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The Etruscan Civilization: The Origin of the Geometric Regulation in Ancient Roman Gardens

Morteza Hemmati*[1], Farshad Bahrami[2], Heshmatollah Motedayen[3]

1. Ph.D. Candidate in Landscape Architecture, Faculty of Fine Arts, University of Tehran, Iran.
2. M.A in Landscape Architecture, Faculty of Fine Arts, University of Tehran, Iran.
3. Faculty of Fine Arts, University of Tehran, Iran.

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Abstract

Problem statement: The Roman garden style is one of the most important products of the ancient Roman empire. Although many of the Roman cultural aspects follows the Greece civilization, the Roman garden layout does not follow the structural characteristics of Greece gardening and it seems to be a follower of the other ideas. This approach is contrary to the Greek garden layout, which lacks regular geometric organization, follows an axial and straight line in the plan. While scholars have several assumptions and hypotheses on justifying the emergence of this geometrical order in Roman gardening, there remain many ambiguities. It must be noted that before the formation of the Roman Empire, the Etruscan civilization: were resided in the region of Tuscany in Italy and affected many cultural achievements of the Roman civilization. Also, the sacred importance of the geometric regulation in the beliefs of these peoples which is reflected in their remained cities, temples and the other buildings can be considered as the roots of the geometrical order in the Roman gardening.

Aim: Analyzing and criticizing the existing opinion and assumptions and submitting new evidence, the current study aims to provide a new perspective on the roots of geometrical order in Roman gardening.

Research method: The study also applies a content analysis method for the interpretation and criticism of some of the available documents. The study also attempts to achieve a new interpretation of the subject applying interpretive-historical research method.

Conclusion: Accordingly the current study by questioning and doubting the available literature assumes the Etruscan civilization as the roots of geometric regulation in the ancient gardening.

Keywords: *Roman gardening, Etruscan civilization, Greek gardening, geometric regulation.*

* Corresponding author: +989120704329, hemmati.m@ut.ac.ir

Introduction

The Ancient Roman civilization was formed from the eighth B.C. on the Italian peninsula and by the Mediterranean Sea. Having the Rome city as the capital in the first and second centuries AC, the establishments turned into one of the largest ancient empires. Despite being dominated by the Roman empire, the Greece civilization had a high impact on many cultural aspects of the Roman civilization. It is widely accepted that after the dominance of Greece, the Roman people were attracted to the philosophy literate art and the other cultural aspects of the Greece civilization in the extents to which they accepted all of their cultural attributes.

However, despite the wide impact of ancient Greece on the Roman civilization in various cultural aspects, there is a great distinction in geometrical order of Roman and Greece gardening. Unlike the typical classical Greek gardens, regularity was always the Roman way. The auxiliary and straight line is clear in the Roman garden plans which creates a one-point perspective for the passenger and adds to the aesthetic by pruning of evergreen plants. This great distinction of gardening style between these two civilizations has created a fundamental challenge for scholars to find the cultural roots of this geometrical order and there have been various attempts answering this question. The current study aims to answer the question: "Why despite being affected by the ancient Greece the Roman gardens were designed differently? Accordingly, initially, it introduces the features of the Roman and Greece gardening style. It further concentrates on the Etruscan civilization gardens' attributes. After that, the existing hypotheses and the current study hypothesis on the origins of the geometrical order of ancient Roman civilization will be discussed and the findings and conclusion will be presented.

Research Methodology

The current study applies interpretive-historical research method. Reviewing the historical context historical subject the current study attempts to find the reason behind a historical event relying on the archeological patterns. This method, by classifying the characteristics of historical documents in a similar cultural context, attempts to explore a comprehensive pattern. Even though it is difficult to achieve a precise image relying on the structures that have been deteriorated fully or partially or have been renovated differently of their origin over time, hence the study attempted to rely on the archaeological information, mythology evidence, as well as the linguistic and the other related sciences as well.

Literature Review

So far, numerous studies have shed light on the different aspects of the Roman gardens. The majority of these studies imply that the Roman garden design finds its roots in the Greek gardens. Littlewood is one of the first researchers who has canonized the Roman gardens systematically. In his papers that generally focus on the Byzantine literature, culture, and gardens, he has emphasized several times that the ancient Roman garden design is derived from the Greek gardening but hasn't shed light on the comparison of the geometric layout of these two (Littlewood, 1979; 1992a; 1992a; 2002). Similarly, Thomson and Griswold based on their archeological studied on the Greek gardens also confirmed this claim however their argument was based on the similarity of the decorative motifs of these two garden designs (Thompson & Griswold, 1986, 14-36). While Carroll-Spillecke pointed to the fundamental differences between the Greek and Roman gardens in terms of relationship with nature but didn't discuss the origin and the definite root of this distinction (Carroll-Spillecke, 1992). In line with this research Bergmann in a "Greek Masterpieces and Roman Recreative Fictions" a chapter of his book entitled "Greece in Rome" specified that the foundation of Roman gardens could be found in the Greek garden designs. He further brought up the possibility of inspiration of the Roman villas from other nations like Egypt (Bergmann, 1995).

