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# The role of *ollae perforatae* in understanding horticulture, planting techniques, garden design, and plant trade in the Roman World

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## Riassunto

Il numero crescente di scavi di giardini ha evidenziato il ruolo delle *ollae perforatae* come tracce di giardini romani. Tuttavia, questi vasi ed il loro contributo alla nostra conoscenza dei giardini romani rimangono in gran parte inesplorati. In questo saggio viene evidenziato quello che le *ollae perforatae*, fatte apposta per la coltivazione, possono dirci sulle piante ed i giardini romani. Innanzitutto si è proceduto a descrivere le tipologie possibili per un accorpamento di *ollae perforatae* nel mondo romano. Poi, sono stati esaminati i contesti archeologici specifici delle *ollae perforatae* e che cosa questi vasi ci dicono sul design del giardino romano. Infine, viene avviato il dibattito su cosa le *ollae perforatae* possono dirci sulle piante antiche, l'orticoltura, le tecniche di messa a dimora e sul commercio.

## Introduction

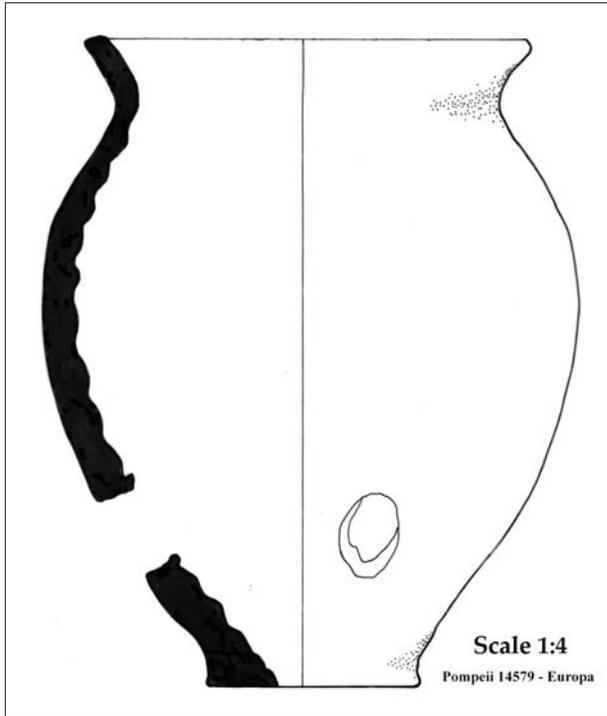
Recent garden excavations have raised the profile of *ollae perforatae* as evidence for Roman gardens. However, these pots and their role in Roman gardens remain largely unexplored (Messineo 1984; Barat 1999; Barat, Morize 1999). This paper examines *ollae perforatae*, Roman planting pots, as evidence for plants and gardens in the Roman world. First, possible typologies for the assemblage of *ollae perforatae* in the Roman world will be discussed. Second, a selection of garden contexts where *ollae perforatae* have been found will be analyzed. The study of the use of *ollae perforatae* in Roman domestic, commercial, villa, sacred and monumental garden contexts is highly informative about Roman gardens and their design. The paper concludes with a discussion of the information that can be discerned from *ollae perforatae* about the plants, horticulture, planting techniques and plant trade of the Roman world.

## Introduction to *ollae perforatae*

According to the ancient sources, *ollae perforatae* were purpose-made pots used to plant trees, vines and shrubs in Roman gardens

(Theophr., *Hist. pl.*, 4.4.3; 6.7.3; Cato, *Agr. Org.*, 52, 133; Plin., *HN*, 12.7.15-16; 17.11.64; 17.21.97-98; 25.102.160; Palladius, 3.10; 3.25; 4.10; 6.6; 10.14). These earthenware pots with purposely placed side and base holes for drainage and aeration were also used to transport plants across the Roman world and to propagate plants by aerial layering (fig. 1). The defining feature of purpose-made *ollae perforatae* is a single base hole (usually 1+ cm in diameter). Side holes are common, but are not universal. If a pot has side holes, it typically has three side holes or, occasionally, four (e.g. Jashemski 1979a: 239). Generally, both side and base holes are placed before firing. However, certain *ollae perforatae* were perforated after firing; for example, many of the pots found at Petra were perforated after firing (Macaulay Lewis 2006).

*Ollae perforatae* have been recovered from sites in Britain, France, Greece, Israel, Jordan, Italy and other regions (tab. 1). Archaeologically known pots date primarily from the late first century BC to the mid second century AD. Before the first century BC, we only have textual evidence for Roman planting pots Cato, *Agr. Org.*, 52, 133). The precursors for Roman *ollae perforatae* are unclear. In ancient Egypt, large planters that rested on the ground are depicted in



1. - Drawing of *ollae perforatae* from house of the House of the Ship Europa, Pompeii (author).

wall paintings (Wilkinson 1998: 86, fig. 43). Planting pits, filled with rich Nile soil, were reportedly dug between the row of sphinxes leading up to the funerary temple of Queen Hatshepsut at Deir el-Bahari. Trees were planted in these pits. Whether these plantings belonged to the original temple or a later phase remains debated (Wilkinson 1998: 76). Currently, there is no archaeological or other evidence to suggest that plants are potted and planted in the ground in Egypt. In the Ancient Near East there is no evidence for planting pots in gardens. In Greek gardens, ceramic, often decorated, pots, more like modern vases or planters, were used (Carroll-Spillecke 1989: 48, fig. 21; see Day in this volume). These pots were set on paved courtyards, on window sills or in light wells.

