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Keywords: megalithic
building; Iron Age
technology; sacred
geometry, virtual
architecture, Geographic
Information System (GIS),
landscape archaeology

Research

The Megalithic Building of S. Erasmo di Cesi: Architecture, Astronomy, and Landscape

Abstract. One of the most enigmatic megalithic buildings of Italy is the structure which lies on the S. Erasmo hill near Cesi, in Umbria, a huge complex encompassing an area of around 8000 square meters and enclosed by refined cyclopean walls. Although its date is uncertain, suggested dates comprise the Iron Age and archaic period, down to the third century B.C. The building's function is also uncertain. Usually identified as a fortified structure, in fact there is a megalithic platform at the southern end of the enclosure which could have served as foundation of a temple or palace and, from the top of Monte Torre Maggiore, a complex of temples dating from the fourth century B.C. overlooks the hill. Similar combinations of megalithic buildings resting half-way to temples placed on high peaks are known to exist. In order to clarify the function of this structure and its position in relation to the surrounding landscape, with particular attention to its visibility and to the directions of visibility from the complex, as well as to the possible astronomical alignments, we present a multi-disciplinary approach to the study of the S. Erasmo complex, which includes the mapping of the sky at the various possible epochs of construction, the creation of a digital model of the landscape in forms of digital maps using Geographic Information System technologies, and a 3D model using various 3D software packages.

1 Introduction

The so-called *polygonal* (or *cyclopean*) walls are huge walls made out of megalithic blocks joined together without the use of any kind of mortar. This technique made its appearance during the Bronze Age in Anatolia and in the Mycenaean citadels, like Mycenae and Tiryns; in some cases, the defensive purpose of huge walls constructed in this way is clear – for instance in the fortified Mycenaean site of Gla – but in other cases the citadels more likely symbolised the pride and power of the warrior aristocracy which inhabited them; it is indeed only at the end of the Mycenaean civilization (around the twelfth century B.C.) that settlements like Mycenae and Tiryns were provided with water reservoirs, showing new requirements of a defensive character (see e.g. [Castleden 2005]).

Less well known, but equally impressive and magnificent, are the polygonal walls visible in many Italian towns, spread throughout an area which extends across the whole western part of central Italy from Umbria to Campania. All such towns made their first appearance in written history through the works of the Roman historians, who mention their conquest. Before the Roman conquest however, the ethnic scenario was extremely complicated.

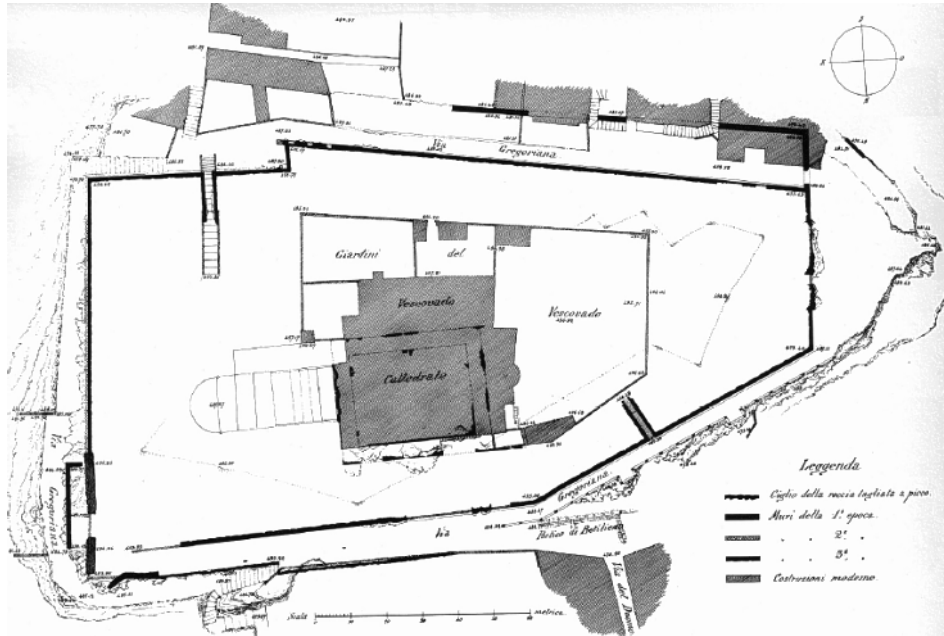


Fig. 1. Plan of the Alatri acropolis (a 1895 survey by G. Giovenale, adapted from [Zevi 1976])