Kane and Kuttner in similar studies focusing on the fresco paintings of the Roman villas claimed that the Roman gardens follow the Greek garden design style however they overlook their fundamental differences in terms of geometrical layout design (Kane, 1998, 6; Kuttner, 1999).

Some scholars like Turner claims that after dominating the Greece civilization, as well as its villas and gardens, Roman civilization was attracted to this civilization that forgot all of its past cultural attributes and became alike it. He further inferred the genesis of geometrical order in the conquests of the Romans (Turner, 2016, 114). In addition, Macaulay Lewis also in a study examined the similar flower pot planting method in the Greek and Roman gardens, but he has not pointed to the obvious distinction between the geometrical order of planting of these pots (Macaulay Lewis, 2006). While Bowe sheds light on the imitation of Romans from the Greek gardens he doesn't discuss the origins of perpendicular layout in the Roman gardens (Bowe, 2004, 59; 2010).

In his interpretation of the Roman gardens, Jones has also discussed how Roman gardens were inspired by the Greek garden from general design to decorations but did not heed the organizing of the garden components (Jones, 2014). Considering the previously discussed literature it seems that in general, the research in this field hasn't codified and comprehensively explored the origins of geometric regulation differentiation in the gardens of Rome and Greece. The current study seeks to fill a part of this gap and discover the possible answers.

Roman Gardening

Today, what is known as the Roman garden is based on our knowledge of the archaeological documents, remains of the Roman Villas and royal gardens as well as interior fresco paintings of special buildings. In this term, the Roman garden created a method of planting and garden design that was spread in the ancient Rome period and affected the next periods of the Europe garden design. This method of gardening which was generally applied in the Royal villas and gardens for showing the Roman empowerment had a distinctive characteristic of the other landscaping style. The features of this method can be classified in various residential types.

The main types can be found in the Royal gardens, the urban garden houses such as Domus, and in the urban and suburban villas. Some of these villas, such as royal villas on the PalatineHill and the suburban villas were designed with the abundant breadth of spacing, but some others, such as Domus and the urban town villas in the city, were generally constructed with smaller-scale and more limited spaces (Turner, 2016, 115-130). Both of these examples share similar principles and methods that make it to be placed in a more general category so-called Roman Garden. The garden layout was a geometrical design with path and flower beds were planted with straight path creating a single point perspective centering on such a focal point as the main pavilion (Carroll-Spillecke, 1992; Mac Dougall, 1999, 22-25). In these examples, the landscape is created either by the rows of trees or single columns or porches. Also, these gardens are generally enclosed and separated from the outer space by the walls or row of columns. In addition, water has been used and presented in the main axis of the garden in various ways (Conan, 1986).

Also, in this historical practice, the evergreen trees were pruned into regular geometric shapes, which later this was spread under the name of topiary[2] and widely were used all over Europe. Decoration of the garden space with the sculptures and the fresco paintings of the mythological characters is the other attributes of Roman gardens.

There are two main landscape attributes recognizable in the urban gardens. The first is an open-air inwardly oriented space, open at the roof, with a water dock at the middle so-called "Atrium" and the second is a continuous porch formed by a row of columns surrounding the perimeter a courtyard and so-called "Peristyle". It must be noted if this open interior

space were planted for edible and medical herbs or plantations was so-called "Hortus" and when it was solely served for aesthetic and landscaping aspects was called peristylium or peristyle (Jashemski, 2017, 122).

Although the above-mentioned gardens are built on a variety of scales, the existence of regular plans that are sometimes accompanied by the relative symmetry is the fundamental reason for the unified perception of the style between these gardens and their distinction from the other gardening styles (Fig. 1 & 2).

Greek Gardens

Ancient Greek gardens can be examined in three ancient eras (the 8th to 6th century B.C.), classic (sixth-quarters B.C.) and Hellenistic (3rd to 1st B.C.)[3]. Our knowledge of the earliest period descriptions is limited to the literary texts of poets such as Homer and Ibycus. It can be guessed that there were scattered gardens around the city with three sections of vineyards, fruit trees and flower and vegetable gardens (Ferriolo, 2012; Carroll-Spillecke, 1992; Turner, 2016, 96-101).

There are more historical documentation as well as descriptive texts are available from the second or Classic period. Archaeological excavations reveal that the cities of ancient Greece were enclosed by the thick walls and the inhabitants were lived in a defined area. Also, given the mountainous geography, most of the cities had a compact layout with either an irregular design such as Athens or regular plan such as Piraeus. On average, the area of a residential plot in the classical period is estimated to be 250 square meters, which didn't remain a space for the creation of a garden (Carroll-Spillecke, 1992; Bowe, 2010).

In these houses, even the game rooms were transformed for daily purpose usage, such as cooking, washing and rising animal, accordingly the floor of such space was mostly covered by stone or mosaic. Founded explanations of an inscription from Hellenistic era prohibited the planting of trees for the possible damaging of their roots to the walls of houses. Therefore, given the discovered clay jars, plants were thought to be kept in the yard pots[4]. Although there was little space for gardening in the residential buildings, plants were presented in the urban areas - on a limited scale (Thompson & Griswold, 1986, 14-36; Macaulay Lewis, 2006). However, the situation in the countryside was different.