The earliest examples of what appear to be utilitarian planting vessels are *amphorae* reused as planters in the Greek world; however, these vessels are thought to have been used in conjunction with the Adonis ritual (Carroll-Spillecke 1989: 40, fig. 17), so their use in other gardens may not have been widespread. Theophrastus' reference to planting vessels remains problematic, as there is no archaeological evidence for the existence of utilitarian planting

pots in the fourth and third centuries BC. Perhaps, Theophrastus was referring to *amphorae* reused as planters. Excavations of Hellenistic gardens may help resolve the early chronology of utilitarian planting vessels. After the mid second century AD, there are no surviving examples of *ollae perforatae* in Roman gardens. *Amphorae*, not *ollae perforatae*, were reused as planters in the early third century AD temple garden of Elagabalus in the Vigna Barberini on the Palatine Hill in Rome (Villedieu 2001: 94-100, figs. 76-80). Vessels reused as planters continued in medieval Europe (A. Deagrave: Per. Comm.). Reportedly, six purpose-made planting pots were also found in a fifth to sixth century AD palace garden at Sigiriya in Sri Lanka (Gleason 1991: 274). However, these vessels seem to be exceptional. The apparent *terminus* for *ollae perforatae* in the archaeological record may be artificial, and further excavations should refine the chronologies for these vessels.

### Establishing *ollae perforatae* typologies

In order to understand what data *ollae perforatae* provide about the larger issues of garden design, planting techniques and plant trade in the Roman world, a typology for these pots is needed. A typology for *ollae perforatae* can be established by analyzing their distinctive features and distribution. The two most important characteristics of each pot for determining typologies are form and fabric. These two features are of equal importance. Depending on the examples of *ollae perforatae* from a site or region, the pots may be better classified by form or by fabric. As these pots were designed to be planted in the ground, the aesthetics of the pots, as well as their rims and bases, appear to have been less important considerations during their manufacture. The different forms of *ollae perforatae* at Pompeii, Jericho and Petra seem to derive from local utilitarian wares, which were adapted to serve as planting pots (Yellin and Gunneweg 1989: 85-90; Di Giovanni 1996: 90-92; figs. 18-19; Macaulay Lewis 2006).

For example, *ollae perforatae* from Vesuvian gardens are best classified firstly by fabric, and, secondly, by their form. During an examination of the Vesuvian pots, three distinct types, which I have termed Vesuvian types A, B and C, emerged

Table 1

*Ollae perforatae* from the Roman World. This table can be used only as a preliminary total, as excavations are ongoing (author).