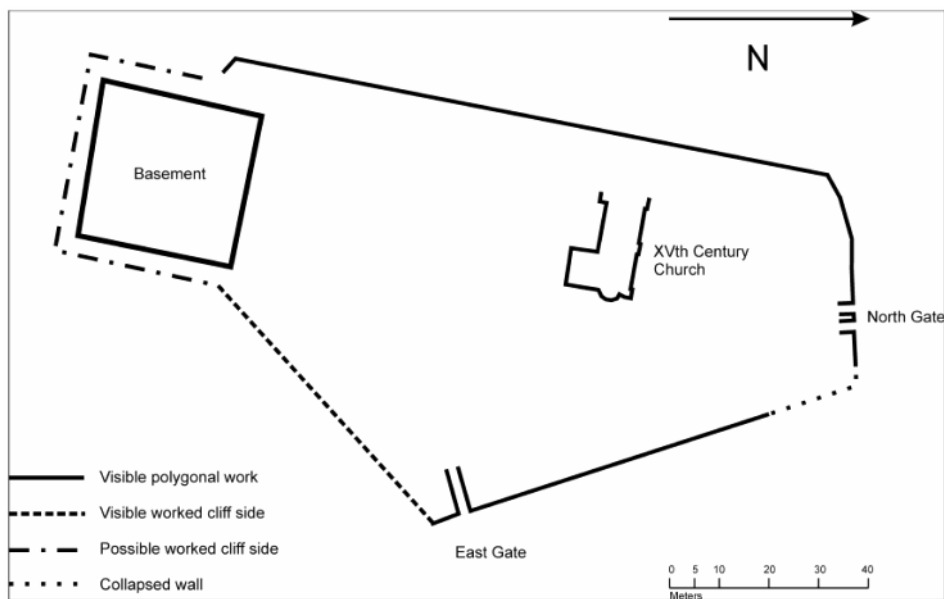


Fig. 2. Schematic plan of the structure on S. Erasmo according to the recent survey

Indeed, leaving aside the Latin tribes to which the Romans themselves originally belonged, the region was inhabited by many peoples of uncertain origin, each with its own culture, active in cultural and commercial exchanges with the Etruscans and throughout the Mediterranean area. As a consequence, the dates of construction and even the builders of the megalithic walls in Italy have so far *not* been identified with certainty, although many archaeologists currently believe that the builders were actually the Romans, and therefore the dates have to be moved back to as late as the intermediate Republican Roman period, essentially between the fourth and the second century B.C. In many cases, however, this belief is not actually based on firm evidence; in particular, a readjusting of the dating to Roman times appears to be particularly problematic for the so-called “acropoli”, huge megalithic buildings (“citadels”) comparable in dimensions and structure to those, for example, of Tiryns, and situated on prominent hills or promontories. The two most famous are the so-called acropoli of Alatri and Circei, both in southern Lazio, and both usually interpreted as fortified enclosures. In recent years, the problem of dating and interpreting these megalithic monuments, as well as others of the same kind, has been reassessed, using the tools provided by archaeoastronomical analysis and, more generally, in an attempt to interpret the motivations at the basis of their construction in terms of the geometry of the settlements and of their relationship with the landscape [Magli 2006, 2007]. The picture which starts to emerge from this ongoing work is that these constructions, rather than being fortified enclosures, were symbolic complexes connected with the Italic (pre-Roman and early Roman) religion, a religion which probably included important references to the sky. A case that is particularly clear from this point of view is that of the Alatri acropolis, a huge polygonal building located on a hill at the centre of the town [Zevi 1976] (fig. 1).