In the Green Belt outside the city wall, there were farmlands, gymnasiums, tombs, and private

Figs 1 & 2. The Hadrian Villa in Tivoli, one of the indicators of the ancient Roman landscape with an axial arrangement and relative symmetry. Source: www.teggelaar.com.

gardens that included vineyards, deciduous trees, and vegetable gardens as in the previous period (Carroll-Spillecke, 1992). In the Hellenistic or third period, the Greeks lost their independence and were dominated by the Macedonian empire. According to Turner, Macedonia had three important elements of land, security and wealth in this period. Imposing to the new culture hence, was a start of transformation in Greek garden design. For this reason, with the opening of cultural doors to Greece, a transformation in Greek gardening began as "Gothein sees this period as "the beginning of garden craft in Greece" (Turner, 2016, 112). During the period, the urban gardens were expanded and the number and quality of suburban gardens were increased. Shreds of evidence suggest that enclosed gardens with straight-line planting in such a large scale that was created by Hellenistic kings were considered pretty much new to the Greek gardening style. Some believe that this has been the influence of oriental culture (Bowe, 2010). Finally, it is possible to conclude that the Greek garden in the classical period and earlier was not properly structured and was not systematically geometrical until the Hellenistic period, which was influenced by other cultures.

Hypotheses on the origins of geometrical order in the Roman gardening

As noted above Roman gardens differ from the other gardens in terms of rectangular and straight-line arrangement and regular design and layout. Understanding the origins of geometrical order in Roman gardening requires the recognition of its origins in the earlier styles. So far There have been many opinions about the origin of Roman Gardening.

Thompson and Griswold in their archeological study of the Greek gardens asserts that Roman gardening has been branched from this gardening (Thompson & Griswold, 1986, 14-36). Conan believes that the appearance of peristylium in the Greek houses is another evidence that the Roman gardens find their roots in the Hellenistic Greek gardens (Conan, 1986). In addition, Kane, in his study of the Pompeii murals, as one of the main sources of understanding the Roman gardening confirms the previous studies on the impact of Greeks gardening on the Roman gardens (Kane, 1998, 6). These studies also agree with the impact of oriental culture on the Hellenistic Greek giving some clue on the geometrical order of Roman gardens. The scholars who believe in the great distinction between the geometrical order of Greek and Roman gardens justify the matter differently. Some have attributed this discrepancy to the differences between the two gardening style and more specifically the irregularities in Greek gardening due to practical constraints. They believe that the structure of Greek gardens was in line with the urban style and physical attributes of the country, which was facing a shortage of suitable and arable lands. As the rocky nature of some areas made it difficult and almost impossible to dig and reach the proper soil, they sometimes formed a hole for planting in the ground and used large pots that were filled with soil for plantation (Macaulay Lewis, 2006; Thompson & Griswold, 1986, 10). In addition, it must be noted that the natural slope of the mountainous cities made it difficult to get enough flat space for regular gardening. In contrast, the Romans, who were not facing significant restrictions on access to fertile and flat land formed different gardens from heir Greek counterparts (Huxley, 1978, 74).

Some scholars such as Turner believe that the formation of new regulations in Roman gardening design was the result of Roman rulers' conquest and being exposed to different civilizations such as Iran and Egypt. This inspiration led to more systematic gardening even by abandoning the past gardening style (Turner, 2016, 114).

Another hypothesis is that the differences in the geometrical order of Greek and Roman gardens lie in their geographical-political differences. Unlike Greece, where power was generally dispersed and cities were governed by city-states[5] and councils

were democratic in decision-making, in Rome power was concentrated. In addition in Rome, the cities were not in a struggle for gaining power against each other, they were rather united and hence in a less need for military defense.

unlike Greek cities, which were limited to the thick border walls and because of the lack of urban spaces there remained no room for gardens it was possible to build more spacious Roman cities and open spaces (Nardo, 2017, 36-45; Smith, 2006, 94-98). On the other hand, the centralized power brought enough security for erecting the countryside villas and their gardening which are of the most important ones remained from ancient Rome. All these arguments appear to be reasons why the Greeks did not apply regular gardening. On the other hand, Greek gardening can not be considered as an absolute style but rather the collection of scattered gardens due to, the lack of philosophical roots, inconsistency in design during the different periods of time. In addition, the Roman gardening suggests that if not adaption of the oriental ideas in the Hellenistic era it could adapt the other styles.

Etruscan civilization as the cultural root of Roman civilization

In rooting the Roman gardening attributes, as was noted earlier, the majority of scholars emphasize the inspiration of Rome from the other civilizations' gardening style such as Hellenistic Greece, Egypt, and Iran - in various ways. Examining the historical context of Italy, as the home of several civilizations, can give some clue on the formation of the Roman garden style.

