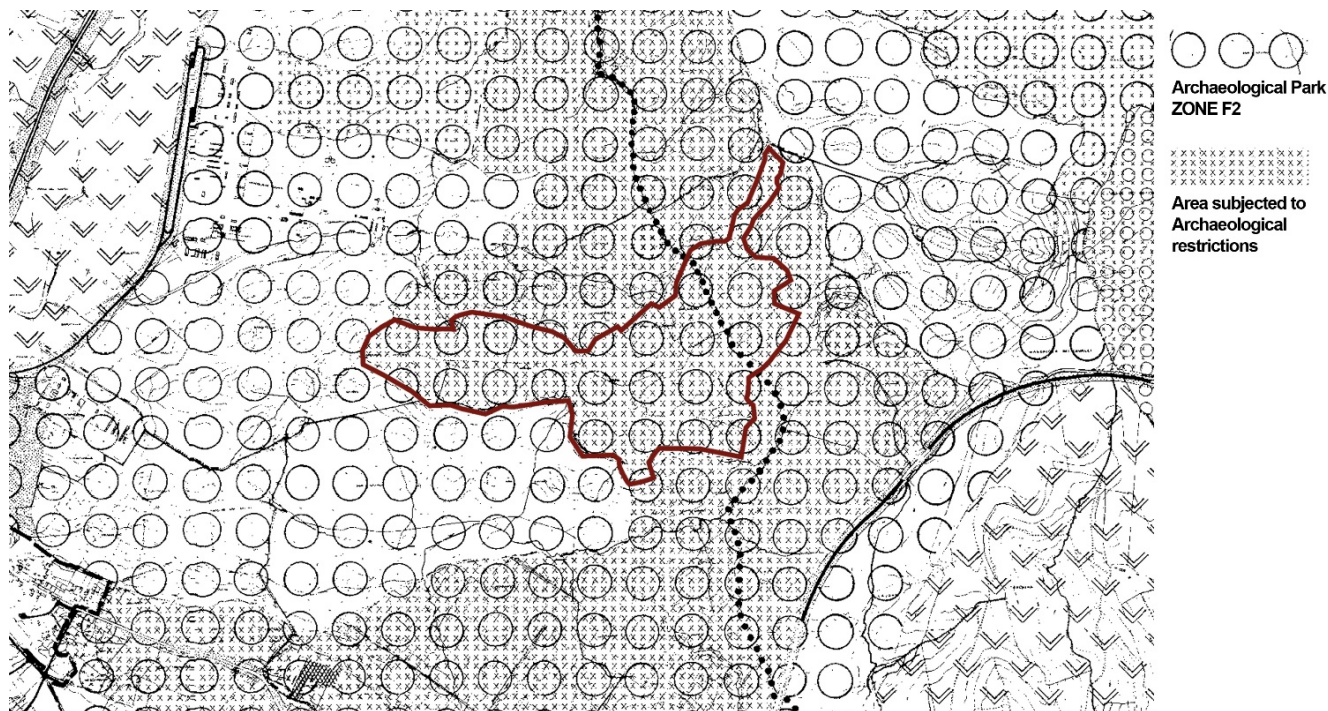


Figure 3. Extract from the General Town Plan of Tarquinia (1968 and subsequent additions, Table 9C centre, updated as of November 1972) showing the area subject to archaeological restrictions and extension of the Archaeological Park (Zone F2).

In light of these considerations, it can be assumed that even what was recorded by the surface surveys of the 1990s regarding the Villanovan frequentation is today in danger if not definitively compromised. On the eastern hills, traces of huts, artisan areas and extensive outcrops of materials attributable to the Late Bronze and Early Iron Ages had been noticed in primary or slightly displaced positions, demonstrating the intense occupation of the area in the protohistoric age (now barely recognisable) [28,32]. Finally, it should be noted that even the western part destined for the “Agricultural Natural Landscape” is not free from threats. The passages of agricultural vehicles with steel belts, which for decades have been travelling daily on the inter-ponderal roads directed to *Casale degli Scavi* and to the parcels where agricultural work is permitted, removed the surface-level soil of the protected archaeological area in several places, eroding and shattering the structures buried under a few centimetres of the ground. Significant examples are found along the road that crosses the town longitudinally, along which numerous wall alignments and remains of buildings and structures in *macco* (local calcareous stone) and *nenfro* (local black stone) have been exposed to such worrying circumstances. In this sense, the most emblematic case is the city gate to the south-west of the Ara della Regina sanctuary (Figure 4), where the ancient paved road surface and the door itself obtained inside a cut in the rock have been damaged and removed at least half a meter in distance, definitively compromising what remained of the archaeological information once clearly distinguishable [15] (p. 74).

