Rome before Rome: the role of landscape elements, together with technological approaches, shaping the foundation of the Roman civilization

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Abstract

Most of the ancient cities link their initial fortune to the uniqueness of their geographical position: rivers, hills, islands and natural resources are playing a fundamental role in the game of shaping a powerful future for any urban settlement. However, very few cities share the astonishing destiny of the City of Rome, where all those factors, together with the powerful boost of its citizen's determination and their primitive but effective technologies, have contributed to design the fate of that urban area, establishing the basis of western civilization and giving a fundamental contribution of all humankind.

Keywords

Archaic smart cities, knowledge management, strategic management, paleo-urban technologies, ancient building environment, urban civilization, landscape analysis, urban history, geographical analysis.

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Introduction

> After starting from small and humble beginnings, has grown to such dimensions that it begins to be overburdened by its greatness. (Titus Livius, *Ab Urbe Condita translated by Rev. Canon Roberts*, 1905)

The Tiber River flows for about 400 km from the Apennine Mountains in Central Italy, until the eastern coast of the Italian peninsula, reaching the coast of the Tyrrhenian Sea. On that low and sandy coastline, the river forms a pseudo-delta of two branches, the branch of *Ostia* and the branch of *Fiumicino* (small-river), a secondary branch that creates a large island, called *Isola sacra* (sacred island).

However, the most famous island of the Tiber lays about 30 km from the sea, and takes its present name from the River itself: the *Insula Tiberina* (Tiber Island). The history of the River is inextricably associated with the Tiber Island, with the foundation of Rome and with the development of the western civilization.

The River is quite large and deep for most of its course, cutting literally in two the western part of the Italian Peninsula. Among the most ancient inhabitants of the pre-roman Italy, the Etruscans developed their civilization in the central/western part of Italy since the X Century BC, spreading from the Po Valley in the north, until the present areas of the gulfs of Naples and Pozzuoli, with a strong presence of Greek coastal colonies.

Etruscans held a strong flow of commerce both by land and sea, especially on pottery and metallic artifacts like jewels and blades[1]. Their commercial routes from north to south, linked since the end of the Iron Era at the different centers of the Etruscan civilization, crossing the River Tiber, mainly in the immediate downstream of the Tiber Island[2].

The earliest landscape analysis: *Ab Urbe condita*

It is impossible to establish the right date of the foundation of Rome, but most archeologists and historians agree that the first human settlements on the Palatine hill (*Palatinus*) could be dated 5000 years ago (Heiken, Funiciello, De Rita, 2005). The site of the foundation of Rome is a very crucial one for several reasons: one of the main crossing-points of the River was located in the area where the Tiber Island lays. The original landscape of Rome territory (fig. 1), around the IX-VIII Century BC was shaped by tufaceous hills, depicting the typical morphology of a volcanic area[3]. The hills are dominating the lower course of the River, where the valley opens in a large alluvial plain stretching out to sea.

The lowland surrounding those hills used to be very rich of waters and characterized by water stretches, mudflats and short seasonal streams, the so-called *Marrane*[4], still visible today in the countryside surrounding Rome. The ancient landscape, character-

ized by swampy plains and rocky tufaceous hills, with vegetation typical of the Mediterranean climate in central Italy[5] could be seen still today in the *Caffarella* archeological park, along the Appian Way, where also lays the ruins of the *Egeria Nymphaeum*.
The site is also the most advanced point where commercial ships were able to arrive inland (fig. 2), the maritime ships, sailing up the river, could not go beyond this point, because of the rapids formed by a step in the riverbed, right where the Tiber Island is located (fig. 3). The craggy slope hills, often flat on tops, were the remains of the ancient Pliocene platform of sediments, deposed when the entire area of the present Rome was submerged by the Sea level rise, during the inter-glacial period.
Later during the following warmer climatic period, the Tiber river and its affluent, among them mainly the Aniene river, were tracing their course in that sedimentary platform, shaping the present landscape around the present hills, composed by harder rocks of volcanic origins. Two of the Seven Hills of Rome, the Palatine and the Capitoline were perfect observation points over the River, the Island and the surrounding plains, strategically dominating the entire area.
The hills profile shaped like natural fortifications, and their strategic position over the river and the Island, was giving to the first inhabitants a natural place for establishing their first settlements, still today at the core of the modern city.
The legends related with the early history of Rome, narrate that the bridge was built without nails, to be eventually removable in case of enemies' attacks[6].
The bridge had obviously a great relevance in the ancient Roman culture, both for commercial importance, and from the religious point of view, considering its connection with the security of the State, as clearly asserted by the role of the religious order devoted to the custody of the bridge, the so called *Pontefices*[7], etymologically derived from the Latin 'bridge builders'[8].
The Tiber Island had always a strong link with the early roman religious traditions and was always connected with the cult of the health gods, mainly the God Aesculapius (protector of the medicine and healing)[9]. The reason of this dedication could be

Fig. 2 – Model of the archaic City of Rome around about 500 BCE (scale 1:1000 – detail) designed by Prof. Lorenzo Quilici, was added to the Museum collection in 1995. On the reconstruction by Prof. Quilici, it is clearly visible the temple of *Portunus* (1), the ancient *Portus Tiberinus* (2); the Capitoline (3) and Palatine hills (4) dominating the harbor, the primitive *Pons Sublicius* in his original wood structure (5) and the Tiber Island (6) (Photo authorized by the Superintendence of Capitoline Museums of Rome © 2014).