|  |                |  |                 |
|--|----------------|--|-----------------|
| <b>ITALY</b>   |                | Villa di Tor Bella Monaca  | 1               |
| <b>Vesuvian Region</b>                                   |                | Settecamini on via Tiburtina   | 1+              |
| <b>Pompeii (218+)</b>                                    |                | Roman necropolis at Fidene, columbarium near Via Salaria Antica at the foot of Villa Spada | 1               |
| House of the Lovers (I.x.10)                             | 1+             | Villa Imperiale at San Nicola, S. Etruria  | 1+              |
| House of the Hebrew (L.xi.14)                            | 1              | Marina di S. Nicola  | 11              |
| House at I.xiv.2   | 1+             | Ager Faliscus  | 1               |
| House at I.xiv.12  | 4              | <b>Total</b>   | <b>147+</b>     |
| House of the Ship Europa (L.xv.3)                        | 28             | <b>The City of Rome (116)</b>  |                 |
| Garden of Hercules (II.viii.6)                           | 9              | Vigna Barberini  | 5+              |
| Triclinium with the Mosaic Fountains (II.ix.7)           | 1              | Horti Luculliani   | 13+             |
| Vineyard at III.vii                                      | 1              | Esquiline Horti  | 74              |
| House of Sallust (VI.ii.4)                               | 1              | Esquiline - location unknown   | 16              |
| House of Marcus Lucretius Fronto (V.IV.a)                | 25             | Domus Aurea  | ?               |
| House of the Surgeon (VI.i.10)                           | 7+             | S. Suzanna, via XX Settembre   | 8               |
| House of the Greek Epigrams (V.i.18)                     | 8+             | <b>Ostia (10)</b>  |                 |
| House at VI.16.27  | 8              | Insula of the Paintings (Insula dei Dipinti - I.iv.2-4)                                    | 5               |
| House of Ganymede (VII.xiii.4)                           | 4              | Regio 4, Insula 4  | 3               |
| House of Marcus Lucretius (IX.iii.5/24)                  | 3              | Unknown Location   | 1               |
| House of Julius Polybius (IX.xiii.1-3)                   | 3              | One of the villas of Dragoncello   | 1               |
| The House of the Centenary (IX.viii.6)                   | 1+             | <b>Total</b>   | <b>126+</b>     |
| House of Marcus Fabius Rufus                             | 1+             | <b>GREECE</b>  |                 |
| Temple of Venus  | 1              | Hephaisteion, Athens   | 14              |
| Outside of the Porta Ercolano                            | 109            | Stoa of Attalos, Agora   | 1               |
| <b>Herculaneum</b>                                       |                | Actium tropaeum monument, Nikapolis  | 2+              |
| Casa dei Cervi (IV.21) - pergola                         | 4              | <b>Total</b>   | <b>17+</b>      |
| Casa dei Cervi (IV.21) - garden                          | 2*             | <b>JORDAN</b>  |                 |
| Casa del Salone Nero                                     | 10             | Petra Garden and Pool Complex  | 9               |
| <b>"Villa of Poppaea" at Oplontis, Torre Annunziata</b>  |                | Petra "Great Temple"   | 10              |
| Southeast, porticoed garden                              | 85             | <b>Total</b>   | <b>19</b>       |
| Planter pool garden                                      | 4              | <b>SYRIA</b>   |                 |
| <b>Stabia</b>  |                | Muhi   | <b>Total</b> 1+ |
| Villa San Marco  | 1              | <b>ISRAEL</b>  |                 |
| Villa San Marco - eastern peristyle                      | 8              | Small courtyard garden, Herodian Palace, Wadi Qel  | 33+**           |
| <b>Boscoraele</b>  |                | Rows of pots around swimming pool, Herodian Palace, Wadi Qelt                              | ?               |
| pots from ancient Boscoraele, context unknown            |                | Benches of Hemicycle, Herodian Palace, Wadi Qelt   | 14              |
| Pots, unknown context                                    | 36             | Sunken garden, Herodian Palace, Wadi Qelt  | 2               |
| Museum in Boscoraele, unknown context                    | 2*             | <b>Total</b>   | <b>49+</b>      |
| Unknown Context  | 6              | <b>FRANCE</b>  |                 |
| <b>Total</b>   | <b>375+</b>    | Villa at Richebourg (Yvelines)   | 33              |
| <b>Central Italy</b>                                     |                | Pots from Lyon Region  | 3               |
| Prima Porta, Swedish Excavations                         | 64             | Hauts de St-Just   | 2               |
| Prima Porta, SAR Excavations                             | 35             | Rue des Farges   | 3               |
| La Celsa   | 1+             | Commarmond collection, Musée de Lyon   | 3               |
| Via Flaminia, 600 m. SEE of Prima Porta                  | 6              | Workshop at La Sarra   | 3               |
| Villa at 21.400 km on the Via Flaminia                   | 1              | Saint-Romain-en-Gal  | 3               |
| Monte S. Michele, SW of Prima Porta                      | 1              | Nimes-rue Séguier  | 4               |
| Castel Giubileo  | 1              | <b>Total</b>   | <b>54</b>       |
| Centocellae  | ?              | <b>BRITAIN</b>   |                 |
| Albano   | 3              | Fishbourne   | 4+              |
| Tusculum   | 1              | Eccles   | 30+             |
| Boville, near Villa Senni, ancient Via Latina            | 1              | Walting Street   | 2               |
| Villa Comunale di Anzio                                  | 1              | Casterly Camp  | 1               |
| Ager Capenas - Casale Marcigliana                        | 1              | Bancroft   | 2               |
| San Biago, near Nepi                                     | 1              | <b>Total</b>   | <b>39+</b>      |
| Horace's Villa, Licenza                                  | 4              | <b>Total Number of known/published pots</b> 827+   |                 |
| Hadrian's Villa  | 5              | this total should be seen as preliminary, as excavations and studies are ongoing           |                 |
| N. of Via Praenestina at Tor Angela                      | 1              |  |                 |
| Via Praenestina, Pagus di Nona                           | 2              |  |                 |
| Villa, Monte Porzio Catone                               | 1              |  |                 |
| Villa in Contrada Colonnacce, 18th KM of the via Aurelia | 1              |  |                 |
|  | * above ground | ** 33 of a possible 77 located   |                 |

(fig. 2). Of these three types, all are local and are made of volcanic clays, typical of many of the utilitarian wares found in the Vesuvian region. Each differs in terms of inclusions, weight and firing. While archaeometric studies have not been carried out on any *ollae perforatae* from the Vesuvian region, comparison with other utilitarian wares made in the Vesuvian region and discussion with local archaeologists confirmed that these pots were manufactured locally. The pots range in date from the first century BC to AD 79.