The layout of the Alatri acropolis is trapezoidal, and it has only two entrances, a major gate on the south and a postern gate on the northwest sector. It is free of inscriptions of any kind, and nobody knows for sure who built it, or when. On the top of the hill, inside the acropolis, another megalithic structure exists, probably the basement of a temple, constructed with enormous stone blocks perfectly cut and joined. In the 1980s it was discovered that the Alatri acropolis was planned on the basis of geometrical and astronomical alignments, which start at a point located on the north side of this basement [Capone 1982; Aveni and Capone 1985]. In particular, the line connecting this point with the northeast corner of the acropolis is aligned to the rising sun at the summer solstice. The sun at summer solstice was near the Gemini constellation in the first millennium B.C., and – perhaps not by chance – the entire geometric plan of the acropolis resembles the peculiar polygonal boundary of that constellation. Further, it has been shown more recently that the whole building may have been conceived in accordance with the celestial cycles, since the eastern and western side of the acropolis are oriented cardinally, while the northern and southern sides have features which point, respectively, to the rising of the bright star Capella and to the bright asterism of the Crux-Centaurus [Magli 2006]. The time validity of such alignments depends, of course, on precession, but can be reasonably assumed to be between 700 and 400 B.C., thus before the Roman conquest of the area.

2 The megalithic building of S. Erasmo

The Terni lowland had been inhabited since ancient times, and it was only in the fourth century B.C. that the area suffered the Roman expansion. Once they settled here, the Romans built one of their most renowned engineering works: the deviation of the river

Velino, which created the most famous artificial cascade of the ancient world, the Marmore Waterfall.

To the north, the landscape of the Terni valley is dominated by the mountains called *Monti Martani*, with the rounded acme of Monte Torre Maggiore (1170 m) and a steep spur of rock, called S. Erasmo, beneath which the ancient town of Cesi is located. The Martani mountains are an extremely significant “presence”, visible and prominent from everywhere across the lowland; it is therefore understandable that since ancient times (at least since the sixth century B.C.) there has been a center of worship on the top of the mountain. Without a doubt it was also active in the Roman period, as evidenced by the remains of two impressive temples. The temples were re-built in Republican times on a pre-existing sacred area, which included a cave and a rift of natural rock adapted as an altar. When the sacred mountain is approached from the south, the ascent begins at Cesi, which preserves traces of polygonal walls and a late Bronze Age necropolis (ninth century B.C.). Indeed, the whole area was inhabited by ancient Umbrians, and was perhaps abandoned with the Romanization and the foundation of the Roman town of Carsulae, a few kilometres west, located on the *Consularis Via Flaminia*. Half-way up the ascent from Cesi along the road which leads to the summit of Torre Maggiore one encounters the spur of rock of S. Erasmo, which hosts an imposing megalithic building about 160 meters long (fig. 2).

The building has the form of a six-sided polygon, similar to that of the acropolis of Alatri, skewed, however, anticlockwise 90° (the shorter sides are the northern and southern ones) to comply with the general orientation of the rocky outcrop.



Fig. 3. The northern front of the megalithic building, with the main gate (today occluded from inside)

It occupies a plateau of about 7000 square meters, and it is in a relatively good state of preservation; however, the southwest side is not accessible, and it may be that the southern side – which overlooks the steep promontory and is absolutely unreachable – was only roughly regularized. The north, northeast and northwest sides are constructed with a fine polygonal masonry, while the southeast side is essentially cut straight into the living rock, an equally impressive engineering feat. The complex was, exactly as Alatri and Circei (and, for that matter, also Mycenae and Tiryns), furnished with only two gates. The main one is that located on the northern front (fig. 3).

The main gate is more than three meters wide, divided into two entrances by a sort of pillar made out of squared blocks (the entrances were closed up in later times by a brick wall). The postern gate is located in the northeast wall and corresponds to an ancient terraced pathway that ascends the hill along the eastern flank. The internal space enclosed within the walls appears today as a leveled meadow, and the only visible structure is the small medieval church of S. Erasmo. However, an ancient structure certainly existed on the edge of the rock at due south (fig. 4). Nothing remains standing, but still today a huge megalithic platform is visible. Of roughly square form, it is integrated into the southern edge of the external walls.