Fig. 3 – Satellite 3D view of the Tiber Island today, where are clearly visible the rapids on the two branches of the river on both island sides. In the center of the image it is visible the location of the paleo-harbor *Portus Tiberinus*, and close by the modern bridge, located in the same site where the wooden *Pons Sublicius* was supposed to be (Image by courtesy of Google Earth).

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Fig. 1 – Tridimensional rendering view of the Tiber Island, the Capitolium hill, the Tiber River and the original swamp located at the foot of the hill, as it was most probably appearing before the foundation of Rome – IX Century BC (Image by courtesy of Arch. G. Rosi <http://www.archein.it/html/lavori/roma%20fondazione.html>).

most probably found in the need to separate from the rest of the city, people affected by contagious diseases. The river itself had a very central role in the religious beliefs of the Roman people, personified in the figure of a god, considered the father of the Romans (*Pater Tiber*) and protector of the State (Cinquepalmi, Pungetti, 2012).

The legend says that in 293 BC, because of terrible plagues affecting the Roman population, the Senate sent a ship to Epidaurus, the main center of Aesculapius[10] worship in the antiquity, in order to have an image of the god and build a temple in Rome. In Greece, the priests of the temple gave to the Roman delegation a snake, sacred animal symbol of the divinity, to be brought back in Rome.

The story tells that once in the ship the snake curled around the ship's mast, and once reached the harbor of Rome, the snake left the vessel and crossing the river, disappeared into the Tiber Island, clearly indicating to the priests the place of the future shrine. Beside the geomorphological natural contest, it is interesting to observe how the Romans of the early ages developed an advanced and very 'smart' approach to the management of the natural site where they settle down.

Masonry techniques in early fortifications: Palatinus atque Capitolinus

The transformation of the Capitoline hill, together with the Palatine, in small fortresses did not require in effect so much efforts, considering the natural shape as a flattop hills, with very defendable slope sides. However, also that transformation presented very soon some technological challenges, in order to consolidate the fragility of the tufaceous slopes of both hills, problem mainly present on the margins of the so-called *Roma Quadrata* (Squared Rome).

The academic discussion around the so-called

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Fig. 4 – View of the archeological excavation on the site called 'Romulus shed' on the Capitoline hill in Rome. Over the lower Neolithic layer are clearly visible the tuff blocks on *Cappellaccio* of the *Opus Quadratum* (Courtesy of Wikimedia commons, photo by Sailko 2016).

'squared' Archaic Rome, has involved many historians and archaeologists since the antiquity, however the proposal coming from Aurora Maccari[11], archaeologist at the University of Pisa and expert in ancient Topography, seems the most plausible one. She is reflecting on the way Greek authors, who described Archaic Rome almost on contemporary times, used the term *Tetragonos* (Τετραγώνος) for describing the earlies shape of the Rome foundation. *Tetragonos* is a noun geometrically describing a quadrangular perimeter, which is well suited to the roughly quadrangular shape of the Palatine. The most interesting conclusion she proposes, is referring to the influence that such quadrilateral figure exceed later in the Roman history, reverberates both on the classical Roman military camp, and on the model of the Roman foundation cities, often overlapping the planning of pre-existing urban settlements[12]. The archaeological researches that took place on the Palatine Hill, especially during the nineteenth and twentieth Centuries, have established the presence of a square construction system (*Opus Quadratum*), the same building system, used in *Etruria* and *Lazio* since most ancient times. In general, the *Opus Quadratum* is located in the territories with a tufaceous soil, this rock suited itself better than the limestone to be cut in the form of parallelepiped blocks, and arranged in uniform planes (fig. 4).

The two main masonry techniques that we must recall connected with the earliest remains of the archaic Rome are: the Polygonal work (*Opus Siliceum*) and the Square work (*Opus Quadratum*):

- The Polygonal work (*Opus Siliceum*): widespread in central Italy, between the sixth and second centuries BC, consisted of the superposition of unworked stone boulders, even of considerable size, without the aid of binders, grappas or pins. That system was mainly used for terracing and containment walls.
- The Square work (*Opus Quadratum*): consisted of the superposition of square blocks in a parallelepiped shape and of uniform height, which are laid in homogeneous rows with continuous supporting surfaces. In the Roman area, the technique was used as early as the sixth Century BC and progressively refined, with greater regularity of the cut and a more articulated arrangement of the blocks[13].

