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Drawing and Archaeology: new research objectives

The case of Civita Musarna the only full-discovered Etruscan city

GIUSEPPINA ENRICA CINQUE, HENRI BROISE, VINCENT JOLIVET

1. Territorial and urban framing and determination of the analytical instruments

The town lies on a plateau of 5ha, bordered to the north, west and south by steep slopes of which that the one on the west ends on the left bank of the river Leia. At the east, out of the city, the terrain keeps flat, and right on this side are preserved the remains of the biggest defensive works, of a type for the first time fully documented in Etruria. Most external is a ditch, wide ca 16m to a maximum depth of 6m, lined to the west by a first defensive wall; the main wall is reinforced by an *agger* width of 12m. Along the remaining sides, thanks to the presence of the steep slopes, a single wall constitutes the fortified structure. The urbanized area, which occupies the whole extent of the plateau, was accessible through at least two gates, fully excavated, located north-east and south-east; the arrangement of the town and the surrounding fortification makes it likely the presence of a third gate, probably opposite to a pedestrian door, traces of which are preserved in the western wall.

The archeological excavations, together with magnetic and electric prospections realized by Alain Kermoravant, revealed clearly that the urbanized area presents orthogonal characters, underlined by bipartition along the north-south axis. Such division is underlined by a highway median, 6.7 in width, whose intersections with five

auxiliary axes east / west, each of them width about 4m, define the boundaries of blocks 12 distributed in two rows.

The perimeters of the blocks have always at least one oblique side, or even mixtilinear, dependent, to the east, by the limits of the foundation tufa, and by the limits of the plateau in the other sides. Among the blocks and the fortification can be seen some sections of a perimeter road; the smallest identifiable sections of that road have a width of about 2.8 meters and the road seems to have been designed to create a connecting ring for the east-west streets. From the north/east gate, a further street presents an oblique trend and directs towards the central axis.

A rectangular square constitute the central connection of the city; the long sides of the square are on average parallel to the north-south axis and pass through the center of the same square. In general, the features described above recall those documented for the contemporary Roman colonies. From this it is possible to roughly estimate the number of permanent inhabitants: the *Ostia castrum*, within an area of 2.44ha, which is a bit less than half that of Musarna, housed about 300 settlers. Already, the similarity

with the Roman colonies suggests that the city was founded beginning with a project realized with predetermined and common rules and principles. The urban orthogonality implies that the implementation of this project took place following very similar geometric procedures, if not exactly the same operational practices as applied in the Roman *limitatio*. Everything gets a first confirmation observing the similarity between Civita Musarna and one vignette of *Liber Diazo-graphus* (*ps Agennius Urbicus, Comm. de agrorum qualitate, Codex Arcerianus, f.39r*) showing the typical case of a fortified city, built on a plateau and surrounded by a river and steep slopes.

Based on these considerations the first moves of the study have started from historical sources (Varro *Lat.*, V, 143, 1-4; Plutarch, *Rom.*, XI, 2□4), from which it is deduced that after the inevitable rite, the *agrimensores* traced a principal axis, preferably the north-south one (Front., *Limit.*, 1-2; Hyg., *Constit.*, 132-135 Th). Later on, they delimited urban limits and then dug a sacral hole (*mundus*) in the central point established by the priests. The subsequent operations aimed to the determination of the urban borders

through the positioning of the access gates, generally, arranged *in morem castrorum ut viae amplissimae limitibus diriguntur*, i.e in line with the *cardo* and *decumanus* (Hyg., *Constit.*, Th p. 144-145= La p. 180-181) and aligned with the limits of the colonized *ager*. With reference to the instruments used, old traditions refer to practices followed with a plow tied by a rope attached to the *mundus* center, i.e. a process of concentric circles whose nodal points (often adopted as angular origins of public buildings) correspond to the intersections of two main orientation axes. From the most ancient traditions we can deduce that other instruments adopted include the knotted rope, probably with thirteen knots and twelve intervals, each of them of a cubit length ($1 + \frac{1}{2}$ *pes*), useful for the formation of the Pythagorean triangle. Furthermore, it is also known the use and the graduated rod (generally equal to a cubit), whose size depends from the existing reference model existing in the hegemonic city. From this, of course, it follows that the unit of measurement (*pes*) can vary from place to place and, in this case, therefore, the unit of measure should be that corresponding to the land of Tarquinia.