While typologies for the pots from the Vesuvian region can be established fairly easily, this is not the case for the rest of Roman Italy (Messineo 1984: 76-77; figs. 12, 14, 15a-f; Macaulay 2006; Macaulay Lewis 2007). *Ollae perforatae* in this region vary tremendously in both form and fabric not only on a regional level, but also on a site level. The *ollae perforatae* recovered from gardens at “Horace’s Villa” (Licenza), Hadrian’s Villa and Livia’s Villa at Prima Porta are different. Furthermore, each site has at least two distinctive types of *ollae perforatae* (Hannestad 1982; Salza Prina Ricotti 2000; Macaulay 2006; Macaulay Lewis 2007). The typologies for pots outside Roman Italy also confirm this diverse picture (Barat, Morize 1999: 217-223, figs. 4-9). In the garden of the Gallo-Roman villa at Richebourg, France, the excavators identified eight different types of *ollae perforatae* (Barat, Morize 1999: 224-229, figs. 12-13). However, these pots do not match any other pots found at sites in France. In Greece, the two different sites where *ollae perforatae* have been found, the Actium *tropaeum* monument at Nikopolis and the *Hephaisteion* in Athens, each have their own distinctive type of pots, made of different fabrics and encompass different forms (Zachos 2003: 64-92; Thompson 1937: 396-425). Typologies for *ollae perforatae* should be established only where the evidence permits. Thus far, no general, large scale typologies on a regional or interregional level can be established.

### ***Ollae perforatae* as evidence for garden design**

*Ollae perforatae* were used in all types of Roman gardens. By examining the different contexts of *ollae perforatae*, we can understand the role of planting pots in the different types of

Roman gardens, the plants *ollae perforatae* housed and discern some of the principles that underlie Roman garden design. *Ollae perforatae* from the Vesuvian region demonstrate how the Romans used such vessels in commercial, domestic and villa gardens. The presence of *ollae perforatae* in sacred gardens and royal, monument gardens in Greece and Petra respectively also informs our understanding of the use of these vessels in other garden types.

### **Commercial gardens in the Vesuvian Region**

In Pompeii, W.F. Jashemski excavated a number of commercial gardens, including the Garden of Hercules (II.viii.6). Here, a large garden was attached to a small house. The majority of the plantings in this garden were related to the growing and selling of commercial flowers for garlands (Jashemski 1979b: 408-410). During her excavations, Jashemski found ten Vesuvian type A *ollae perforatae* and an amphora base reused as a planter. Seven pots were found in the root cavities along the east wall, and one was located along the south wall (Jashemski 1979b: 408-410). The fragments of *ollae perforatae* were also found in the backfill along the eastern wall. The root cavity found in one of the pots appears to have been that of tree of the citron *genus* (Jashemski 1978b: 408). Therefore, it seems likely that in this garden the *ollae perforatae* housed trees.

While trees may have provided shade for the flowers grown in this garden and, no doubt, created a pleasant location which the owner of the house enjoyed, the trees probably were raised for a commercial purpose, like the garden’s flowers. The pots may have been used for aerial layering and housing saplings. The presence of a lemon, or citron, plant which was propagated by layering, in the Garden of Hercules further supports the theory that this garden may have also functioned as a tree nursery, producing citrons or lemon saplings for the Pompeian market.

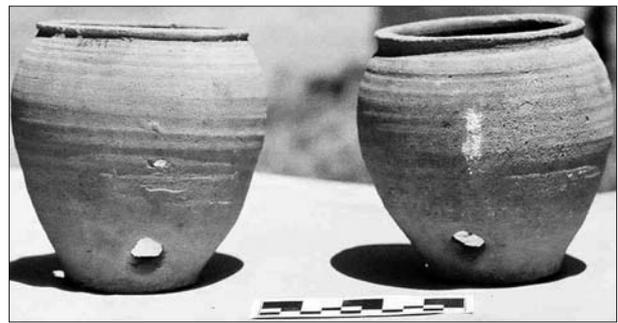
It may be that the commercial gardens of the Garden of Hercules, like those of the House of the Ship Europa (I.xv.3), the vineyard at III.vii and other unexcavated commercial gardens, provided Pompeian gardens with plants (Jashemski 1979a: 233-242). The design of commercial gardens and vineyards is overwhelming linear, with plants



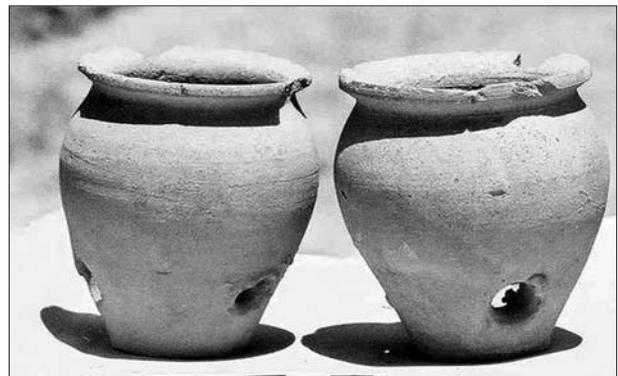
a



b



c



d

2. - Examples of the three types of planting pots of Vesuvian region, Italy (author):

- a - Vesuvian Type A, House of the Europa, Pompeii;
- b - Vesuvian Type B, Pompeii;
- c - Vesuvian Type C2, Ancient Boscoreale;
- d - Vesuvian Type C1, Ancient Boscoreale.