One of the most advanced civilizations that dominated some parts of modern Italy- such as Tuscany, the Umbria, etc. - before the Romans, is the Etruscan civilization. The Etruscans with their advanced cultural background inhabited the Italian peninsula from around 8 B.C. to mid 1st B.C. The ethnic origin and the point of entry into Italy have been a subject of debate since antiquity (Gardner, 2018, 167; Vernesi *et al.*, 2004, 694). The Etruscan territory was expanded from the current Etruria in northwest Italy, reaching north to the Apennine Mountains and south to the Campania. The cultural effects of Etruscans on Rome is clear as Rome was commanded by the Etruscan kings for a long period of time. They ruled Rome from 5 B.C. to the establishment of the Roman Republic when they were defeated by the Romans. The majority of Etruscan cities were either destroyed by the Romans or new cities were erected on them hence our knowledge is pretty much limited in this term (Gardner, 2018, 169; Torelli, 2001, 146; Dupuy, 1993, 89-90). However, examples of remnants of Etruscan cities on the historical sites of Marzabotto, Bagnoregio, Sovana, Cerveteri, and Tarquinia indicate their grid and axial plan (Figs. 3 & 4). Another notable example is the murals and colorful reliefs that were found in the interior parts of the tombs in Tarquinia cemeteries which share great similarities especially in the term of technique with those that were discovered attributed to the Roman empire. The content of these paintings generally presents the vibrant lives, parties, and dances of

Fig. 3. A part of the Aerial view of the Etruscan city of Marzabotto, the remained foundations, sheds light on the grid and geometrical order of plan. This is a part of a more general plan that can be seen in the right figure. Source: www.gettyimages.com.

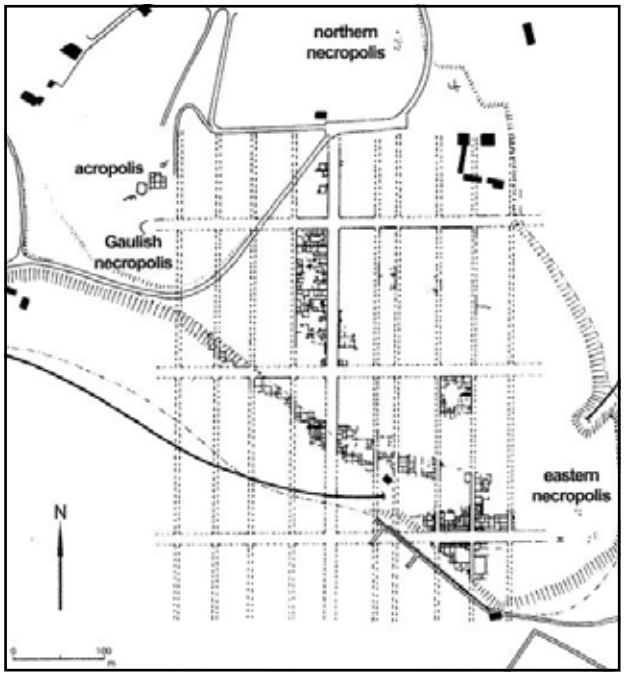


Fig. 4. The Marzabotto General Plan, in which the straight main streets have created a geometric regulation in the city. Source: Smith, 2006, 83.

the Etruscan peoples, with a thematic resemblance to later artworks of the ancient Roman that were discovered in the Pompeii.

The Etruscans had a great influence on the later civilizations' art and culture. Many scholars repeatedly have canonized this issue. For example, Janson and Janson believe that the Etruscan civilization set the stage for many of the Romans's achievements (Janson & Janson, 1962, 127). Gardner states despite being inspired by the Etruscans and Greeks the Roman art has acquired its distinctive traits (Gardner, 2018, 175-176).

D'Ambra states, while the Etruscans were influenced by other cultures, they influenced Roman art in turn. The Romans adopted many aspects of Etruscan art and took it a step further (D'Ambra, 1993, 14-19). Edlund-Berry canonizing the tremendous impact of Etruscan civilization on Roman art he states that the Etruscans were inhabitants of Archaic of central Italy, that their great influence on the Roman art that cannot be overlooked (Edlund-Berry, 2006, 116).

Brown claims that Etruscan influence on European civilization is not limited to Rome. He states that the Etruscans created a profound and lasting impact on the Western civilizations after their influence on Roman civilization during the pre-Roman Empire" (Brown, 1995, 34).

In addition, some scholars believe that Etruscan style effect in Italy wasn't limited to the ancient Greek art but also on some of the Greek gardens of the Renaissance, particularly those were erected by the Medici family (Holmstorm, 2015; Bartoloni & Bocci Pacini, 2003; Bule, 1996, 313).

According to Nardo, Etruscans influenced the Romans in many ways... The Romans also accepted some Etruscan gods. The most important of these were Jupiter the god of the sky, Juno the goddess of protecting women and Minerva, was the Roman goddess of wisdom and handicraft (Nardo, 2017, 21). Gardner also states that the construction of paved roads, sewage systems, and stone bridges are among the Etruscan civilization achievements (Gardner, 2018, 168). Nardo also states that "the Romans learned Etruscan masonry and the other construction techniques, as well as the construction of arches which eventually became the symbol of Roman architecture" (Nardo, 2017, 21). It has been also noted that the Roman grid urban planning and water systems were influenced by Etruscan civilization (Bell & Carpino, 2006, 93-94). Janson & Janson also state that Etruscans were masters of engineering, mapping, and urban planning techniques and undoubtedly the Romans had the advantage of learning from them. It should be noted that, in all likelihood, the Etruscans taught the Romans the techniques of construction of bridges, castles, sewage systems, and dams. But unfortunately, there haven't remained of their constructions (Janson & Janson, 1962). Thus, Etruscan civilization seems to have had a great and lasting effect on the techniques and methods of the later civilizations. In an interdisciplinary study of Pisa in Tuscany, Italy, Bini et. al. proved the urban development pattern of many cities such as and Rome Pisa buildings (both public and private) follows the Etruscan patterns (Bini, *et al.* 2015, 209).