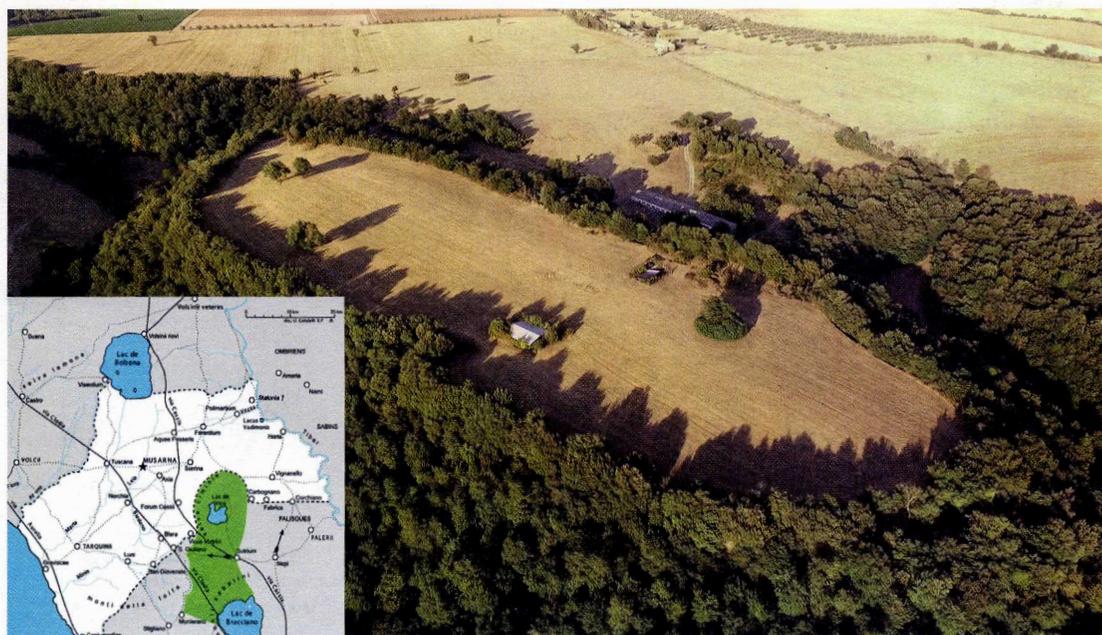
Among the instruments, besides, we cannot omit the *groma*; tool for the determination of the orthogonal system, transmitted to the Etruscans by the Greek world, and subsequently adopted in Rome. With specific reference to Tarquinia, fi-



nally, we must mention *Tages* - white-haired baby born from clumps of earth raised by a plow, revealing the Etruscan discipline - whose legend would have originated in Tarquinia, as referred by Cicero (*Div. II, 23, 50a*; cfr. Paul. Fest. 492, L 6-7): *Tages quidam dicitur in agro Tarquiniensi cum terra araretur et sulcus altius esset impressus exstitisse repente et eum adfatus esse qui arabat. Is autem Tages, ut in libris est Etruscorum, puerili specie dicitur visus, sed senili fuisse prudentia. Eius adpectu cum obstipuisset bubulcus clamoremque maiorem cum admiratione edidisset, concursus esse factum, totamque brevi tempore in eum locum Etruriam convenisse. Tum illum plura locutum multis audientibus, qui omnia verba eius exceperint litterisque mandarint. Omnem autem orationem fuisse eam qua haruspicinae disciplina contineretur; eam postea crevisse rebus novis cognoscendis et ad eadem illa principia referendis. Haec accepimus ab ipsis, haec scripta conservant, hunc fontem habent disciplinae.* Furthermore, as is known, the informations conveyed by Cicero, when associated with the so-called “prophecy of Vegoia” preserved by *Gromatici Veteres* (La, p. 348–350) makes it clear that the roman *limitatio* derives directly from the Etruscan world: *Cum autem Iuppiter terram Aetruriae sibi vindicavit, constituit iussitque metiri campos signarique agros. Sciens hominum avaritiam vel terrenum cupidinem, terminis omnia scita esse voluit. Quos quandoque quis ob avaritiam prope novissimi octavi saeculi data sibi homines malo dolo violabunt contingentque atque movebunt.* All of this suggests, therefore, that the principles of urban and regional regulations have found their main center of diffusion precisely in Tarquinia and, so far, Civita Musarna is the only example available to ascertain these principles.