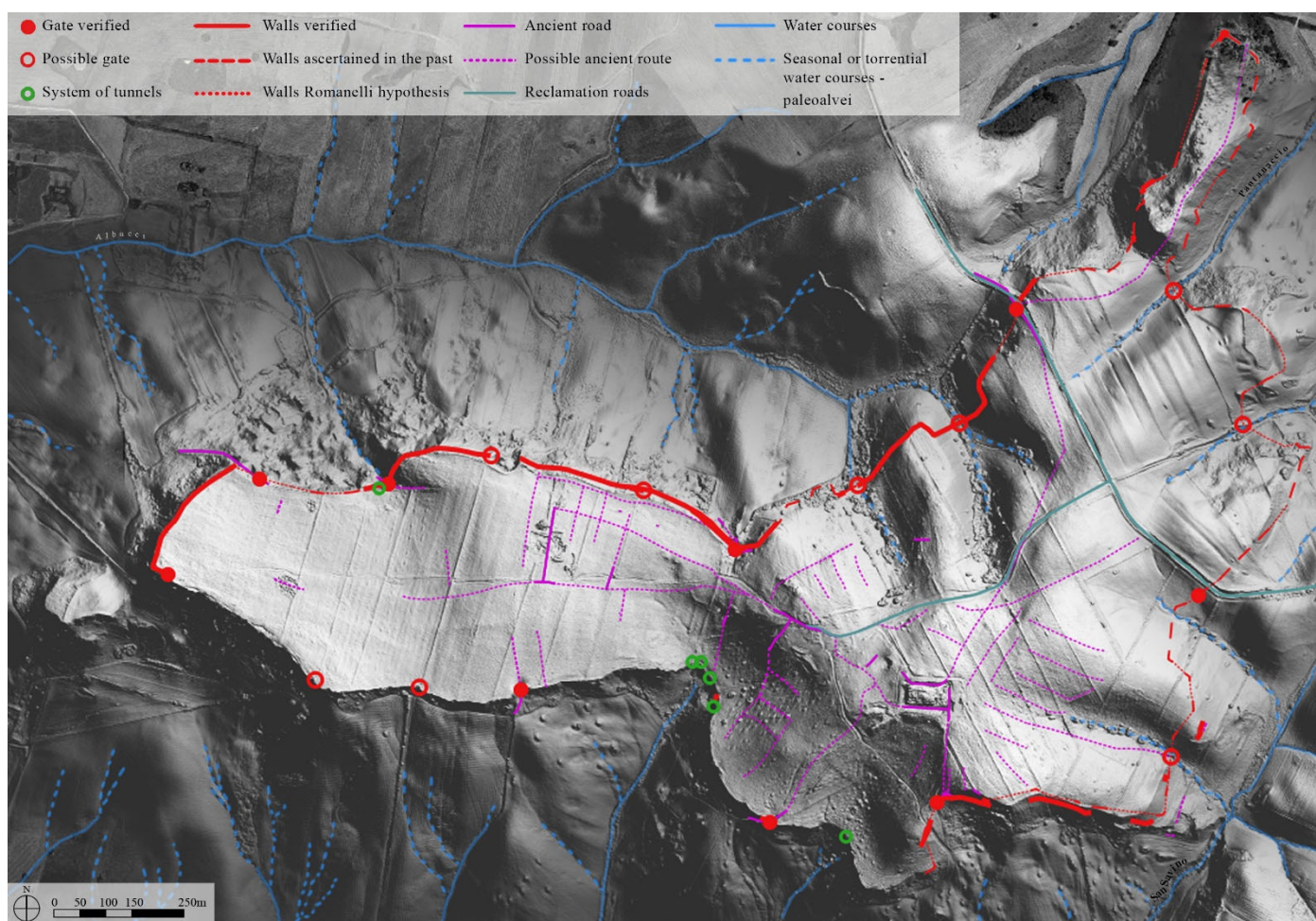


Figure 4. Thematic map of ancient Tarquinia’s city walls (red lines), entrances (red circles) and roads (pink lines) [15].

3. Reading the Landscape through Chrono-Stratigraphy

The understanding of the archaeological area in its widest extent and scale is possible also thanks to the results of the research and analysis of two articulated archaeological sites: the ‘monumental complex’ and the Ara della Regina sanctuary. The chrono-stratigraphic study was indeed essential to reconstruct the historical development through a consistent analysis of the material findings and phases of activity in their connection with the territory [33]. To understand the relationships between the large- and small-scale signs and their connections with archaeoastronomical analysis, it is necessary to briefly describe the two sites, which are quite unconventional. In the next two subchapters, the main results and peculiarities of the studies will be illustrated in order to anticipate some key concepts and starting points useful for subsequent archaeoastronomical analysis.

3.1. The ‘Monumental Complex’

Since 1982, excavations on the western part of the Civita plateau have revealed the ‘monumental complex’, one of the most ancient Etruscan areas with continuous frequentation from the 10th century BC to the Roman imperial period [34–36]. The results of the excavations shed light on the continuity of religious and ceremonial practices in a peculiar religious landscape, where supernatural manifestations took place and the local community gathered for sacred and public purposes [37]. The limits and setting of the ‘monumental complex’ coincide with the very beginning of the history of the site and confirm its continuity and memory through centuries, showing persistent relationships between objects and sacred spaces, built environments or open air [38].

Since the beginning, relevant areas of the bedrock of the ‘monumental complex’ are marked by perishable structures and human burials [37]. A child affected by *morbus sacer* (epilepsy) was buried near the natural cavity at the end of the 9th century BC. This ritual practice, unexpected for a child burial at this time, proves that the cavity is the focus of the whole ‘monumental complex’ and belongs to the core of the reasons for its foundation. His memory was maintained over the centuries, as it is shown by an Etruscan inscription dating three centuries later (end of the 6th century BC) found near the cavity: *terela*. This is the Etruscan word corresponding to the Latin *prodigium* and Greek *teras*, which are both terms indicating an exceptional phenomenon, immediately recalling the story of the prophetic child *Tages*, the boy born old, who sprang from a clod in the territory of *Tarchna* and taught *Tarchon* the principles of the Etruscan religion and prophecy. It could be claimed that this real child is the inspiration for the legend of *Tages* or, alternatively, that his body was associated in antiquity with *Tages* [39].