Etruscan Gardening

The lack of information on the Etruscan cities where new cities have been constructed at the original sites makes provision of primary data difficult for the research. Yet the study mostly relies on the archaeological, mythological, and linguistic secondary data examining the Etruscan gardens. Acquired information from a villa in Murlo dating back to the 6th or 7th century B.C. reveals the existence of a large courtyard that resembles the primitive types of symmetrical peristyle where was used for plantation unlike the Greek cobblestone yards (Farrar, 2016, 75-78). It also challenges the previously accepted hypothesis of the adaption of Peristyle from the Greeks (Fig. 5). Based on this evidence, it seems that Pristile was existed in the Etruscan civilization and later were transferred to Greek gardening (Simelius, 2018). It seems that the shared courtyard between the row of the house which was excavated of 6th B.C. in Acquarossa was acted as the gardens (Rohner, 1996, 120-121). On the other hand, in the majority of the Marzabotto houses (Fig. 6) an inwardly oriented space with a water pond and openings in the roof could be found that reminds us of the Roman villa atriums. The architectural element that later was repeated in the Roman villas tremendously and is known as one of the elements of Roman garden design (Izzet, 2007, 156).

In addition, archaeological studies revealed that Etruscans were used to plant in their courtyards houses and they even were encouraged by their religion to rise specific plants (Macintosh Turfa, 2000, 155; De Grummond, 2013, 544). As it was mentioned earlier, these plantation yards later were known as the "Hortus". On the other hand, some linguists and mythologists assert that the word Hortus was adapted from the Horta, the Etruscan goddess of planting and fertility (Farrar, 2016, 70-76; Leland, 2015, 137).

Relying on the scholars such as Farar, Sibelius, and Ronnen's assumptions about the Etruscan gardening and the excavated foundations of Etruscan houses with great similarities with the Roman houses more similarities in the open space layouts of these two also can be expected. In the excavated house in Roselle, an atrium and symmetrically designed yard were founded[7] (Fig. 7). Similarly, in a Marzabuto House, plan and more specifically the yard, the geometrical order, and axis symmetry are obsessively observed (Fig. 8). In addition, gardening requires a great knowledge of water management, just as Roman gardening style uses water management techniques effectively.

Jordan Bannon describes the water management practice of the Etruscans and how they controlled the water flows through the rocky canals around the 4th and 5th centuries B.C. and established water management regulations. He adds the most of the Etruscan infrastructures were continued to be used during the Roman period hence the inhabitants were also living in the same areas (Bannon, 2009).

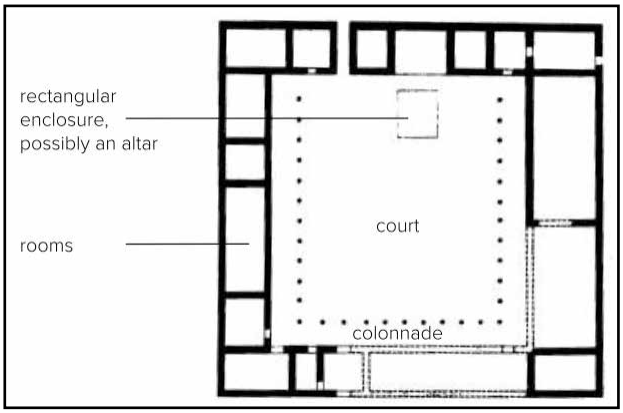


Fig. 5. A house in Murlo that date back to 6th or 7th century B.C. with a large Peristyle with a set of rooms around it. Farrar, citing archaeological evidence, believes there were shady trees in the center of this space. Source: www.vangogo.co.

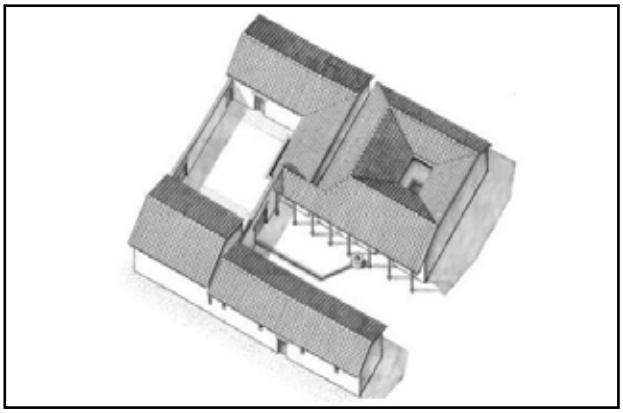


Fig. 6. An example of Marzabotto houses with an atrium and a central pond. Most of the Marzabotto houses consist of an atrium. Source: Izzet, 2007, 156.