Fig. 4. The view looking south from the interior of the structure, showing the square platform

3 The survey

The megalithic building of S. Erasmo is undoubtedly one of the most enigmatic structures of this kind in Italy, and the date when it was built is extremely uncertain. However, in accordance with the theory which claims the Romans as the builders of almost all polygonal walls in Italy, some scholars believe that it was constructed by them as a fortified fence “to guard the territory” after the conquest; as a consequence, they moved the

date of the structure back to as late as the full third century B.C., while others – more reasonably – identify it as a settlement of the Umbrians, on the basis of a text by Pliny who mentions a site located *supra Iteramna* (i.e., over Terni) called *Clusiolum* (see [Bonomi Ponzi 1988, 1989] and references therein). In any case, it appears that most scholars consider the “strategic” purpose of the construction as reliable, although a few, such as Buettner [1987], cautiously propose a cult function instead (see the discussion section below for details). In any case, the building is much less studied than similar ones such as Alatri and Circei, and it has never been excavated. Some maps of the complex have been drawn in the past, starting from the seventeenth century (for example by F. Stelluti in 1637), others in the nineteenth century (by Virginio Vespignani) and in the twentieth (by Schmiedt [1964]). The most recent is the plan created by Lilli [2003], who defends the idea that the center was a fortified enclosure. Lilli’s is a detailed study of the complex, which also includes a study of the remains of polygonal walls that are located downhill near the town of Cesi, proposing that they formed an integrated defensive complex together with S. Erasmo, seen as a small fortified village.

All in all, and also in order to clarify the meaning and possibly the date of construction of this interesting site, we felt that a complete re-evaluation of the complex using the techniques of Geographic Information System (GIS) landscape archaeology was definitively worthwhile, and thus we carried out a multi-disciplinary approach for the study of S. Erasmo. Our approach includes a complete transit survey of the building and of the horizon, aimed at studying the possible astronomical references of the structure; the creation of a digital model of the landscape in the form of digital maps using GIS technologies, aimed at clarifying the position relating to the surrounding landscape, with particular attention to its visibility and its directions of visibility, with the final goal of constructing a full 3D model. The aim of the present paper is to present those results of the survey that are especially related to the geometrical and the astronomical references of the structure, and therefore are of special interest regarding its interpretation.

4 The View-shed and the Astronomical Analysis

The GIS-based view-shed analysis is a technique that can be applied to give a general description of the visibility of a structure from the landscape, and vice-versa. In the present survey we have taken into account a maximum reference distance of 20 km, which is a reasonably safe value for the visible horizon due to the placing of the structure on a prominent hill. The analysis makes use of a digital elevation model (DEM) that represents the landscape; an algorithm is applied to it which returns a celled raster map of 0’s and 1’s; wherever there is a 1 it means that a direct line of sight is present. The analysis revealed that the most visually predominant elements were the southeast, south and southwest walls of the platform, together with the west wall of the acropolis. Among the various features and details of this type of analysis, it is especially interesting to note here that it is possible to simulate the view-shed of the same area without the presence of the building, as it would have appeared originally, before the construction. It is then pretty clear that the site was deliberately chosen to enhance those characteristics, already present in the rocky outcrop, of being the predominant element of the surrounding landscape (fig. 5). This is indeed a quite strange choice for a fortified village; it is, however, very much in accordance with the will to construct a symbol of power.



Fig. 5. The rock outcrop with the S. Erasmo building (arrow) as viewed from the Terni valley



Fig. 6. Author Nicola Schiavottiello surveying the steep north-east corner of the building, looking north to the Martani mountains

This impression is immediately confirmed by even a superficial inspection of the site. Indeed, the whole complex gives the impression that, once its position was chosen and its general north-south orientation was dictated by the rock, all the details of the form of the building were constructed exactly according to the will of its planners, rather than in conformance to the natural relief. This is clearly confirmed by direct survey and holds true, in particular, for the northern front and the northeast and northwest sides, which were built with a “filling” technique (fig. 6), and for the southwest side, which was cut into the rock with impressive engineering skill and follows the ridge of the outcrop but, strangely, seems to isolate the profile of the platform purposely with a traversable passage. Therefore, the geometry of the whole structure appears to have been inspired by symbolic, rather than strategic, needs. Consequently, in order to verify this, we have performed a complete transit survey of all the possible astronomical alignments of the structure, considering the azimuths and the altitude of the horizon of all relevant elements of the building. In what follows we consider individually the megalithic building and the platform.