From the mid-8th century BC onwards, the natural cavity continued to be surrounded by perishable structures and additional human interments, including sacrificed individuals, and votive deposits mark cultic areas.

Paleoanthropological analysis of the features of the skeleton of an adult man, buried in the area northeast of the cavity carved deep into the bedrock around the mid-8th century BC, suggest he was mistreated and killed with a blow to the head and that he was probably a seafarer. The fabric of a geometric pottery shard found in connection with him makes it possible to understand overseas contact and the presence of foreigners likely from the Aegean, so far mostly detected in the funerary equipment of the necropolis (*Poggi orientali*) [40].

The technical features of the subsequent Orientalising phase of the ‘monumental complex’ point in the same direction: they are inspired by eastern Mediterranean masonry (pilaster-wall linked by sections of smaller stones). Its sacred and political destination is demonstrated by the deposition of the three famous bronzes (axe, *lituus-trumpet*, and shield) in front of *building β* (Figure 5), the ‘altar temple’ at the beginning of the 7th century BC. The three objects were folded and placed one above the other, in front of the east’s main entrance, showing the evident religious and institutional target of the ‘monumental complex’. A sherd of an impasto ware cup, found in a secondary deposition in the surroundings of the bench/altar of *building β*, helps outline the status of the individual responsible for its

dedication to the goddess. This, like the three bronzes, is datable at the latest to within the first quarter of the 7th century BC, and bears the Etruscan inscription *mi kalan* [—], which is an Etruscan loan word from a Greek epithet of the hero Herakles in his apotheosis. This condition matches the attributes of the Phoenician *Melqart* in Thasos from the first half of the 7th century BC (Archilochus). This figure could thus be a consort to a goddess resembling the Phoenician Astarte and Uni, the foremost female goddess of the Etruscans [41–44] (pp. 160–163).

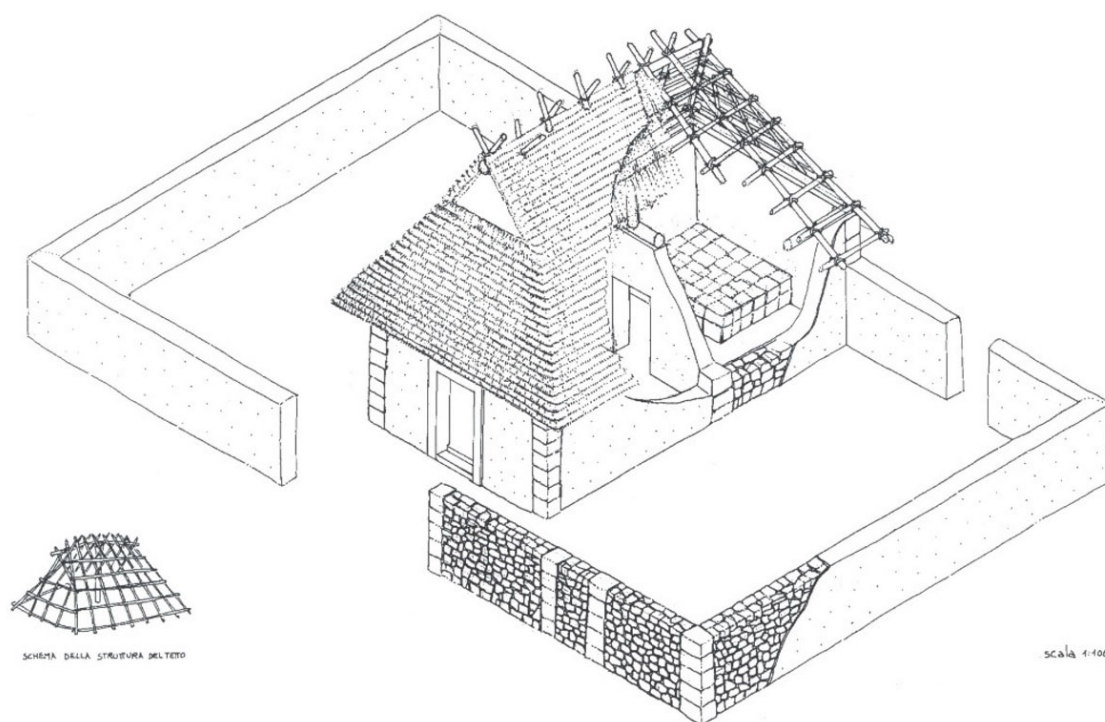


Figure 5. Reconstruction of the elevation and plans of building β with the sacred enclosure.

The recipient of his dedication is the main Etruscan goddess *Uni* [41], who continues the role of the natural force connected to the natural cavity since the foundation of the ‘monumental complex’.

Her presence has been proven by the discovery of some shards inscribed with her name and proven by the inscription *χiiati*, which means ‘related to *χia*’, inscribed on an ‘impasto’ pottery shard found on these same premises. In fact, the inscription refers to *χia*, which defines the chthonic nature of the goddess *Uni*, whose features are already well-known thanks to the documentation of Cerveteri and Pyrgi [42] (p. 96) and [43] (p. 300).