Fig. 7. Aerial view of the Etruscan city of Roselle, an example of Etruscan symmetrical settlements that share great similarity with the Domus in ancient Rome. The symmetrical plan in the semi-open space of the atrium, as well as the colonnade around the courtyard, signifies regular and symmetrical order in the Etruscan urban components. Source: www.flickr.com.

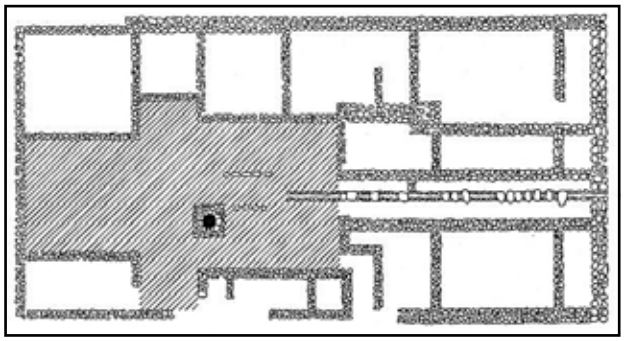


Fig. 8. An example of a residential plan in Marzabotto where indoor spaces are arranged in such a way that the courtyard looks symmetrical. Source: Izzet, 2007, 156.

Regulation in the Etruscan Civilization

The question that arises here is whether the repeated regulation in the Etruscan thoughts, urban planning, architecture, and gardening, was rooted in their beliefs or was a subordinate or coincidental issue for them? The review of the archaeological findings of the Etruscan cities as well as recent findings on the Etruscan religion[6] values and beliefs reveals the sacred nature of order and organization in their culture. Previous research revealed that Etruscans had an important ritual during the construction of new cities. Plowing the field, they aimed to create rectangular and regular parallel lines that either was correspond to their believed sacred celestial orientation (Figs. 9 & 10). This practice that was believed to bring fertility to the Etruscans' residential land, affected all aspects of the city life (Bell & Carpino, 2006, 93-94; Edlund-Berry, 2006, 118; Sassatelli & Govi, 2013, 285; Becker, 2013, 356; Magini, 2015, 127).

Janson & Janson assert that when it came to the new cities, on the flatlands Etruscans came out with a blueprint. The urban plan was a regular grid of intersected pathways of two major streets. These two streets, called kardo (North-South) and decumanus (East-West), were laid out based on the path of the sun, divided the land into four main districts (Figs. 13 & 14), and any of these regions or districts could be developed when required (Janson & Janson, 1962, 167-169). Similarly, Steingräber also believed the regular system of land deviation wasn't arbitrarily constructed and had a clear association with their ritual and religion. He further believed the divisionary practice of Etruscans as well as the axial location of city gates rooted in the haruspices division of the world (Steingräber, 2008). Besides the city planning, this practice was also applied in the other city components such as the temples (Spivay, 2006, 144-148). In this system, temples were stood along the main axes, the location of residential areas and their symmetrical open spaces were a reflection of the ancient rituals (Bell & Carpino, 2006). In addition, the city boundaries were also derived from this ritual practice, later was called the sacred boundary of pomerium[7] (Becker, 2013). As it was mentioned earlier this regularity could be traced in the architectural and urban open spaces (Figs. 7 & 8).

Discussion

There have been several arguments and assumptions regarding the regularity of the Roman gardens layouts, yet the current study sheds light on the impact of Etruscans in detail. As it was mentioned earlier, one of the reasons given for differences between the Greek and the Roman garden lies on their geographical differences. While the rocky

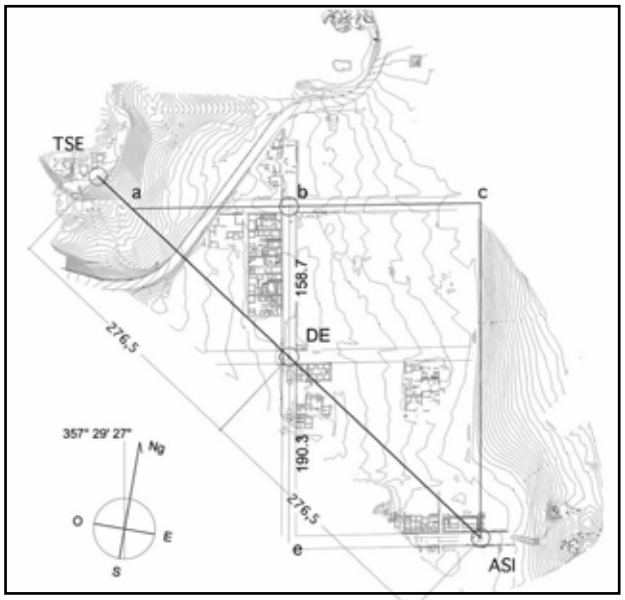


Fig. 9. This figure illustrates the geometry of the sun's movement and the geometric pattern forming the boundary of the development of the Etruscan city of Marzabotto. Source: Gottarelli, 2010, 63.