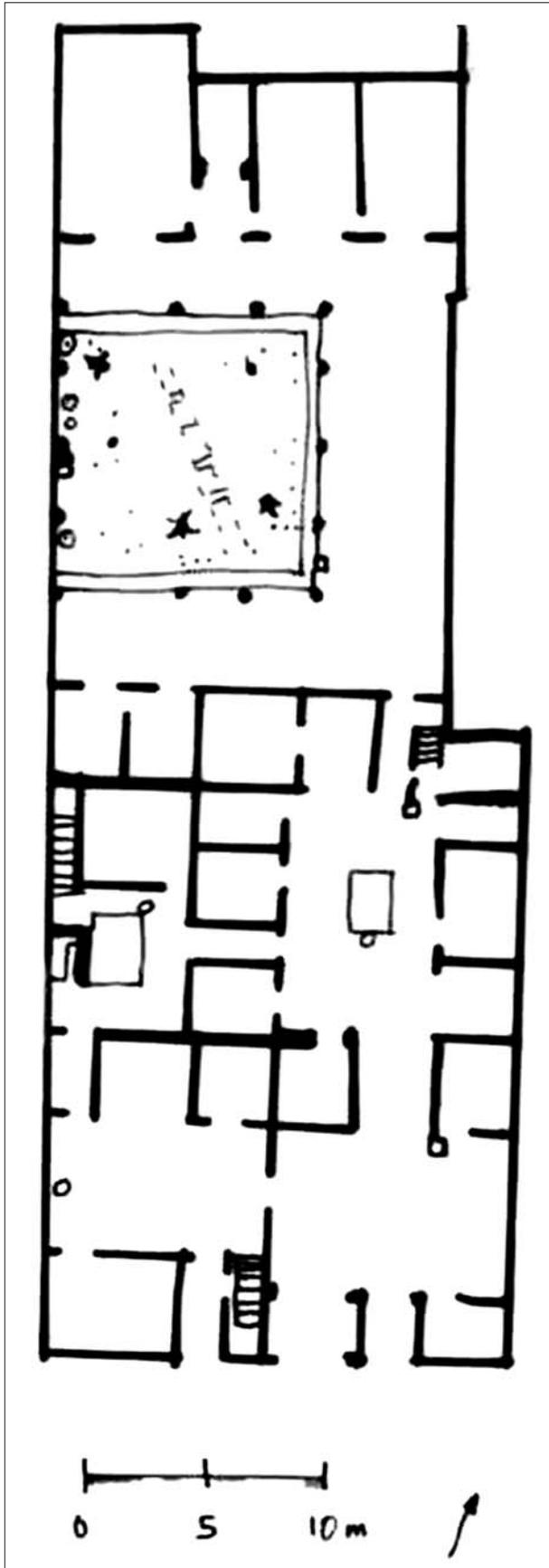
being planted in rows. Such a design reflects the need to use space effectively and productively, but it also created an organized visual effect that the owner could admire.

### *Domestic and villa gardens in the Vesuvian Region*

Villa and domestic gardens appear to be the most common contexts for *ollae perforatae* in the Roman world. There are numerous domestic and villa gardens in the Vesuvian region that contained *ollae perforatae*. The gardens of Pompeian villas and houses were designed landscapes, usually enclosed by architecture. The owner of a garden

made conscious decisions about the (dis)organization of the garden and its plantings. Of Vesuvian gardens that used *ollae perforatae*, these can be grouped into three styles: the informal, the designed and the formal. The domestic gardens of Pompeii reflect the wide scope of garden design, while the villa gardens of the Vesuvian region, Roman Italy and France, which will be discussed in a moment, are overwhelmingly formally landscaped.

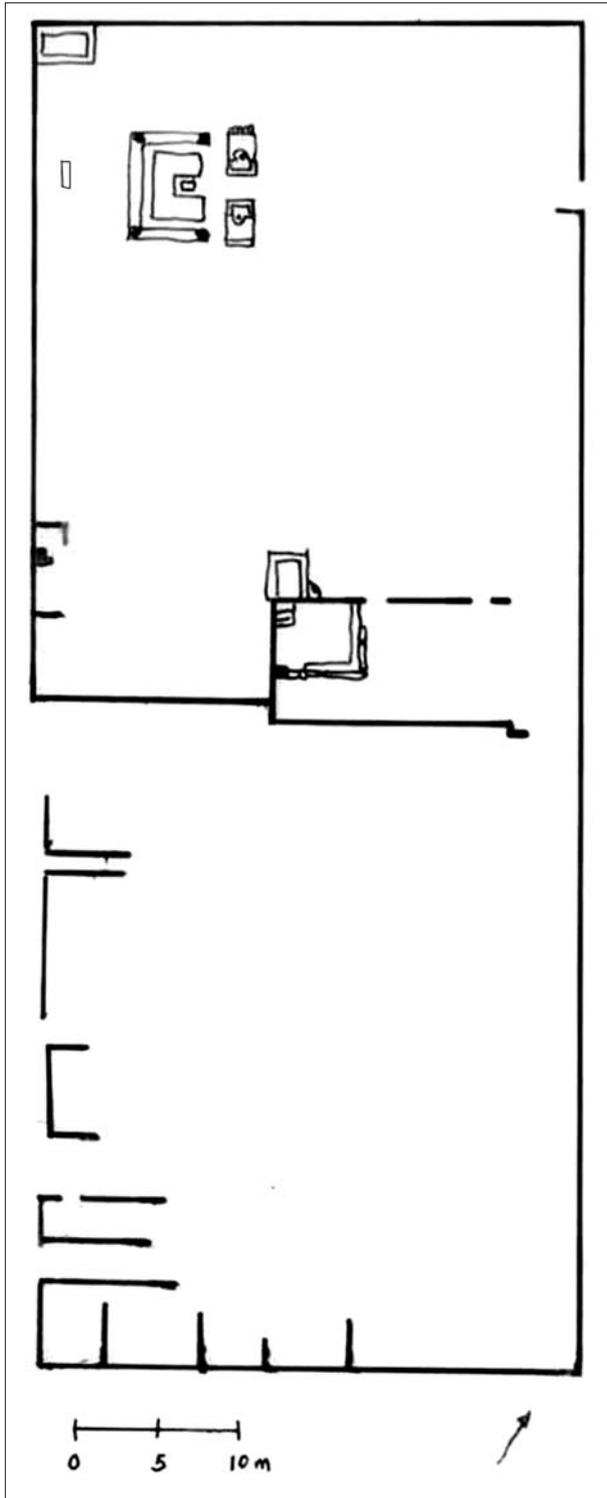
An excellent example of the informally planted garden is that of the House of Julius Polybius (IX.xiii.1-3) in Pompeii, where Vesuvian type A *ollae perforatae* were found (fig. 3). This