2. Urban area and agrarian limitatio

During previous investigations (Broise, Cinque, Jolivet, 2017a-b), we have considered, identified and verified some of the tracking cornerstones of Civi-

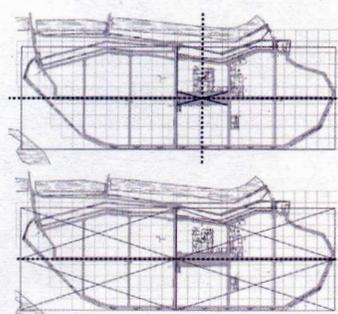
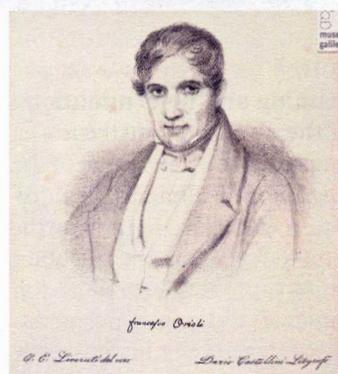


ta Musarna. Also, in particular, we have determined the base module and, consequently, the unit of measurement used, at least in the Tarquinia’s territory, equal to 27.3cm; dimension, this, that very little deviates from the one evidenced by the ancient sources as the *pes oscus* (also said *italicus*), considered equal to 27.5cm. In this regard, and remembering Musarna’s history, it is useful to read La Regina (1999, p. 5) when he states that “La differenza risulterà non tanto dall’incidenza dell’unità di misura (il piede osco di m 0.275, in luogo del piede romano di m 0.296), visto che il piede ‘osco’ è in realtà una misura comune, in uso anche a Roma e in ambiente latino fino in epoca medio repubblicana”. With reference to this dimension, obtained through analysis and comparisons between the masonry thicknesses and road widths, moreover, we also carried out the necessary checks on the very few cases, known and recognized, of Etruscan settlements, from which it applies in a fully satisfying way. One relevant issues regarding the difference, equal to 24°, between the orientation attributed to the longitudinal axis and the main geographic axis north-south, was also previously analyzed, evaluating also the possibility of an original amplitude decrease, of about 8°, in relation to the extensive evidence obtained from the superposition of the urban plan over the Etruscan’s cosmic scheme. This evaluation, waiting for a more appropriate verification in the

astronomical field, comes from the identification of the most likely location of the *mundus*, urban center, verified through geometric considerations and the positional ordering, with respect to the geometrical mesh. The latest results, the subject of our current presentation, aiming to check the geometric mesh when extended over the territory - adjacent and surrounding -, which appears to be an important outcome in both fields of Etruscan and *agrimensoria* research.

Analyzing a large portion of colonized *agger* based on what was found around the city in the course of the archaeological investigations are noticed some signs, widespread and significant, definable within three groups. Each group corresponds to a single orientation whose rotations depend on the presence of the Leia River. Overlapping the geometric mesh (divided into *heredia* = 240x240 *pedes*) above such evidence allows to observe a surprising strict adherence. It is also remarkable that the mesh on the portion of the territory in the same bank of the river has the diagonal mutually parallel and perpendicular to what is believed to have been the position of the of north/south geographical axis adopted in the process of foundation.