Fig. 10. The bronze statue of a clergyman and the bull discovered in Erzu dating to about the 5th century B.C, Adland Buri quotes Frantineus Romanus, that the regular grid structure of cities has been a part of Etruscan religion and straight lines and boundaries were drawn on the ground by priests according to sacred directions on earth. Source: Edlund-Berry, 2006, 117.

mountains throughout Greece minimized the possibility of digging the ground and the planting, the vast land of Italy had fertile soil for cultivation. On the other hand, the sloped lands of Greece remained a little space for gardening and inside the cities. These two climatic justifications don't explain the lack of regularity in the Greek gardens. For example despite the slopped and rocky area there have been some gardens created with geometric regularity (so-called Bagh-Takht) in Iran. On the other hand, some believe it is possible that regularity in the Roman garden finds its roots in the Egyptian, Iranian gardening style, adapted during the Roman warrior trips during the Hellenistic period. There seems to be some doubt in this assumption. It is because the study of the Roman urban system, as well as its villas and gardens, shows their practice did not change significantly from the fourth century B.C. to the second century AD - when they had cultural interactions with the two countries of Iran and Egypt. However context the similarities between the Roman and Etruscan cities couldn't be overlooked (Bini *et al.*, 2015).

These cultural connections may have led the Romans to learn from these countries. However, it should be noted that the comparison of the structure of the ancient Roman cities from Cosa that was constructed more than three centuries B.C. to the later Volvilis - in Morocco - built almost simultaneously with the Iran-Rome conflict, indicates that they all adhere to a single grid planning layout. In addition, the differences in the political system of the two countries can ultimately justify the lack of regularity in Greek gardening but not the great geometrical order of the Roman gardens.

In contrast, the review of the literature reveals the evidence that Etruscan civilization has an influence on the regular foundations of Roman structures. As noted above, many aspects of the Etruscan culture was transferred to the Roman civilization, in the extents that the Etruscan urban patterns are the basis of the construction and development of many today's Italian cities.

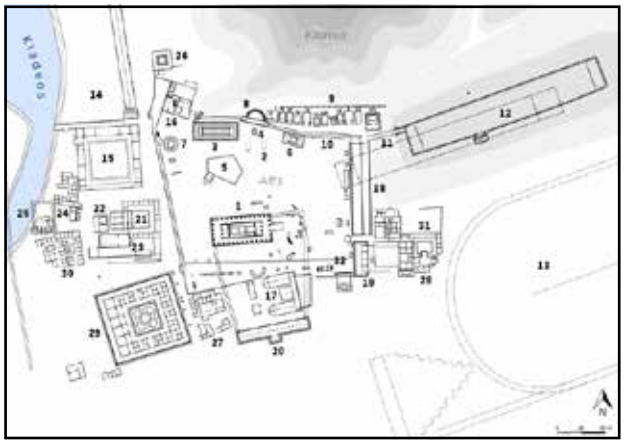
As a comparison of the ancient Roman urban patterns and the relics of the Etruscan cities, emphasize the conformity of their urban patterns. Interestingly, these patterns do not have any similarity to many of the ancient Greek cities built during this period, such as Olympia and Delphi. On the other hand, the faithful dedication of Etruscans to order and regulation, which is rooted in their deep ritual beliefs led to the formation of a great organization in the city general plan and its components (Figs. 3 & 4).

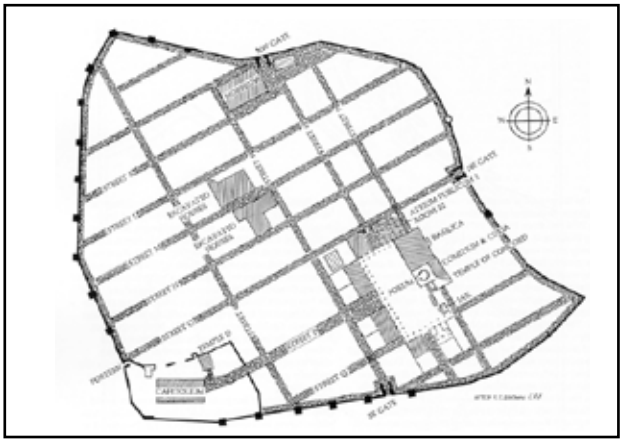
This order is not the result of the coincidence and the coercion but derived from the people's beliefs on the universe laws (Figs. 9 & 10). On the contrary, regulation during the Hellenistic times or the lack of it in the ancient and classical Greece was not rooted in the religion. The planting layout of areas adjustment to some of the Acropolis temples had a regular pattern, suggesting the inconsistency or lack of conformity by Greeks (Figs. 11 & 12).

In addition, as noted above, Greek gardens did not have the required consistency in their design and layout to be called as a specific style. In contrast, recent research has asserted the possibility of Etruscan gardening style with similar spaces to the Hortus, Peristyle, and Atrium, the important components of Roman gardening (Figs. 13 & 14).