The most ancient remains we refers to are some cisterns covered with *Thólos* on the Palatine Hill, the base of Jupiter Capitoline temple, the remains of the fortifications of *Roma Quadrata* on the Palatine Hill and those of the first circle of Servian Walls, the most ancient sections of the *Cloaca Maxima*, the *Regia* and the primitive Temple of Castor and Pollux. All these monuments are made with a soft-grained

tuff, commonly called 'Cappellaccio', which was cut into ashlars cm. 90 long (= 3 feet), cm. 60 wide (= 2 feet) and cm. 25 ÷ 30 high (Lugli, 1957)[14].

Urbanization of *Velabrum* valley: *Cloaca Maxima*

According to the most recent archaeological discoveries, right at the foot of Capitoline and Palatine Hills, on the southern bank of the river were originally most probably laid a swamp in the flat area within the river meander was located the primitive harbor of Rome (*Portus Tiberinus*).

That swamp was firstly excavated to shape a small harbor basin, and later reclaimed when the harbor was moved to the downstream banks of the river, just at the foot of the Aventine hill, along the present *lungotevere Testaccio*. As very well showed in the plaster cast model by Lorenzo Quilici, conserved in the Museum of Roman Civilization in Rome, the primitive harbor was in the ground depression where lays a parking area, nowadays called *Bocca della Verità* square, nearby the church of *Santa Maria in Cosmedin* (fig. 5).

If we do not have so much information about the archaic *Portus Tiberinus*, apart that it was located at the base of the Palatine Hill, nearby the still existing temple of *Portunus*, as confirmed from the archeological point of view, there is another artificial feature that need to be considered in relation to the genesis of the early Rome.

The Tiber received the waters of some minor affluent in this area, where marshes and swamps characterized the alluvial plain. A vast swampy area (*Velabro*) was located at the base of the *Campidoglio*, Palatine and Aventine hills, just west of which, the ancient Roman stadium *Circo Massimo* was built later on, in a flat-bottomed valley, of Holocene alluvial deposits. It was the so-called *Valle Murcia* or valley of the small river *Velabrum Maius*, a seasonal stream flowing into the Tiber[15,16].

That first fluvial port most probably created exca-

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Fig. 5 – The temple of *Portunus* and the area presently denominated *Piazza Bocca della Verità*, the site of the primitive harbor of Rome (*Portus Tiberinus*) (Photo by F. Cinquepalmi – © 2014).

vating those antiques marshes and conceived for small fluvial vessels remounting the river, progressively lost his function and importance, also because the city development and the maritime traffic increase. Once it was completely relinquished for other more favorable sites, more or less in the same place was realized the final section of the *Cloaca Maxima*. The description of that hydraulic feature could be found in almost all literature sources referred to the earliest history of Rome.

Strabo[17], in his work *Geographica* ('Geography'), reports that:

> Romans engaged in the construction of roads, aqueducts and sewers that poured into the Tiber the dirt of the Urbe [...] the sewers, turned with rows of stones, are in some places so wide as to allow the transit of large wagons laden with hay. (Strabo, *Geographica* book V 3,8)

Also Dionysius of Halicarnassus describes the effectiveness and importance of this work of hydraulic engineering, that he considers the most impressive of the early Rome, reporting the attribution of the project to the Etruscan king *Lucius Tarquinius Priscus*. It seems that during the reign of *Tarquinius Priscus*[18], following several flooding occurred on the lowlands surrounding the Palatine hill, finally the King decided the excavation of the *Cloaca Maxima*, more or less in the same time of the realization of the circus dedicated to horse races (Circus Maximus)[19]. So between 580 and 530/520 BC it was built a massive duct, as highlighted by Plinius, aimed to quickly drain the reflux water of the Tiber floods; a massive duct, aimed mainly "to quickly drain the reflux water of the Tiber floods" (Bianchi, 2018). Considering the low level of the ground, a preventive and conspicuous work of landfill was most probably required[20].

It makes perfectly sense that the transformation of the original open-air drainage canal in an underground sewer could be attributed to the expertise of the Etruscan, in general more familiar with underground excavation. What it seems to be clear is that the original purpose of such impressive hydraulic work was mainly connected with the need to drain the marshes on the area, fighting in the meantime against the endemic problem of seasonal fevers carried out by mosquitos in that swampy and unhealthy plain[21]. All antique authors agree about the unhealthy nature of the lowlands around the Roman Forum valley. The context described clarify the importance played in the early roman religion of the cult of goddess *Febris* (Fever) together with her dedication of the month February (*Februarium*)[22].