Assuming that the north-south axis position is the same obtained by the superposition of the map map of the city on the Etruscan cosmic system, i.e. rotated 8° north than the current, initially we can appreciate how the necropolis fall in the area of



the celestial heavenly gods. Furthermore, by tracing concentric circumferences centered on the *mundus*, it is possible to observe the particular geometric coincidences that elucidate the application of a symbolic logic to the tracking of the city and of the necropolis. Even more interesting and innovative are the results that emerge after application of the mesh (with module formed by square = 10x10 *heredia*) to the portion of the territory of Tarquinia in which is located Musarna. In this case it is possible to observe that Tuscania and Sorrina (Etruscan Viterbo) are located on the vertices, diagonally opposite, of a golden rectangle. The basis of this golden rectangle is a square with eastern side limited by Viterbo and Norchia. Musarna is aligned at the diagonal of the square, in an almost central position, and close to the apex is situated Axia, one of the other cities built in the same period and for the same purposes. Less clear is the latest vertex identification, over the side opposed to Viterbo, around which are not known Etruscan settlements, although literature reported widespread ar-

chaeological finds. Instead, so clear as to leave amazed is the Tarquinia position. The hegemonic city, in fact, lies on the line Sorrina-Axia-Norchia and constitutes the vertex of another golden rectangle on which the positions of other cities (Luni and Blera) are identifiable. As well as other Etruscan cities, as Blera and S. Giuliano, constitute the vertices of another golden rectangle, built on the side Axia-Norchia.

The geometric rigor observed in the territorial organization directly addresses to the possibility that the colonial program of Tarquinia, hence the foundation of Musarna, and its agrarian-territorial division, started as a project actuated by a series of visual targets and resulting alignments.

In addition, the same rigor allows to state that, at the time, this would be the only checked case that clarifies some principles of the Etruscan discipline, in accordance with that reported by Festus (*de Verb. Sign.*, L. 1928, p. 158) about the *Initia Urbis*, which must be carried out following *Rituales nominantur Etruscorum libri, in quibus perscribuntur, quo ritu condantur urbes, arae,*

aedes sacrentur, qua sanctitate muri, quo jure porte, quomodo tribus, curiae, centuriae distribuuntur, exercitus constituentur, ordinentur; ceteraque ejusmodi ad hellum ac pacem pertinentia.