In the Archaic period, architectural devices such as stone blocks and altars of raw stones and earth were placed to keep the memory of previous Villanovan cultic spots. This happens, for example, in *area γ*, where the Villanovan evidence is preserved inside an elevation of the floor, marked by walls and votive deposits [42,45]. Therefore, this archaeological evidence is tightly connected to the concepts of memory, authority and recognisability that are crucial for the survival of traditions and place-attachment for most ancient communities [46–49]. Recent archaeological and epigraphic discoveries, connected to the filling of a well located in the north-east sector of the ‘monumental complex’, confirm this trend until the encounter with the expansion of Rome after the Second Punic War [13].

3.2. The Ara Della Regina Sanctuary

The Ara della Regina sanctuary was built with monumental features from its very architectural beginning to become one of the largest in Etruria. The temple was raised on top of this base in four main phases, built one on top of the other from the beginning

of the 6th century BC to the end of the Hellenistic period (Figure 6). One of the most impressive architectural accomplishments of the whole sanctuary is the enlargement of the hill by means of a high base of regular levelling courses of stone blocks (34×55 m) and the production of an even ground level [4]. The Temple I, with one elongated *cella* and a *pronaos* (12×27 m), was refurbished around 530 BC with two *alae* and incorporated into the second phase of the Temple. Archaic terracotta remnants include fragments depicting Herakles' deeds, as suggested by the plaque with the cattle of Geryon and a high-relief pediment that features the Hydra.

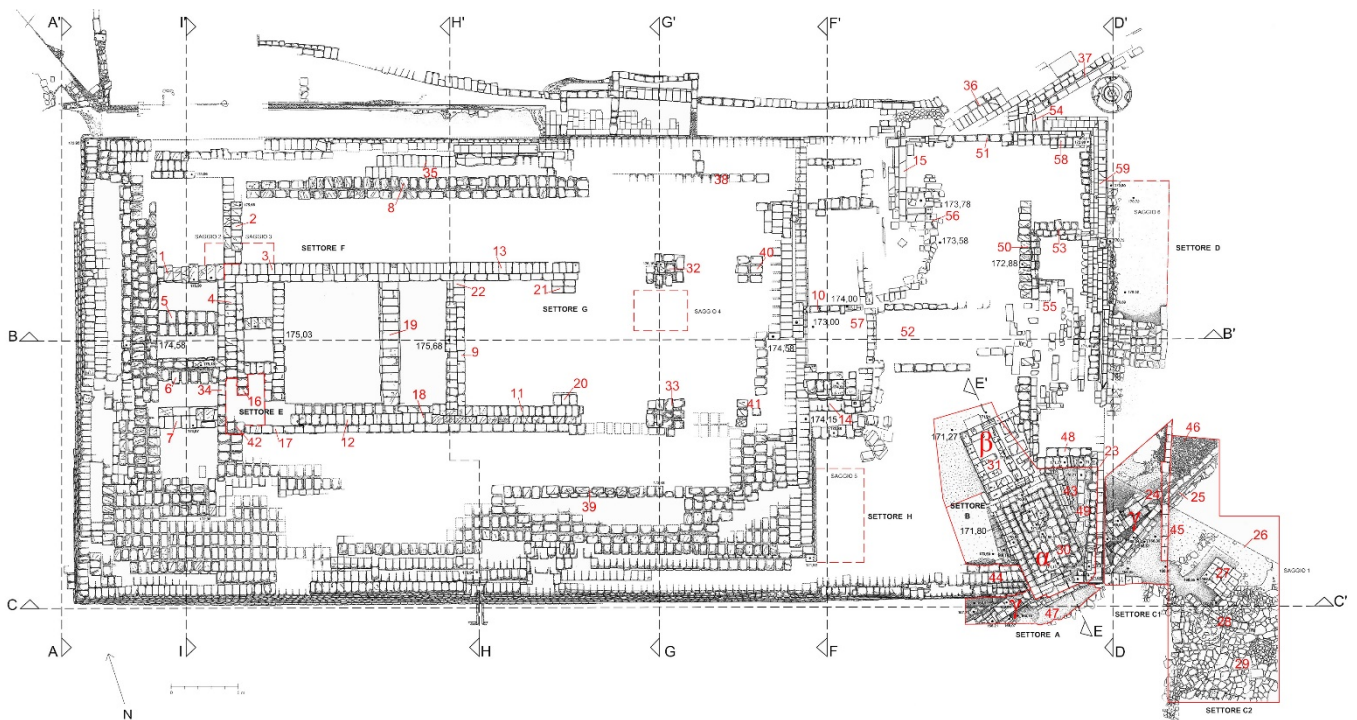


Figure 6. Plan of Ara della Regina, showing Archaic Temples I and II and the whole extension of Temple III with the terrace in front including altar α [4]. Numbers indicate structures, letters indicate sections of the building.

The area in front of the east entrance to both temples, roughly orientated east–west, had a similar layout, being delimited and contained at the same time by a wall built with blocks of rock of different colours (*wall γ*), thus far traced for 40 m by means of modern technologies. Its purpose was both controlling the thrust of the earth from the hill behind and also supporting a stone chest, with an orientation (340°) that differed from that of the Temples (95°). These features are hard to assess because it was sealed under the *altar α* of the subsequent phase of the sanctuary, which is the most evident. Since excavation on the terrace during the first half of the last century yielded a fragment of an inscribed marble slab probably bearing the name of *Tarchon*, the stone chest has been interpreted as his cenotaph.