The structural details of the walls belonging to the most archaic sections of the *Cloaca Maxima*, are perfectly in line with the construction techniques

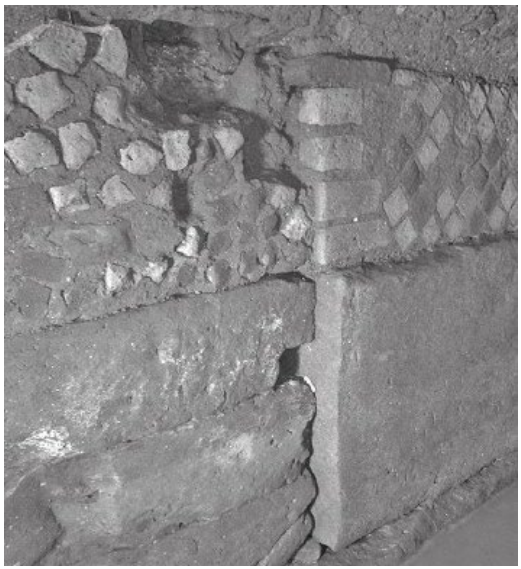

Fig. 6 – Detail of the *Cloaca Maxima* masonry at the intersection with the Sacra via collector. On the upper left, the Republican or Augustan age restoration of the Roman Kingdom conduit (bottom part); on the right, the connection of the Imperial age conduit (E. Bianchi).

of the same times. The most ancient parts of the underground sewer canalization are realized with squared blocks of *Cappellaccio* tuff, exactly like the most ancient remains of the fortifications and containment walls on the Palatine hill, and it is easy to recognize the successive maintenance works, analyzing the different masonry techniques of the republican and imperial times (fig. 6).

The *Cloaca* was paved with harder stones like travertine, in order to prevent the ground erosion caused by water and sediments flow, and the risk of structural collapse of the side's walls. Most of the surviving parts of the underground canals are still showing those pavements fixed with bronze clamps (Bianchi, 2018, p. 182).

The impressive size of the tunnels, reaching in the central part of the system even a section of 9 square meters, allowing a water flow reaching tens of cubic meters per second, giving the impression of a hydraulic system apparently over-dimensioned for the size of the city. Even if expanded time after time, in order to cope with the needs of the the growing city, that astonishing hydraulic project was conceived since the origin as a drainage system, useful both for possible flooding's caused by the streams, westbank affluent of the Tiber[23], but mostly for guarantee the control of the Tiber water levels.

Regarding the project management of such complex infrastructure, we completely agree with Elisabetta Bianchi, when she affirms that:

> Probably the workers who built the great Rome drainage conduit attended the same technical training of those Etruscan, expert in the construction of large burial mounds, accessible through long dromoi with corbelled vault coverage, formed by large nenfro blocks, such as those of Cerveteri or Cortona. (Bianchi, 2018, p. 179)

First wooden bridge: *Pons Sublicius*

The first *Pons Sublicius*, realized most probably[24] around the V century BC during the reign of King Ancus Marcius, employed for its realization a very simple but effective technology. The bridge, located just downstream of the Island, was rightly positioned probably on pilings fixed in the riverbed. The name comes from the Latin words *Pons*, *Pontis* (bridge) and the adjective *Sublicius*, meaning etymologically 'erected on pilings'. Dionysius of Halicarnassus[25] about king Ancus Marcius states:

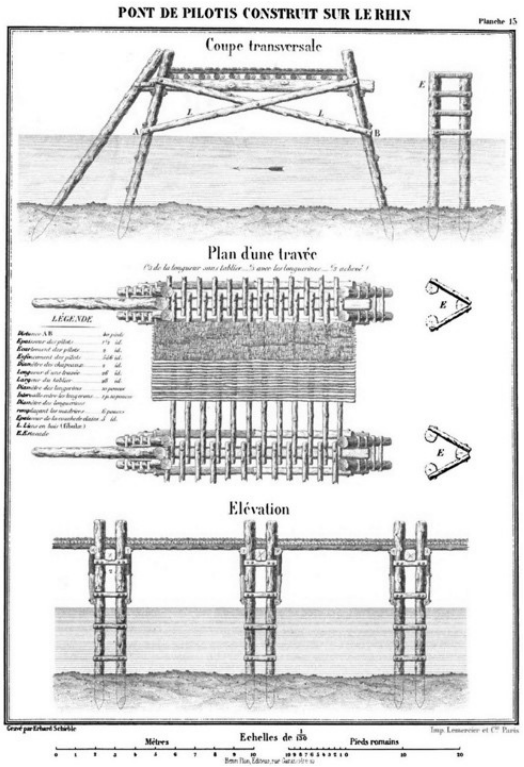

Fig. 7 – Detail of the hypothetical structure of the military bridge by Giulius Cesar's on the Louis Napoleon Bonaparte – Histoire de Cesar – Atlas 2 – table 15.jpg (Courtesy of Wikimedia commons, Dudenw, 2016).

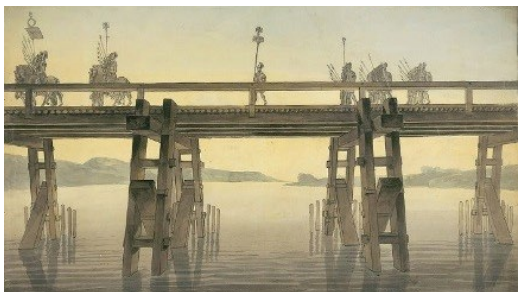

Fig. 8 – Proposed reconstruction of the Caesar's Rhine Bridge, by John Soane (1814). Guido Beltramini, Pierre Gros, 2003, pp. 182-196.