3. - Base plan of the House of Julius Polybius (author after Jashemski 1992a: 249, Plan 94).

garden was densely planted with a large number of trees. Fragments of *ollae perforatae* were found along the edge of the south wall around root cavities, of which casts were made. Fragments of two other pots were found when two of the cavities along the western wall were excavated. The pots contained trees, and they were broken before they were placed in the ground (Jashemski 1992b: 278). The location of many of the trees against the western wall may have meant that they received cooler breezes, but not the strongest, hottest sunlight (J. DeLaine: Per. Comm.) The nail holes on the wall above the roots suggested to Jashemski, the excavator, that the trees had been espaliered, or flattened against the wall. The espaliering of the trees presumably created a beautiful effect, perhaps something like a three-dimensional wall painting.

Between informal domestic gardens and formal villa gardens was an alternative, which can be described as a designed garden. A number of designed gardens are currently being excavated at Pompeii (E.M. Viitanen and M. Robinson: Per. Comm.). The house at II.ix.6, which was excavated in the 1950s and 1970s, appears to have contained a designed garden (Jashemski 1992a: 97, plan 31) (fig. 4). In its northwest section was a large masonry *triclinium* and table, which was covered by a pergola mounted on four stuccoed columns. A low wall enclosed the *triclinium* and contained a space for plants. In front of the *triclinium* were two ornate, mosaic fountains, decorated with garden paintings and with ducks and fish on the front of each drum. A fountain was located in the northwest corner of the garden, and an altar was unearthed near the west wall, behind the *triclinium*. Jashemski's excavations revealed the presence of root cavities, possibly those of trees, and one *olla perforata* along the north wall. While we cannot reconstruct the overall planting pattern of the garden (Jashemski 1992a: 97), we can make a few comments on the design. The garden does not appear to be formally laid out. The *triclinium* was not on an axis with the architecture of the house nor is it in the center of the garden. It is located in the northern part of the garden, is clearly framed, and is the focal part of the garden. The planting of the north wall with trees would have added to the atmosphere of *amoenitas* in the garden. While Jashemski suggested that this garden might have served as a vineyard (which would suggest a highly organized



4. - Base plan of House at II.ix.6 (author after Jashemski 1992a: 97, Plan 31).

planting pattern), the presence of the *triclinium* would have interrupted such a design. Thus, this garden was probably neither formally nor informally organized. By designing the northern part of the garden around the *triclinium*, the

owner of the garden was able to appreciate his fountains and the trees of his garden, which may have also brought him an income. Thus, just because a garden was not symmetrically and formally planted did not mean that it lacked design.

The use of *ollae perforatae* in the villa gardens of the Vesuvian region complement this picture and are also highly informative about garden design. The contexts of *ollae perforatae* demonstrate that the majority of Roman villa gardens were designed formally. The use of *ollae perforatae* in gardens from the so-called villa of Poppaea from Oplontis and other villas in the Roman world illustrates this point. The villa of Poppaea at Oplontis is a large, well-preserved suburban villa, just over a mile outside Pompeii. In this villa, there are thirteen known gardens (Jashemski 1992a: 293, plan 131). Two of the gardens, the Planter Pool Garden (16) and the Large Garden (59), used *ollae perforatae*. In the Planter Pool Garden, *ollae perforatae* were used to create an elaborate display of *topiaria* and water. The plantings in the Large Garden are an excellent example of a formally planted garden. Located to the east of the main entrance, the Large Garden was enclosed on three sides by a *porticus*. Excavated in the 1970s, two rows of root cavities were found, directly in front of each column, and outlined the colonnade's three sides. Each pot had a single base hole and three side holes; they were broken before they were placed in the ground. The inner row of pots probably housed trees. The row of pots, closest to the columns, was placed at an angle towards the columns and may have housed some type of climbing vine (Jashemski 1979a: 295). The use of planting pots in the large portico garden informs our understanding of garden design. The location of pots indicates that in certain gardens plantings had a strong relationship to the architecture, which enclosed them. Here, the pots extended the portico and created a tree-lined promenade. The vines may have been trained to climb the columns, creating a beautiful visual effect. Thus, the pots could be used to create ornamental gardens.