Analysing its layout, the previous literature review supported the idea that *altar α* was Archaic and celebrated the ancestral spot where *Tages* sprang from a clod in the ground. According to literary sources, *Tages* was the child who appeared looking like an old man who taught *Tarchon*, the founder of Tarquinia, the secrets of the *Etrusca disciplina*. Nevertheless, the results of excavations held since 1983 show that *altar α* belongs to the third phase of the sanctuary and that their orientation depends on the cultic arrangement focused on the Archaic stone chest and *wall γ* [50].

During the third phase of the sanctuary (beginning of the 4th century BC), the above-mentioned polychrome wall was partially destroyed and superposed by the south-eastern

corner of a vast terrace in front of the base of the temples. The stone chest was sealed under an altar built in front of the two archaic temples from blocks of local stone, sloping upwards at a constant 340° angle and protruding southwards out of the huge terrace. Given that the altar, together with an adjacent precinct built of red tufa located to the north, was enclosed by the temple's terrace, and had no dedicated access ramp, it could only have had a symbolic value. It probably represented Tarchon's heroön, due to the presence of two holes connecting it with the stone chest underneath in order to receive liquid offerings [51] (pp. 21–22).

According to the dating of its stylistic features, the famous terracotta plaque of the "Winged Horses Group" adorned Temple III in this phase. The identification of the group with the story of Herakles' apotheosis on Mount Oeta, after his burning on the pyre, is supported by two more terracotta fragments sharing the same style, technique and ceramic composition, and by comparison with the iconography of two large vases, which combine all these elements [52].

In addition, the metrological analysis obtained by combining the angle (22°) of the top of the plaque and the width of the base of the pediment (25.5 m) helps to determine the size of the chariot behind the horses and the number of its possible occupants [53]. Consequently, it is clear that the Winged Horses group, including the chariot, was placed in the upper register of the pediment, with the head of the *auriga* in the middle and *Hercle* mounting the chariot for his apotheosis symmetrically positioned behind the horses. In the bottom register, female figures, holding closed vessels, could be positioned around the remains of a possible pyre, according to the dimensions of the other two surviving elements associated with the pediment as a whole [54].

The genealogy of *Tarchon* from Herakles implies his meaningful presence developed in the local tradition: his deeds were recalled by Archaic terracotta fragments (a plaque with the cattle of Geryon and a high-relief pediment with the Hydra) discovered in the temple terrace [55].

Temple IV represents the final refurbishment identified so far; it is late Hellenistic and can be perceived in the ultimate setting of the two arms flanking the stairway to the terrace and in the blocks of black stone (*nenfro*) framing its crucial spots such as a transverse altar built above the cenotaph.

During the Roman period, a series of rooms were built against the northern side of the temple. They hosted the commemorative monument of one of the earlier famous families of Tarquinii citizens bearing Latin inscriptions known as the *Elogia Tarquiniensia*, describing its members' careers and exploits, thus reflecting local Etruscan history.

4. Cultural Landscapes and Archaeoastronomy: The Sky over Tarquinia

The research project was also aimed at exploring the correlations between astronomical aspects and the configuration of urban spaces and monuments in Tarquinia and the Etruscan world in general. Particular attention is given to the two main sites on the Civita plateau illustrated before: the 'monumental complex' and the Ara della Regina sanctuary. The project has, furthermore, led to various results concerning, in particular, the orientation of the Etruscan sacred buildings, with a detailed analysis of the Tarquinian structures [16–18,56–59].

4.1. The Etruscan Astronomical Framework

To date, 40 structures have been analysed and recognised as temples in 16 different locations (Figure 7). The study of this sample has allowed us to observe that most of the temples under investigation (26 out of 40) were oriented along the southern sky arc that extends between the points where the sun rises and sets at the winter solstice. To demonstrate that this orientation of the temples is not just coincidental, we can use probability.