> He also is said to have built the wooden bridge over the Tiber, which was required to be constructed without brass or iron, being held together by its beams alone. This bridge they preserve to the present day, looking upon it as sacred; and if any part of it gives out the pontiffs attend to it, offering certain traditional sacrifices while it is being repaired[26].

The legend reported by *Titus Livius* about *Horatius Cocles*, the early roman hero, defending the bridge during an attack from northern enemies seems to confirm the hypothesis of a wooden bridge, easy to dismantle in case of emergency:

> The enemy would have forced their way over the Sublician bridge had it not been for one man, *Horatius Cocles*. The good fortune of Rome provided him as her bulwark on that memorable day. He happened to be on guard at the bridge when he saw the *Janiculum* taken by a sudden assault and the enemy rushing down from it to the river, whilst his own men, a panic-struck mob, were deserting their posts and throwing away their arms. He reproached them one after another for their cowardice, tried to stop them, appealed to them in heaven's name to stand, declared that it was in vain for them to seek safety in flight whilst leaving the bridge open behind them, there would very soon be more of the enemy on the Palatine and the Capitoline than there were on the *Janiculum*. So he shouted to them to break down the bridge by sword or fire, or by whatever means they could, he would meet the enemies' attack so far as one man could keep them at bay[27].

The technology developed for building temporary bridges, it is still described centuries later by Giulio's Cesar in the *De Bello Gallico* (fig. 7), referring to the temporary bridge built by its legions for crossing the Rhine River during that military campaign[28]; the technology applied was evidently a consolidated knowledge within the roman military engineers. One of the most fascinating reconstruction of that bridge, following step by step the techniques of the Giulio's Cesar military engineers has been proposed by Sir John Soane[29], in a very evocative painting dated 1814 (fig. 8).

The island on the river: Insula Tiberina

The Island origin has been largely discussed by scholars and historians, since the Roman times. Titus Livius reports the legend of a possible alluvial origin, for an artificial human intervention[30]. According to Besnier, the basic structure of the island would be tuff, of the same kind as the nearby Campidoglio and the hills on the left bank; the resistance of the tuff would have forced the river to divide into two branches and the tuff rock would have formed the basis of the subsequent alluvial sediments[31].

However, the Department of Earth Sciences of La Sapienza University in Rome, produced in 2012 a very advanced study dedicated to the geological site corresponding to the Island[32] and summarized in a geological data sheet comprised in the Italian national inventory for geo-sites.

The analysis states definitively that the Island is from alluvial origin, just successively consolidated with tuff-squared blocks, employing the same technique as in the Capitol and Palatine hills, and in the construction of the Cloaca Maxima.

The Island was later shaped in the form of a roman ship, commemorating the travel to Greece. The borders of the island were enclosed with the local travertine marble[33] designed as a ship hull, decorated with sculptures. One of the marble decorations still visible today in the southern part of the Island[34], is representing the god Aesculapius (fig. 9), showing his main attribute: the snake curled on a stick[35].

The Island since that time has been always used as an hospital, also after the fall of the Roman Empire when, with the rising of the Christianism as State Religion, a church dedicated to Saint Bartholomew[36] was built on the Island. Still today, the site hosts a very famous hospital of the city, the Fatebenefratelli hospital, probably one of the most ancient sites still used with the same sanitarian functions in the last 2500 years.

Several toponym of the landscape in the archaic Rome had a substantial influence on the future development of the western civilization. The noun 'Capital', meaning the town hosting a nation's government, takes its name from the ancient Capitoline hill, and also the word 'Palace' found its etymology from the name of the Palatine hill, original place of the Foundation of Rome, and for centuries the site of the imperial palace of the Roman emperors.

Conclusions

The landscape of the low Tiber valley surrounding the Historic Centre of Rome[37] and backboned by the course of the Sacred River, together with the landmark of the Tiberine Island, dominated by the Seven Hills where Rome was founded, could be right-

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Fig. 9 – Part of the remaining marble decoration still visible today on the Tiber Island, shaped in form of a Roman ship trireme and in the foreground, the marble relief representing the Greek God Aesculapius characterized by a snake curled on a stick (F. Cinquepalmi ®, 2014).

ly considered an unique example of how few landscape elements have been historically influential. That influence was not only fundamental for the flourishing of the Roman civilization, but also mostly significant for western civilization and humankind history.

However, it was the genius of the earliest inhabitants of that small area in the center of the Italian peninsula, that gathering from different places in that crucial place nearby the river, recognized the strategical position of the described landscape element. Applying technological innovation, knowledge and strategic management, the early romans where able to shape that unhealthy site in one the most powerful cities of the ancient world, the capital of one of the most significant civilization, paving the way for all the contemporary architectural technologies.