The megalithic building

- The northern side is quite precisely oriented due north. The deviation is indeed of the order of $1^{\circ} 15'$ west; since the direction of the wall is by no means dictated by characteristics of the terrain (such as rocky outcrops or steep slopes) it is extremely likely that this cardinal orientation was intentional and due to symbolic reasons. As a matter of fact the front of the structure appears as a monumental façade situated at the turn of the ascending road; in front of this “façade” a terrace sustained by a second wall probably created a ramp to facilitate access to the main gate, rather than (as suggested by some authors) being a sort of advanced barbican protecting the gate.
- The northeast side points to an azimuth $73^{\circ} 48''$ which, with an altitude of the horizon around $5^{\circ} 00''$ degrees, is aligned to the rising of the stars which form the basis of the Gemini constellation. Actually, an observer looking from the corridor of the northwest gate at a reference date of (say) 500 B.C. would have seen the “base” of the polygon (the star gamma-Gemini) in alignment with the side of the building, forming a fascinating “heavenly” copy of the construction.
- The azimuth of a line of sight of an observer located on the northwest side points to an azimuth of $281^{\circ} 26'$ which, with an altitude of horizon practically zero, points – perhaps by chance – to the setting of the bright star Aldebaran, of the constellation Taurus, in the same period.

The platform

- The platform is not perfectly square and the angles formed by the sides are not strictly right angles. Not all of the sides are measurable with certainty however, due to the non-optimal state of preservation of the structure; in any case, to the best of our efforts we could ascertain that the internal angles stay within $\pm 1^{\circ} 30'$ from 90° and that the sides remain within ± 2 m. from 30 m.; therefore it can be certainly referred to as a squared building. The platform is skewed towards the east circa 10° (east side) and $11^{\circ} 30'$ (south side); it exhibits therefore a “roughly” cardinal orientation.

5 Discussion

The S. Erasmo megalithic enclosure was built with the very same technique used at Alatri and Circei, and shares with these two structures the same impression of being a place of pride and power rather than a defensive building; it may be further noticed that, at least today, no traces of a closing mechanism could be found in the lintels of the gates, a quite curious fact indeed (usually, the lintels of megalithic gates retain traces of L-shaped embeddings which were used to lock blocking posts, and of frames to insert the doors). In spite of these facts, only a few authors have cautiously proposed that the building might have been devoted to a cult rather than to defensive purposes (see [Buettner 1987] and references therein). This interpretation is sustained by the presence of the podium, which may have hosted a temple, and by the presence of a double entrance at the main gate, a very peculiar characteristic which is of course *not* dictated by defensive needs, and may allude to a “twin” cult located inside. Consequently, Buettner proposes the possibility that the building might have been dedicated to the cult of the divine twins, the *Dioskouroi* Castor and Pollux, the two divinities that were identified with the constellation Gemini. Their cult can be traced back to Mycenaean-Minoic times, and it filtered into Italy very early, as an inscription found in Lavinio (dated to the sixth century B. C.) testifies, and by the *History* of Livius, who mentions Castor and Pollux fighting as allies of the Romans at the Battle of Lake Regillus in the beginning of the fifth century (consequently, the temple to the Castores – the Latin name of the divine twins – was erected in the Roman Forum). Cesi is actually located in an area where the cult of Gemini has deep roots. In fact, apart from the name of the nearby village of San Gemini (which might have had a different origin) in Carsulae, there was a twin temple dedicated to the *Dioskouroi*. Since the Roman foundation of this town apparently occurred when the Umbrians were conquered, it appears at least possible that the twins were already worshipped in the area (unfortunately, it is still uncertain which divinities were worshipped in the Monte Torre Maggiore temples).

We believe that the results presented here strongly reinforce this interpretation of the S. Erasmo complex as a pre-Roman sacred enclosure. Indeed, the monument exhibits a geometrical plan which is not connected with any conceivable defensive purpose, and turns out to have clear connections with the sky, which can hardly be considered as a chance occurrence. These two facts clearly point to a symbolic, religious function. In particular, the plan of the construction is very similar to that of the acropolis of Alatri, where, as we have seen, connections with the Gemini constellation are found, and it is very likely that the S. Erasmo building deliberately included a reference to this asterism as well.