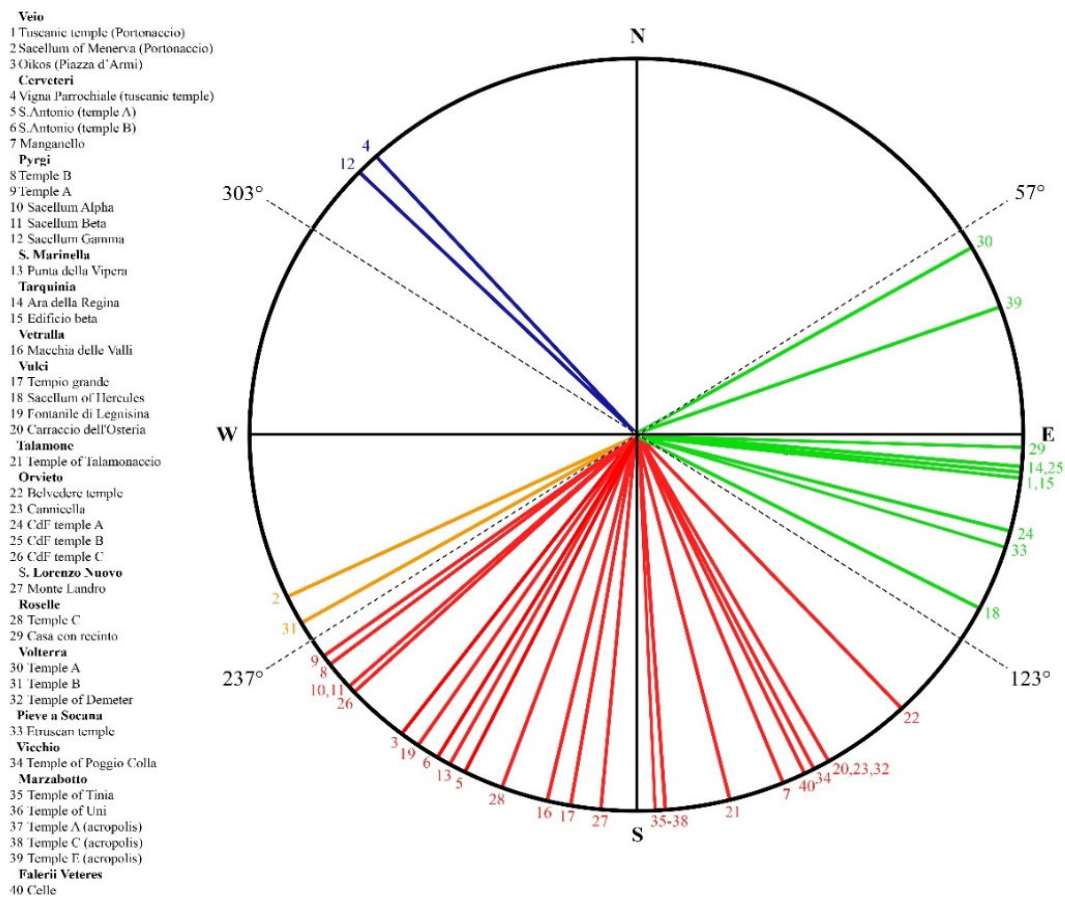


Figure 7. The orientation of Etruscan temples [18].

We have decided to add the orientation of all the 40 Etruscan temples known so far to the statistical analysis. This is supported by the evidence of sanctuaries with temples with different azimuths built side-by-side (for example, Veio-Portonaccio).

We demonstrate that the temples are statistically oriented in two different ways, assuming that they are independent for the above-mentioned reasons:

1. The null hypothesis is that the temples are evenly oriented in the arc 0° – 360° . The null hypo is rejected since p is 1.51×10^{-5} , well below 0.0001. So, the temples are oriented. *Mathematical explanation:* if the null hypothesis is that the orientation of temples is uniform on the interval $[0^{\circ}, 360^{\circ}]$, and each temple is independent, then the number of temples falling in the southern arc of the sky (of size 114°) would have a Binomial distribution with parameters $p = 144/360$ and $n = 40$. If you observe 26 temples in the southern arc, you can reject the null hypothesis in a test of size 0.0001. The p -value, which is the probability under the null of observing 26 or more temples in this arc, is 1.52×10^{-5} .
2. This case does simply rephrase the evidence in terms of the number of standard deviations, which separate the empirical proportion of temples in the southern arc from the null proportion ($114/360$). So, the orientation is statistically not casual. *Mathematical explanation:* if you assume that the number of temples (always assumed independent) in the southern arc is binomial with parameters $n = 40$ and p , the maximum likelihood estimator of p is $26/40 = 0.65$ with a standard deviation of $\sqrt{0.65 \times (1 - 0.65)/40} = 0.75$. So, your estimator for the probability of falling in the southern arc is $0.65 - (114/360)/0.075 = 4.44$ standard deviations away from the null assumption of $144/360$.

This means that Etruscan temples were not oriented towards sunrise during a particular day of the calendar, as is true for most contemporary sacred structures in the Greek

world [60], but that their frontal faces were illuminated by the sun every day for multiple hours a day. On the contrary, the interiors of these structures were never lit by sunlight. Three groups were an exception to this rule:

1. a group of two temples oriented towards the west, or more precisely, along the western sky arc that extends between the sunset points at the solstices. This means that their front faces were aligned with the sunset for two days each year;
2. a group of ten temples oriented towards the east, or more precisely along the eastern sky arc that extends between the sunrise points at the solstices. This means that their front faces were aligned with the sunrise for two days each year;
3. finally, a group of two temples oriented towards the north-west, along the northern sky arc that extends between the points of sunset and sunrise at the summer solstice. This means that their front faces were never touched by sunlight.

These data on Etruscan temples become even more significant when compared to the orientation of sacred buildings in the ancient Greek world, particularly with the temples of the Greek cities of Sicily and Magna Graecia [61–63]. It is noteworthy, particularly for a comparison with the Etruscan world, that they are mainly oriented towards the east, along the arc of the sky where the sun rises. Therefore, only the ten Etruscan temples aligned towards sunrise have an orientation very similar to that of most Greek temples. On the contrary, the comparison between the orientation of ancient Greek temples and all the other Etruscan sacred buildings reveals the peculiar character of the Etruscan tradition for orienting temples [18].