Note

[1] The Etruscans began about 3,000 years ago to work the Elban iron mineral in small melting pot furnaces, which, unlike the older low-lying fires, extended upwards, so that it is possible to define the ancestors of the modern blast furnace. The area that includes the municipalities of Massa Marittima, Monterotondo Marittimo, Gavorrano, Scarlino, Roccastrada, Follonica, Montieri, in the province of Grosseto, Suvereto, Campiglia Marittima and Piombino in the province of Livorno, was strongly characterized by significant mining and metallurgical activities developed by the Etruscan for the extraction of iron, copper, lead, zinc, tin and silver (Irollo, 2008).

[2] The Etruscan maritime traffic took place mainly at short distance from the coastlines and with frequent stops; to the north they reached Liguria and southern France while to the south as far as the Lipari Islands and the Greek colonies of eastern Sicily. The land trade routes to the north acted as a link between the advanced civilizations of the eastern Mediterranean basin and the less developed civilizations of the West. The products for which the Etruscans were best known were wine, pottery, including the *Buccheri*, furnishings and bronze weapons (Torelli, 2003).

[3] The entire central Italy, the region surrounding Rome, was a highly volcanic area around 600.000 years ago, dominated by the Alban volcano.

[4] Marrana (or marana) [*noun*, Mediterranean origin], roman. – Small stream or ditch with water: up to where the hill descends is an element that occurs in various toponyms of the surroundings of Rome, perhaps deriving from *Mara* 'swamp, marsh', from the sea family, with a pejorative suffix (Britannica.com).

[5] White oaks (*Quercus alba*), Maritime pines (*Pinus pinaster*), Laurel trees (*Laurus nobilis*) and Swamp reeds (*Phragmites australis* or *communis*).

[6] "Cum hostes adessent, pro se quisque in urbem ex agris demigrant; urbem ipsam saepiunt praesidiis. Alia muris, alia Tiberi obiecto videbantur tuta: pons sublicius iter paene hostibus dedit, ni unus vir fuisset, Horatius Cocles; id munimentum illo die fortuna urbis Romanae habuit" (Titus Livius, *Orazio Coclite*, *Ab urbe condita*, book II-10). On the appearance of the enemy the country people fled into the City as best they could. The weak places in the defences were occupied by military posts; elsewhere the walls and the Tiber were deemed sufficient protection. The enemy would have forced their way over the Sublician bridge had it not been for one man, Horatius Cocles. The good fortune of Rome provided him as her bulwark on that memorable day.

[7] "Sacerdotes universi a sacris dicti. Pontufices, ut Scaevola Quintus pontufex maximus dicebat, a posse et facere, ut pontentifices. Ego a ponte arbitror: nam ab his Sublicius est factus primum ut restitus saepe, cum ideo sacra et uls et cis Tiberim non mediocri ritu fiant" (Titus Livius, *Orazio Coclite*,

Ab urbe condita, book II-10). Sacerdotal societies in the general sense of the term, derive their names from the respective sacred rites. The pontiffs, as the maximum pontiff. Scevola said, derive their name from *posse* (power) and *facere* (to do), as if it were *poten_fices* (capable of doing). I think the term comes from pons; in fact the *Sublicio* bridge was built for the first time by their care, as it was then often restored, and this is also the reason why sacred rites are held with solemn ceremonies on both sides of the Tiber (Marcus Terentius Varro, *De lingua latina*, book V-15).

[8] The other possible association of Portunus, protecting the river wading points, would also explain why the temple was erected so close to the place where *Pons Sublicius* was originally located. It cannot be a coincidence the fact that the temple of God Portunus its still located as it was since the archaic times of Rome, just where it used to be an important construction as the *Pons Sublicius*, and is also very interesting the fact that the symbology connected to the cult of that Etruscan and Roman God was the keys, passed directly to the Cristian roman pontiff later on.

[9] The complex framework of the development and diffusion of the cult of *Asclepius* in the Mediterranean, whose consistency represents a *unicum* in the Greek-Roman religious panorama, has been analyzed in all the salient aspects in the wider context of analogous religious phenomena present in the Mediterranean area. In the historical-archaeological field, scholars have illustrated the many aspects of the cult of *Asclepius* in the mainland Greek, in the Aegean, in Asia Minor, in the Italic area, in North Africa and in Sicily, with all the open topographical, architectural, iconographic and chronological issues, as well as rituals in connection with literary and epigraphic sources. In the historical religious field, scholars have turned their attention to the treatment of sources of particular significance, of the romantic aspects of cult in the Near East and in Egypt, and of themes involving astrology, magic and medicine on the literary, philological and material culture levels, up to the limits of the cult between paganism and Christianity (Sfameni G., Calí V., De Miro E. (eds.), 2010).