As far as the interpretation of the square platform is concerned, we recall that a fundamental role in pre-Roman and Roman religion was played by the *aruspices*, the priests learned in the *Etrusca Disciplina*, who practiced the art of reading the will of the gods in the flight of the birds and in the liver of sacrificed sheep. The sacred workplace of these priests was the *auguraculum*, which was a square (or rectangular) platform, usually without any walls, situated in a prominent position with respect to the landscape and the town. The *Disciplina* is known to us essentially through the writings of Roman authors, such as Cicero, but the tradition of auguracula is very old, since this kind of building is documented both in Roman times (for instance in Cosa, first half of the third century B.C.) as well as among Italic people, for instance in Meggiaro, near Este, a zone once inhabited by the people called Veneti, where an auguraculum dated stratigraphically at the

end of the sixth century B.C. has been recently uncovered [Ruta Serafini 2002]. A fundamental duty of the aruspices was connected with the cosmic order, and consisted in the individuation of a terrestrial image of the heavens (*templum*) in which the gods were “ordered” and “oriented” in eight (or sixteen) radial directions starting from due north. As a consequence, these buildings show a “tendency” of orientation to the cardinal points; for instance the Cosa auguraculum is a square platform oriented 12° east of north [Brown 1960], while the Meggiaro auguraculum is a rectangular enclosure whose diagonal is also oriented about 12° east of north, so that the longest sides of the building align 45° south of east, one of the eight main divisions of the templum. It is thus seen that the square platform in the S. Erasmo enclosure might be interpreted as an auguraculum as well, an interpretation which, to the best of our knowledge, is proposed here for the first time.

Finally, we mention that, very recently, a new interpretation of the Circei acropolis has been proposed [Quilici and Quilici Gigli 2005]. This megalithic enclosure, which is located at the halfway point of the ancient path leading from the town of Circei to the temple of the Goddess Circe on the uppermost hill of the promontory, instead of being a fortified enclosure as is commonly believed, might have been a sacred precinct (perhaps containing a sort of sacred wood), devoted to Circe herself or to Venus. The position and function of S. Erasmo, located halfway between Carsulae-Cesi and the sacred complex of Monte Torre Maggiore, looks pretty similar.

Acknowledgments

The authors gratefully acknowledge Dr. Laura Bonomi Ponzi, Director of the National Archaeological Museum of Umbria, and Dr. Rosa Maria Salvatori, Head of the Superintendence for the Antiquities of the Umbria Region, for their kind help in providing bibliographic material and for the permission to carry out the survey on which the present paper is based. Special thanks go to the archaeologist Orlando Cerasuolo who provided the Total Station and kindly helped to achieve the topographic survey at a professional level.

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Giulio Magli is a full professor in the Faculty of Civil Architecture of the Politecnico di Milano, where he teaches the only official course of Archaeoastronomy ever established in Italy. He earned a Ph.D. in mathematics at the University of Milan in 1992 and his research activity developed in the field of General Relativity Theory, with special attention to problems of relevance in astrophysics. In recent years, however, his research interests have focussed mainly on archaeoastronomy, with special emphasis on the relationship between architecture, landscape and the astronomical lore of ancient cultures. On this subject he has authored several papers and the book *Mysteries and Discoveries of Archaeoastronomy*, published in 2005 (in Italian) by Newton & Compton; the English edition will be published in fall 2009 by Springer-Verlag, New York.

Nicola Schiavottiello was born in Anzio, on the southern coast of Rome in a zone rich in Roman and pre-Roman history, and grew up with a natural passion for history and archaeology. He joined this passion to that for graphic design, moving to England and obtaining a BA in Computer animation and visualization in 2002. Subsequently he has worked extensively on the subject of Cultural Heritage in digital content displays for museums for the Virtual Landscape Centre at the University of Stirling. In 2007 he completed a Msc. in Computing Archaeology at the University of Southampton (UK), with a thesis on pre-Roman monuments of Central Italy. Currently he works for SPACE, an Italian information technology firm specialized in Cultural Heritage.