In light of these observations, one might assert that the orientation of Etruscan temples can be framed within the division of the sky according to the solstitial axes and consequently connected to the sun's path. Within this division, it is possible to point out that the majority of Etruscan sacred buildings present a prevalent, but not exclusive, alignment of their frontage with the southern half of the sky and, in particular, with the sky arc that extends between the points where the sun rises and sets at the winter solstice. Now, a couple questions arise: what factors could have influenced the disposition of the Etruscan temples towards this very 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 that all Etruscan temples 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 of the building) clearly differentiated from the *pars postica* (the rear of the building). Between these two, only the *pars antica* appears to be open to the outside, usually through a pronaos formed by one or more rows of columns. In contrast, the *pars postica* is completely enclosed by the walls of the *cella* (or cells) and is designed to contain the statue of the deity, which therefore remained in a condition of semi-darkness.

Starting from this strong frontality and in accordance with Vitruvius, who stated that the orientation of a structure must allow the best lighting for its function and use (*de arch.* I 1, 4; I 2, 7), the choice of orienting the temples towards the arc of the sky where the sun passes every day for several hours a day could therefore depend on the practical will to illuminate the front part of the temple [58]. Such an area could constitute the likely seat of some of the rituals and cults that took place in honour of the divinity. In this regard, it can also be pointed out the importance of the south and the diurnal motion of the sun within the *Etrusca disciplina*, particularly for the orientation of priests during divination practices [17,64].

On the contrary, the two temples' orientation towards the northern arc of the sky, where the sun never passes, could be explained by the catachthonic nature of the cults present in their sanctuaries. In contrast to the facades of the majority of the temples, facing the motion of the sun during daylight hours, these two buildings would be aligned towards the part of the sky where, from a geocentric point of view, the sun is engaged in its nocturnal journey through the regions of the underworld, in agreement with the cults of catachthonic nature present within the two sacred areas.

Regarding the individual orientations, it has been noted that a link between the azimuth of the temples and the associated deities could exist. It can be observed that several temples showing similar orientations are dedicated to the same deities, for example, some of the sacred buildings are devoted to *Uni*, *Vei* and *Hercle* [18] (p. 130). Instead, it seems more complicated to find a connection between the alignments of the buildings and the celestial dwellings of the Etruscan deities, which we know through the Piacenza Liver and the words of Marziano Capella (I 41–61).

Consequently, one of the project's next steps is to try to understand the reasons for this possible link between temple orientation and deities and, more generally, to find explanations for individual orientations. This aim requires a contextual study of the individual sites, in line with what has recently been proposed for the Greek world [60].

4.2. Earth and Sky at Tarquinia

The main sacred areas at Tarquinia belong to the group of Etruscan sacred buildings pointing towards the rising sun and, among these, they are the most easterly oriented. In fact, the Ara della Regina temple and *building* β at the 'monumental complex' share a similar orientation at, respectively, 95° and 97° . In particular, taking into account the height of the horizon, the sun rises in alignment with the huge basement of the temple on the 9th of March and the 3rd of October (we verified the phenomenon on site on the 9th of March 2012, Figure 8). Due to the rapid change in declination (and azimuth at rising) of the sun when the equinoxes are approached, the phenomenon is visible only for a few days before and after, and certainly not at, the equinoxes.



Figure 8. The sunrise in alignment with the axis of the temple of the Ara della Regina on the 9 March 2012.

Further, in both cases, the buildings orientation is not constrained by the terrain's morphology and the data are also too far from due east to think of a cardinal orientation. So, we can be sure that the orientation of the monuments did not originate from symbolism related to cardinal points [16].

Generally speaking, eastward orientations may result from the Greek influence, since most Greek temples are aligned towards the rising sun. This influence could be due to both the links with the eastern Aegean world through the construction technique of the ‘monumental complex’ and the Greek connections with the Archaic Ara della Regina temples, or alternatively because the Tarquinian temples are associated with *Heracle* (Etruscan Herakles), a figure with Greek origins. From the ‘monumental complex’ a gem with a character holding a club in front of a lion was retrieved, together with an ancient inscription, *mi kalan[-]*, which recalls the hero’s apotheosis. In Ara della Regina, on the other hand, the pediment scene is reconstructed with the apotheosis of Herakles on Mount Oeta, taking into account all the surviving elements.

However, the problem of the choice of the specific solar date(s) remains. This may well be result of local practices. Precession does not affect solar alignments, and the slow variation of the obliquity of the ecliptic has a very small effect on the solar azimuths, so that the solar (Gregorian) dates of the alignments differed by no more than two days in antiquity.

Of the two dates, it turns out that the one relating to sunrise around 9 March is of interest. In fact, in these days, festivities and rituals marked the beginning of the year, both in Etruria and Rome [65]. Festivities were linked to the dances of the *Salii*, priests armed with figure-eight-shaped shields (called *ancili*) who danced around the city to mark the urban space and reaffirm the relationship with the royal power that controlled it. Well-known to the Roman world through literary sources [66], several scholars have found similarities between these priests and some figures of dancing priests identified in the Etruscan world, both through the funerary equipment (such as in Veii) and through iconographic evidence such as the bronze vase of Bisenzio on which a dance linked to the delimitation and marking of space is represented in three dimensions [67–69]. This idea of dance, connected to the city space and the royalty that governed it, is developed in Etruria in different forms during the Orientalising period, up to the famous scene on the Etruscan-Corinthian oinochoe ‘della Tragliatella’ [70]. An echo of this theme is also found in Tarquinia in the overall composition of the ceramic set of the Tomb of Bocchoris, still dated within the first quarter of the seventh century BC, with acrobats, theory of warriors and markings of the perimeter by means of sacred boundaries [71]. This priesthood was also linked, as Virgil testifies (*Verg. Aen.* VIII 285–305; *Serv. Aen* VIII 285), to the figure of Herakles and his apotheosis, which is strongly present in both sacred areas of Tarquinia. The connections between Herakles and the festivities of the *Salii*, and between Herakles and the Tarquinian temples, could thus have conditioned the orientation of the buildings towards the sunrise on the 9th of March.