[10] "Quod petis hinc, propiore loco, Romane, petisses et pete nunc propiore loco! nec Apolline vobis, qui minuat luctus, opus este, sed Apolline nato. Ite bonis avibus prolemque accersite nostram! | What are you searching here Roman, in a closer place you must search it! For reducing your mourning, it is not *Apollus* that you need, but the son of him" (AEsculapius). "So please move on under good auspices and appeal to our son!" (Publius Ovidius Naso, *L'introduzione del culto di Esculapio a Roma*, Metamorphoseis, book XV verses 619-728).

[11] Maccari, 2019, p. 143.

[12] Ferri, 1950, pp. 3-6.

[13] The use continues even after the introduction of the cementitious material throughout the imperial age, alongside the other techniques.

[14] Lugli, 1957 (MCMLVII).

[15] "Isola Tiberina": Data sheet of the geological survey "Isola Tiberina", 2012.

[16] "About 3500 years ago, on the left bank of the Tiber, were formed four valleys sloping toward the river, crossed by streams whose names are still hypothetical: the *Sallustiana*, the *Petronia Amnis*, the *Nodinus*. The stream which Lanciani identified with the Spinon cited by Cicero (Palombi 2013, pp. 149-150), was fed by rains and by numerous springs, and crossed the valley between the Quirinal Hill and the Velian Hill, heading towards the area where the first public square would be born, the Roman Forum, where the *Basilica Aemilia* was. Before reaching the Tiber, his basin widened in the area that would be called *Argiletum* and continued between Palatine and Capitoline Hill, where it formed the *Velabrum Minus* and *Velabrum Maior* (Foro Boario)" (Bianchi, 2018, pp. 178-179).

[17] Strabo (Στράβων Strábōn; 64 or 63 BC - AD 24) was a Greek geographer, philosopher, and historian.

[18] Most recent analysis from Elisabetta Bianchi, of the *Sovrintendenza Capitolina ai Beni Culturali* confirmed with ad hoc studies the first transformation of the area: "The Velabro valley, as well as other hollowed urban areas in direct contact with the Tiber, was regularly subject to flooding, so that since the Archaic Age, in the middle of 7th century BC, the area was reclaimed, with filling of earth and other material that uplifted the level of about 3 meters (Filippi, 2005). The final reclamation work was probably made at the end of the 6th century BC by the Tarquinian kings. Varro and Livius in describing the unhealthy nature of the Forum valley, marked how only through the construction of sewers (*cloacis*) started by

Tarquinius Priscus, the low-lying areas of the city were finally drained. Livius again says that the one known in his time as the Cloaca Maxima was completed by *Tarquinius Superbus*, which extended it down to the Tiber" (Bianchi, 2018, p. 178).

[19] *Eutropius, Breviarium Ab Urbe condita*, I, 6.

[20] "According to some geotechnical investigations the lowest point of the valley between Capitoline and Palatine Hill was about 6.90 m a.s.l., while the annual floods coming easily up to a level of 9.00 m causing continual flooding" (Bianchi, 2018, p. 179).

[21] Titus Livius, *Periochae Ab Urbe condita*, l.19 and l.37.

[22] In Roman mythology, *Febris* (fever) was the goddess personifying but also protecting people from fever and malaria. *Febris* had three temples in ancient Rome, of which one was located between the Palatine and *Velabrum*, as reported by several authors.

[23] The *Spinon* stream was one of the small affluent of the Tiber river on the west bank: "The stream which Lanciani identified with the Spinon cited by Cicero was fed by rains and by numerous springs, and crossed the valley between the Quirinal Hill and the Velian Hill, heading towards the area where the first public square would be born, the Roman Forum" (Bianchi, 2018, p. 178).

[24] According to tradition, fourth king of Rome (640-610 BC). Numa's grandson, he continued the policy of religious restoration. He founded *Ostia* and conquered many Latin cities, settling part of their inhabitants on the Aventine. In Rome he built a fortification on the *Janiculum* and the first bridge over the Tiber (*Pons Sublicius*).

[25] *The Roman Antiquities* (1939), book II 45 p. 181.

[26] The *Pons Sublicius* leading to the *Janiculum* was for centuries the only bridge in Rome. Dionysius has already, in discussing the pontifices (II.73.1), stated that they were so named from one of their important duties, the repairing of the wooden bridge. Thus, he follows Varro (L.L.V.83) in deriving pontifex from the noun *Pons* (bridge) and the verb *Facere* (to make).

[27] From the Founding of the City by Livy, Book II chapter 10.