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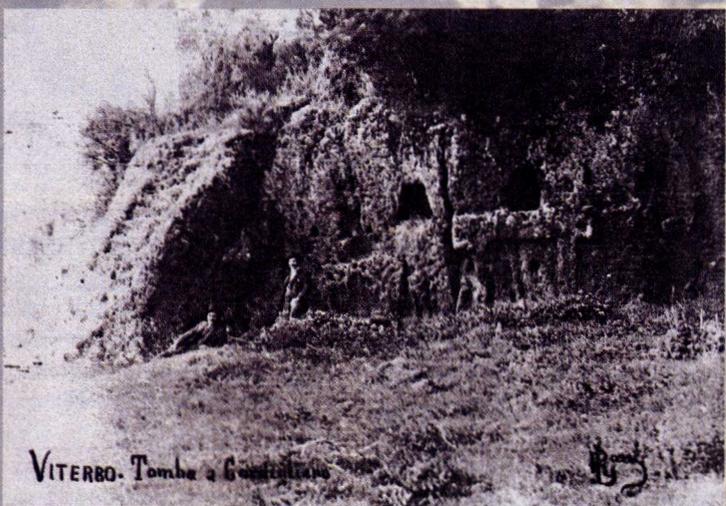
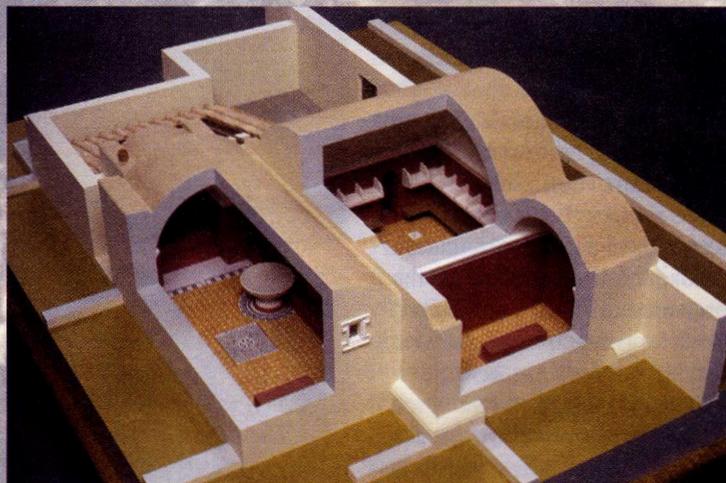
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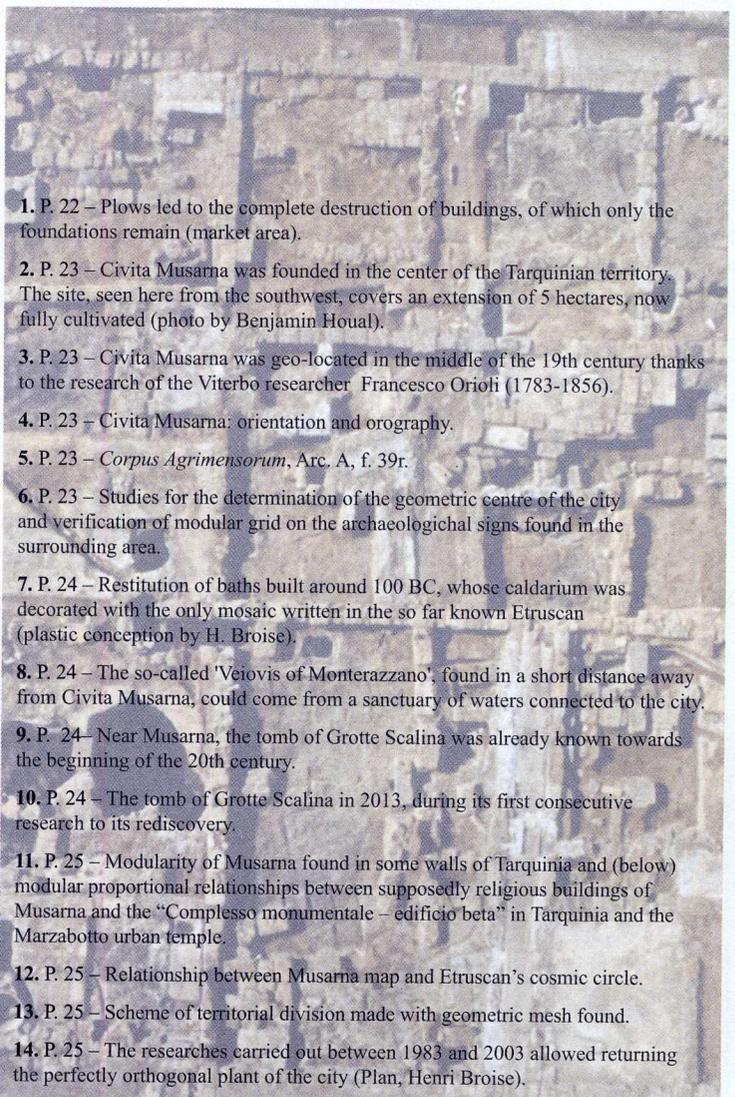
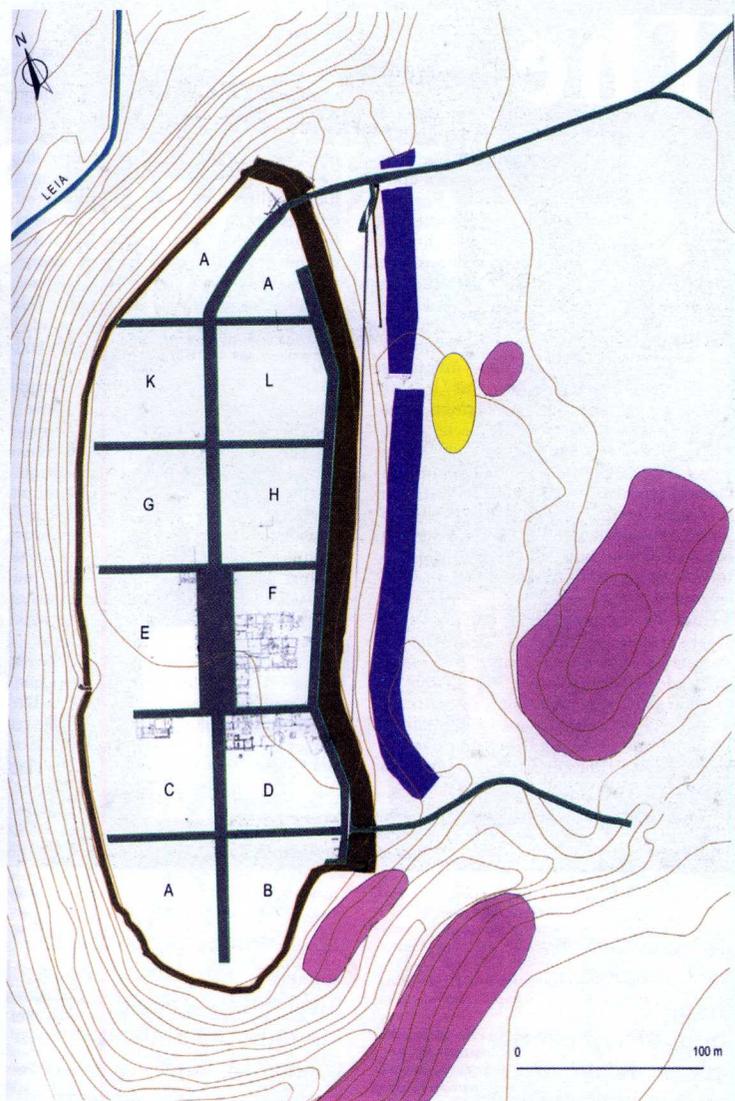
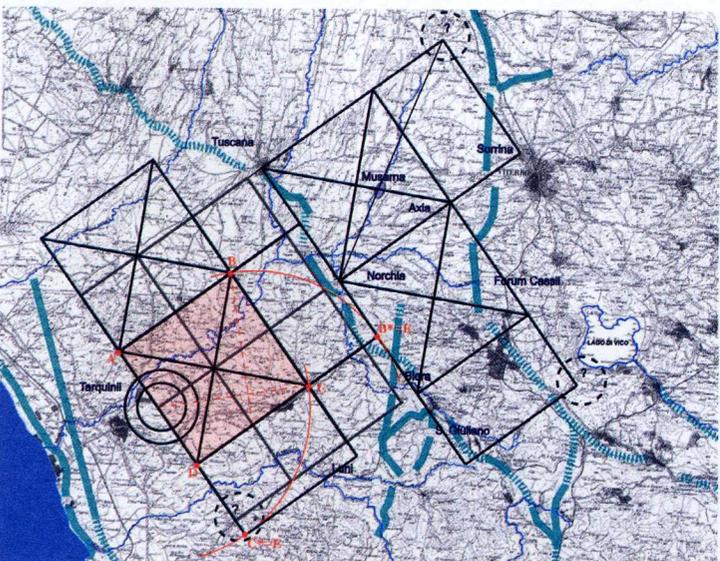
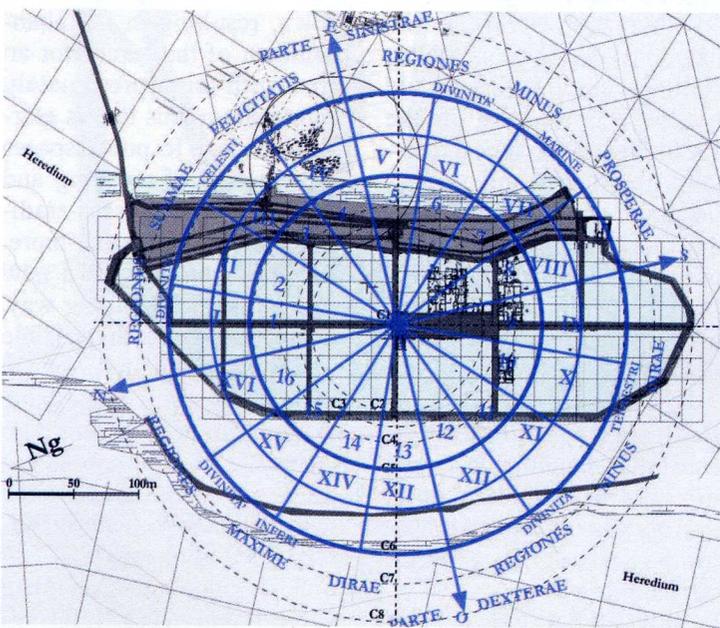
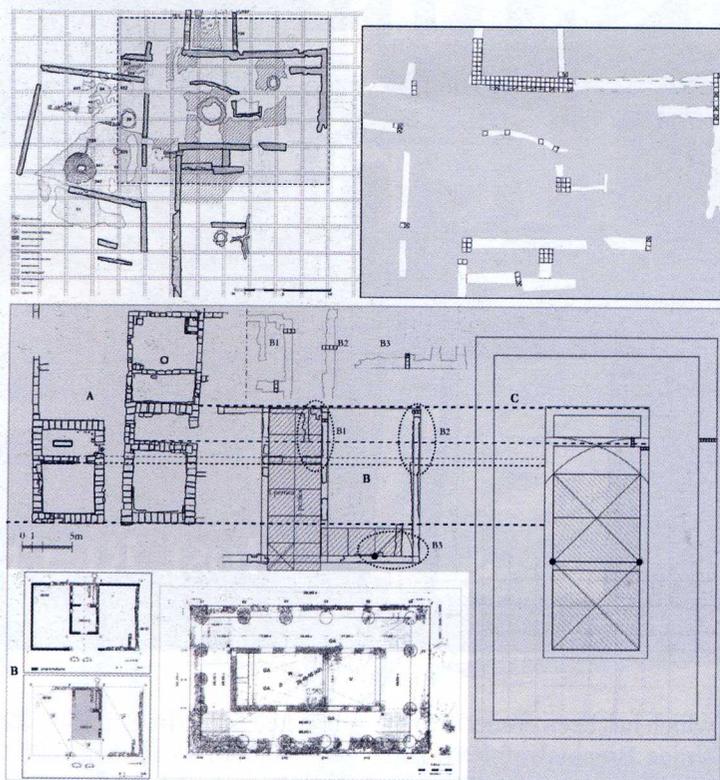
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1. P. 22 – Plows led to the complete destruction of buildings, of which only the foundations remain (market area).
2. P. 23 – Civita Musarna was founded in the center of the Tarquinian territory. The site, seen here from the southwest, covers an extension of 5 hectares, now fully cultivated (photo by Benjamin Houal).