Finally, a further link between Herakles and the orientations of the sacred structures of Tarquinia may come from the different alignment presented by the *altar α* of the Ara della Regina, located at the southeast corner of the terrace of Temple III. Excavations show it was built at the beginning of the 4th century to cover and seal an Archaic stone chest, which, as mentioned above, is probably the cenotaph of *Tarchon*, the hero-founder of Tarquinia and a descendant of Herakles.

The *altar α* and the chest under it lie on the 160°/340° line. In this case, there is no recognisable geo-morphological reason for their orientation, which, therefore, could likely have been chosen based on symbolic criteria [16]. By reconstructing the sky at Tarquinia in the 5th–4th century BC, it can immediately be seen that the northern orientation of the altar (340°) was pointing towards the region of the sky where the stars of the Herakles constellation were seen to set. Precession was slowly completing the task of making Herakles a non-circumpolar constellation, so only the stars of the feet were still circumpolar. The constellation is readily recognisable, although it does not have first-magnitude stars; the huge figure of the kneeling men was seen to “sink” at the horizon in alignment with the altar, with *η-Herculis*, a star placed at the base of the left leg of the figure, setting with the northernmost azimuth.

We lack reliable evidence for the existence of Etruscan constellations. As for the Greek world, apart from several references to asterisms and stars in Hesiod and Homer, the earliest reliable historical information comes from Eudoxus (writing around 400 BC), preserved in Aratus's work written around 270 BC [72–74]. Here, the constellation is presented as a kneeling (or one-leg kneeling) man called *Engonasin*, the One on his Knees. The first explicit identification of the same stars as Herakles known from written sources occurs later with *Heraostenes*. In contrast, a part of the same constellation might have been identified with a kite in Ovid's work [75]. On the other hand, Hyginus mentions that the same constellation was called Herakles by Aeschylus, thus, already at the end of the 6th century [16] (pp. 451–452).

In conclusion, the orientation of the symbolic altar in the terrace at the Ara della Regina that preserves the memory of *Tarchon* could really be the result of the connections between *Tarchon* and Herakles. A difference of a century between the altar at Tarquinia and the literary sources that associate the constellation with a kneeling man in Greece, in the absence of information about an Etruscan system of constellations, does not stop us from considering whether this link is more than coincidental.

5. Discussion and Conclusions

As discussed above, the idea of Herakles in his apotheosis was introduced at Tarquinia in the 'monumental complex' in the first quarter of the 7th century BC and continued in the city at least as late as the beginning of the 4th century BC when the pediment of Temple III in the Ara della Regina sanctuary was created, depicting his apotheosis on Mount Oeta.

If this set of ideas is correct, we can see how people at Tarquinia saw their city as an entity that held and sheltered every aspect of the community's life, including their relationship with space, time and the cosmos. The longevity of this concept can be perceived through a net of ritual behaviours and memories connected to themes of apotheosis, heroisation and royalty, from the Orientalising period (the petrification of the 'monumental complex') to at least the Classical period (Temple III in the Ara della Regina sanctuary). These ideas shaped the architecture and urban form of the city as much as geomorphology did.

The preliminary results of this study allowed us to identify aspects of significant historical and cultural value and the expression of a strong identity. These intangible characteristics must be placed on the same level as the more tangible ones expressed above as a concrete manifestation of cultural landscapes. In fact, the relevant aspect of the question lies in knowing how to define it and the techniques for its maintenance, as well as the methods and times of protection and conservation, once an asset's historical and cultural value has been recognised [76].

In such an articulated panorama, where every element that expresses a value of civilisation can be counted among what is rightfully considered a cultural asset, indifferent of whether it is tangible or intangible, it is not surprising that the need to identify suitable means to achieve the conservation of this great heritage has arisen. This issue assumes particular significance above all because the protection and safeguarding of cultural heritage represents a way like any other of distinction that can produce negative effects or repercussions in maintaining cultural traditions. One of the risks is the possible elimination of these values, which is one of the elements we must protect. One of the negative effects can be the difficulty of knowing how to identify the presence of a particular cultural expression, highlighted by a specific cultural context, and whether it can be traced back to the architecture, archaeology or culture of a place or landscape.

Considering the importance of these aspects, the urge is to identify and open to collaborations, particularly concerning the aspects of the soil, in order to develop effective tools and systems to determine which type of use is suitable for a territory such as that of Civita di Tarquinia. Regarding the destination for agricultural use, for example, solutions such as no-tillage agriculture or sod seeding have proved to be adequate in other contexts, guaranteeing effective results both from an agrarian point of view and for the conservation of the cultural landscape [77]. In conclusion, it is necessary to think in terms of protection, devel-

opment and productivity for a territory that is so fertile and rich in cultural, environmental and naturalistic attributes, but this must be done in consideration of the real limits and the objective extension of the Etruscan metropolis: the research conducted over the centuries has brought to light only a small part of its immense buried archaeological potential.

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