[28] "He devised this plan of a bridge. He joined together at the distance of two feet, two piles, each a foot and a half thick, sharpened a little at the lower end, and proportioned in length, to the depth of the river. After he had, by means of engines, sunk these into the river, and fixed them at the bottom, and then driven them in with rammers, not quite perpendicularly, dike a stake, but bending forward and sloping, so as to incline in the direction of the current of the river; he also placed two [other piles] opposite to these, at the distance of forty feet lower down, fastened together in the same manner, but directed against the force and current of the river. Both these, moreover, were kept firmly apart by beams two feet thick (the space which the binding of the piles occupied), laid in at their extremities between two braces on each side, and in consequence of these being in different directions and fastened on sides the one opposite to the other, so great was the strength of the work, and such the arrangement of the materials, that in proportion as the greater body of water dashed against the bridge, so much the closer were its parts held fastened together. These beams were bound together by timber laid over them, in the direction of the length of the bridge, and were [then] covered over with laths and hurdles; and in addition to this, piles were driven into the water obliquely, at the lower side of the bridge, and these, serving as buttresses, and being connected with every portion of the work, sustained the force of the stream: and there were others also above the bridge, at a moderate distance; that if trunks of trees or vessels were floated down the river by the barbarians for the purpose of destroying the work, the violence of such things might be diminished by these defenses, and might not injure the bridge" (*De Bello Gallico*, Book IV chapter 15).

[29] Sir John Soane (born September 10, 1753, Goring, Oxfordshire, England – died January 20, 1837, London), British architect notable for his original, highly personal interpretations of the Neoclassical style. He is considered one of the most inventive European architects of his time (Britannica.org).

[30] "Ager Tarquiniorum inter urbem ac Tiberim erat, consecratus Marti: Martius deinde Campus appellatus est. Forte hic tunc seges farris matura erat. Quoniam regii campi fructum consumere nefas putabatur, desecta seges, immissa magnis corbibus, fusa est in Tiberim. In valdis haesitantes corbes resederunt in limo et una cum aliis rebus flumine invectis magnos acervos cumulaverunt. Insula inde paulatim creata est. Postea certe moles additae sunt, quoniam eminentem firmam aream et templa et porticus nunc sustinere videmus"

(Titus Livius, liber II-5). "The land of the Tarquins, which lay between the City and the Tiber, was henceforth sacred to Mars and known as the Campus Martius. There happened, it is said, to be a crop of corn there which was ripe for the harvest, and as it would have been sacrilege to consume what was growing on the Campus, a large body of men were sent to cut it. They carried it, straw and all, in baskets to the Tiber and threw it into the river. It was the height of the summer and the stream was low, consequently the corn stuck in the shallows, and heaps of it were covered with mud; gradually as the debris which the river brought down collected there, an island was formed".

[31] "The alluvial theory has never been confirmed either by focused surveys or by the stratigraphy resulting from the numerous surveys, generally carried out for building purposes. This does not, therefore, allow us to completely refute the Besnier theory, which in 1902 stated – based on verbal communications received from the technicians of the Rome Civil Engineering Office – that appear under the layers of sand and gravel, of recent sediment, 'lambeaux du tuf volcanique' (strips of volcanic tuff) appear. It should also be mentioned that, during the excavations carried out in the basement of the S. Giovanni Calibita Hospital, elements of tufa were found (1982, near the church) while other excavations, made upstream of the previous ones under the oldest structures of the island (1990), highlighted a sandy sedimentary structure. Even these claims have never been geologically recognized and confirmed with focused surveys and the major geologists believe that the tufaceous traces are not a sign of a lithoid-tawny tuff deposit, but most likely the remains of defense constructions, foundations or anchoring as suggested also from historical sources" (Titus Livius).

[32] Pica, 2012.

[33] "The graphic surveys presented here, carried out for a more careful and accurate study of this important monument, have confirmed the hypothesis previously advanced, and in fact the decorated travertine structure is interrupted joining with the remainsf a square wall of tufa, which probably constituted the beginning of the bankings-embankment, necessary construction for the buildings of the temple of Aesculapius, here localizable. From the remains even if particularly crumbling, it is clearly recognized the representation of a bow of a Roman warship (perhaps a trireme) faithfully reconstructed" (Pasquali, Passeri, 1983).

[34] "The association of the God Aesculapius with the healing deity has been identified with the island since at least the 3rd Century BCE when his ship was carved into the foundation walls on its south east side. The remains of Aesclepius' travertine ship, staff, and snake are still highlight" (Jones, 2009).

[35] The snake curled on the stick of the god Aesculapius is still today the symbol of the pharmacies in many countries. The serpent of Epidaurus on the staff of Aesculapius, can be also seen in the bottom left quarter of the shield of the crest of the Royal Pharmaceutical Society of Great Britain.

[36] "Even today, the northern half of the island is occupied by the Ospedale di Fatebenefratelli, now a public hospital, but previously run by a religious brotherhood in the Middle Ages. The Basilica of San Bartolomeo to the south was built a millennium ago on the shrine of the ancient healing god. A medieval well built on Aesclepius' ancient spring can be found near the altar of the church" (Jones, 2009).

[37] The Historic Centre of Rome has been recognized, together with the proprieties of the Holy See, World Heritage Site from UNESCO since 1980.

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Carrara Marble Quarries, Cava di Canalgrande #2, Carrara, Italy 2016.
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