The so-called second peristyle garden at the villa of San Marco in Stabia, not far from Pompeii, has been partially excavated and appears to be another example of a formally planted garden (Jashemski 1992a: 305-307, figs. 348-50, plan 135). Along the edge of the garden, next to the

gutter, eight *ollae perforatae* were recovered and appear to have a relationship to the architecture, possibly responding to the colonnade. Formally planted gardens were also constructed without the use of *ollae perforatae*. In Pompeii, the house of Julia Felix (II.iv) contained a number of gardens, including a large garden that was planted rectilinearly (Jashemski 1992a: 86-88, plan 27). The garden of the house of Loreius Tibertinus, also known as the house of D. Octavius Quartio (II.ii.2), at Pompeii, was designed around a *euripus* and vine-covered pergola (Jashemski 1992a: 78-83, fig. 90, plan 25); a series of rows of shrubs and trees, some of which were in *amphorae*, framed the *euripus*.

The orderly planting of villa gardens in the Vesuvian region seems to be typical of villas in Roman Italy and the provinces in the first century AD. For example, in the small garden at the Villa of Livia at Prima Porta, plants in *ollae perforatae* responded to the Ionic colonnade. They were located in line with the columns and in the center of a number of the intercolumniations (Klynne, Liljenstolpe 2001: 224; Macaulay Lewis 2007). The garden of the mid-first century AD villa at Richebourg in France (mentioned on p. 210) was laid out in a quadripartite pattern of plants in *ollae perforatae* (Barat, Morize 1999: 225, fig. 11). The Ionic peristyle garden at Herod's winter palace in Jericho, which used *ollae perforatae*, was also formally planted (Gleason 1993: 159-161). While each garden's design and plants were different, the Roman villa garden was typically designed in a conscious, orderly fashion.

The use of *ollae perforatae* in the first centuries BC and AD villa gardens of the Vesuvian region presents a clear picture of Roman garden design. There appear to be three types of gardens – the informal, the designed and the formal. Formal gardens appear to be favored by Roman villa owners regardless of location. These formal gardens often responded to architecture, forming what B. Bergmann has termed a “green architecture” (Bergmann 2002: 99). *Ollae perforatae* play an important part in the creation of landscape architecture and *ars topiaria* in these gardens.

While the evidence for *ollae perforatae* and gardens from the Vesuvian region is rich, the evidence for pots and garden elsewhere in Roman Italy is not as complete. In particular, the evidence for *ollae perforatae* and gardens in the city of

Rome is scant. Nineteenth and early twentieth century excavations record large numbers of *ollae perforatae* found from the *Domus Aurea* (Messineo 1984: 71, 81, fig. 21) and from an Esquiline *horti* (Messineo 1984: 69-71, 75-77, figs. 12, 14, 15a-f). The excavation of a first and second century AD Imperial garden in Vigna Barberini, which used planting pots in its design, indicates that formal gardens played an important part in imperial and elite residences in the city of Rome (Villedieu 2001: 76, fig. 55). The presence of *ollae perforatae* in the gardens of the *Horti Luculliani* suggests that planting pots also played an important role in the creation of the gardens of a *hortus* (See Jolivet and Giardini in this volume). In Rome, no examples of *ollae perforatae* survive from domestic, non-*horti* contexts. Recent excavations of *Insula* of the Paintings (*Insula dei Dipinti*, I.iv.2-4) in Ostia by J. DeLaine have uncovered five planting pots, a reused amphora and a planting pit in a late Hadrianic garden (J. DeLaine: Per. Comm.). This suggests that small, domestic gardens were probably an important part of the urban landscapes of Roman Italy in the first and second centuries AD.

#### *Sacred gardens and monumental gardens*

Monumental and sacred gardens also used *ollae perforatae*. These include the Actium *tropaeum* monument at Nikopolis in Greece, the garden of the temple of Hephaistos in Athens' Agora and the temple of Venus at Pompeii. *Ollae perforatae* were also used in Petra to create a monumental, royal garden. *Ollae perforatae* are a lens through which we can understand the design and goals of sacred and monumental gardens. A brief study of *ollae perforatae* and their use in gardens from the *Hephaisteion* in Athens and the royal garden at Petra illustrates how planting pots were used in such gardens.

In the 1930's, D.B. Thompson excavated the garden that surrounded the *Hephaisteion*. She discovered ten nearly complete pots and fragments of four others in a series of rock cut pits around the temple, which she grouped into two categories (Thompson 1937: 404, figs. 1-2, 6). She also discovered a single pot 150 m. south of the Stoa of Attalos (Thompson 1937: 409). The garden of Hephaistos was originally planted in the early third century BC. It was expanded once and replanted at least twice during Roman times

(Thompson 1937: 410). Two of the pits, B 5 and B 10, each contained two pots, suggesting a replanting. In the cutting B9, a dark oval patch of earth may have been a basket, which may have housed another plant and marked a replanting (Thompson 1937: 410-11, 420).