3. P. 23 – Civita Musarna was geo-located in the middle of the 19th century thanks to the research of the Viterbo researcher Francesco Orioli (1783-1856).
4. P. 23 – Civita Musarna: orientation and orography.
5. P. 23 – *Corpus Agrimensorum*, Arc. A, f. 39r.
6. P. 23 – Studies for the determination of the geometric centre of the city and verification of modular grid on the archaeological signs found in the surrounding area.
7. P. 24 – Restitution of baths built around 100 BC, whose caldarium was decorated with the only mosaic written in the so far known Etruscan (plastic conception by H. Broise).
8. P. 24 – The so-called 'Veiovis of Monterazzano', found in a short distance away from Civita Musarna, could come from a sanctuary of waters connected to the city.
9. P. 24 – Near Musarna, the tomb of Grotte Scalina was already known towards the beginning of the 20th century.
10. P. 24 – The tomb of Grotte Scalina in 2013, during its first consecutive research to its rediscovery.
11. P. 25 – Modularity of Musarna found in some walls of Tarquinia and (below) modular proportional relationships between supposedly religious buildings of Musarna and the "Complesso monumentale - edificio beta" in Tarquinia and the Marzabotto urban temple.
12. P. 25 – Relationship between Musarna map and Etruscan's cosmic circle.
13. P. 25 – Scheme of territorial division made with geometric mesh found.
14. P. 25 – The researches carried out between 1983 and 2003 allowed returning the perfectly orthogonal plant of the city (Plan, Henri Broise).