Conclusion

Ancient Greek thoughts influenced many of the cultural aspects of ancient Roman civilization. However, the style of Roman gardening, as one of the most prominent styles in the history of gardening, does not follow the structural order of the Greek style. The Roman gardening, unlike Greek examples that lack a geometrical order, is known for its regular and axial grids. There have





Figs. 11 & 12. Comparison of the ancient Greek Olympia's discipline with the and Cosa in ancient Rome illustrates the fundamental difference between the overall organization of the cities. It also shows that its grid structure with the axial streets is very similar to the Etruscan city patterns. Source: www.commons.wikimedia.org and www.romanaqueducts.info.

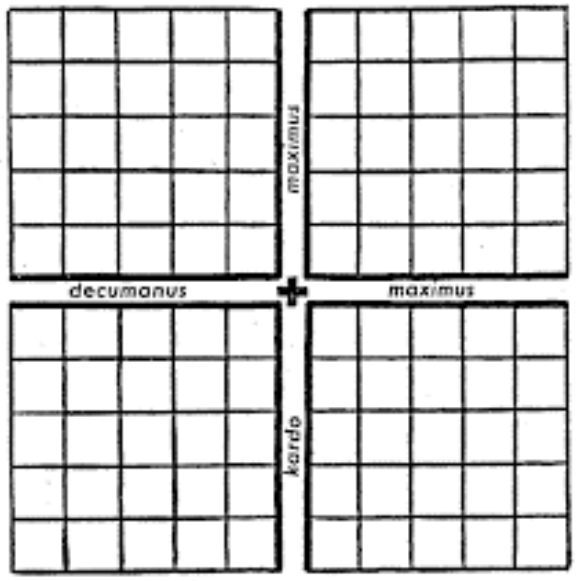


Fig. 13. A typical grid layout of the Etruscan cities, with the geometrical and regular order regular and intersection of the two main streets of Cardo and Decomans. Source: quadriformisratio.wordpress.com.

Fig. 14. The ancient part of Turin which has retained its Etruscan structure.Source: Sparavigna, 2014, 443.

been numerous assumptions to date justify the cause of regularity of Roman gardening such as climatic and political reasons. Some have also canonized the political- security system differences between the democratic Greek and the Roman Empire system. While some believe in the geometrical attributes as the roots of regularity in the Roman gardens the other relate it to the conflict with the East and becoming familiar with the other styles of gardening. Both of the assumptions seem to be correct however they cannot cover all of the reality. It must be also noted that the recent studies comparing the remnants of the ancient Roman cities and the Etruscan cities has shed light on similarities of these two structures and it is believed that the Roman cities followed the Etruscan city structure. On the other hand, studies also indicate the structural differentiation of the Roman and Greek urban patterns. In addition, Etruscan gardening seems to share a great similarity with the Roman gardening in spaces of Peristyle, Hortus and Atrium. It, therefore, seems to be assumed that the desire for regularity in Roman gardening is adapted from the Etruscan sacred beliefs.

This attitude, coupled with specific rituals, led to the creation of a grid order in the city, with a clear presentation in all of the components of the city from city planning to architecture and gardening. Although this issue cannot be substantiated due to the lack of archaeological evidence from repeated and more recent specimens[8], it can be considered as a new possibility for future research as a serious question about the relationship of geometrical regulation of Roman gardening to the Etruscan civilization.

Endnotes

1. The Domus was a type of Roman house with an atrium and a yard with surrounded spaces. This yard was called Hortus, and peristyle if the internal court were surrounded by colonnades.
2. Topiary is also one of the words with the Latin roots -not Greeks- indicating the independent nature of the Roman gardening of the Greek's.
3. Scholars have described these periods in different titles. Carroll-Spillecke (1992) and Turner (2016) have described the ancient Greek gardening in the Homeric, the Classical and the Hellenistic period. However, Patrick Bowe, in an article entitled "The evolution of the ancient Greek garden, Studies" discusses these three periods as the Archaic, Hellenic and Hellenistic periods (Bowe, 2010).
4. Thomson & Griswold (1986), in their book "Garden lore of ancient Athens", describe in illustrations that the Greeks had to scrape the rock around Hephaestus' temple to dig holes to install potteries and plant them. Regular pot planting techniques are associated with the Greek Hellenistic period and can be thought of as having been adapted from the East (Thompson & Griswold, 1986).
5. A city-state is a sovereign state that governs a single city and its suburbs. City-state was governed independently and was generally confined to their walls and barrows for the sake of security and integrity. Although the most important city-states emerged in Greece, historians believe that they were the first city-states were established in the Mesopotamian civilization.
6. There is evidence of the Etruscan specific religious rules known as Disciplina Etrusca. This addressed issues such as the importance of considering 4 main directions and the regular grid layout using straight lines on the ground prior to the establishment of the Etruscan cities.
7. Pomerium was a religious boundary around the city of Rome and the other ancient cities that were controlled by Rome and was defined either by the walls or a gate. This religious concept and mentally evaluations was between the inner and outer parts of the city. Legally, the Rome city existed only within its Pomerium, and beyond was the Roman territory.
8. Even though few shreds of evidence are available of the Etruscan inner-city gardens there is almost no detailed information of the existence and nature of the suburban gardens

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