The garden of the *Hephaisteion* is formally planted and organized. The planting pits established a linear design and the pots maintained this. Such a design is in keeping with sacred gardens known from Gabii, where gardens were formally planted in rock-cut pits around the temples. The plantings at Actium *tropaeum* monument at Nikopolis also seem to respond the Π-shaped portico's architecture. Thus, sacred gardens, particularly if associated with a temple or portico, appear to have been planted formally. The parallels of design and planting pits with other sacred groves also suggest that these pots may have contained trees rather than the elaborately planted garden proposed by the excavator (Thompson 1937: 425). Furthermore, trees were a prominent part of the Agora's landscape (Thompson 1963: 8; Carroll-Spillecke 1989: 30-33; Theb. 12.481-409; Kap. I 3 G, IV 5; Plut., *Kimón*, 13).

The pots from the *Hephaisteion* are highly informative for our understanding of a number of garden themes. The pots are used in the creation of sacred gardens. The planting of the pots in rows further supports a Roman preference for formal gardens that interacted with the architecture associated with a garden. Here, plantings frame the temple. The replanting of this garden three times is also significant. It speaks to the intensive approach and constant care that gardens in the Roman world required. Furthermore, these pots may reflect a Roman form of gardening, since these pots do not bare similarity to the previous planting pots or techniques employed in Greece.

Planting pots were also used to create monumental, royal gardens. L.A. Bedal's excavations of the Petra Garden and Pool Complex (PGPC) demonstrated not only the presence of gardens at Petra, but also the existence of *ollae perforatae* here (Bedal 2004; Macaulay Lewis 2006). Of the nineteen fragmentary *ollae perforatae* from Petra, nine came from the Petra Garden and Pool Complex. Of these, two (PGPC pots 4 and 9) were *in situ* in the garden. The existence of *ollae perforatae*, alongside the

presence of planting pits, confirms that gardens were present at Petra.

The use of planting pots that predate Rome's annexation of Petra in AD 106 is noteworthy. The strong cultural and political ties between Judea and Nabataea may explain the presence of *ollae perforatae* before AD 106. The Petra Garden bears a strong similarity to the monumental pools and gardens found at numerous Herodian sites and is virtually identical (although on a considerably smaller scale) in design to the pool complex at Herodium (Netzer 1985: 344-352; Bedal 2004: 171-178; for other examples, see Netzer 1990: 44-45, fig. 10; Bedal 2004: 175). The strong familial ties and political rivalry between Aretas IV and Herod help explain these architectural similarities (Joseph, *BJ*, 1.8.9; 1.13-14, 18-19, 24. 27-29; Bedal 2004, 173; Hammond 1973: 51; Roller 1998: 254). Influenced by the changes in Roman architecture and garden design, Herod, a Roman client king, was intensely aware of innovations in Roman architecture and landscape design. He added monumental gardens to his palaces (see Evyasaf in this volume). As noted above, planting pots were used at his winter palace in Jericho to plant the Ionic peristyle garden (Gleason 1993: 159-161).

The presence of *ollae perforatae* before the arrival of the Romans may be best explained by the cultural and economic ties between Herod and the Nabataeans, and the rich exchange these ties created. Aretas IV created a monumental garden-pool complex, possibly connected to a royal *Aula* (Bedal 2004: 171-185). The use of *ollae perforatae* in the Petra Garden may reflect Rome's indirect influence on its neighbors and some of their gardening and cultural practices. As excavations are ongoing, these observations are preliminary at best. Thus far, nothing can be said about the plants that these *ollae perforatae* held. However, the pots from Petra provide evidence for monumental gardens in a particularly harsh environment. No doubt the pots would have helped conserve water for plants.

### **Plants, planting techniques, horticulture, plant trade and *ollae perforatae***

*Ollae perforatae* also inform our discussion of ancient Roman plants, horticulture, planting techniques and plant trade. The majority of the plants in *ollae perforatae* which have been

identified appear to be trees. However, vines and shrubs are also found in planting pots. On this point, the ancient sources and archaeological material seem to be in agreement. Further studies of soils and root cavities from garden excavations should provide more insights into what plants these pots contained.

*Ollae perforatae* in ancient Roman villa and domestic gardens are heterogeneous in both form and fabric. The gardens of Roman Italy, as well as the gardens found at the villa sites in other parts of the empire, often feature multiple types of *ollae* in the same context. The diversity of *ollae perforatae* in a single garden may indicate the planting of different species or specimen plants. A small, lightweight *olla perforata* (see fig. 2b) with a wide mouth and with three side holes probably contained a different plant than a heavy *olla perforata* with or without holes (See fig. 2a, c-d.). For example, the presence of different purpose-made pots at Livia's Villa at Prima Porta may reflect the presence of different plants. At Prima Porta, the type A *ollae* were probably too large and heavy for aerial layering; they may have housed saplings from a nursery. The Prima Porta type B *ollae* were small and light enough for aerial layering and had side holes that provided more drainage and air for a root system. These pots may have contained different plants and may have come from a different nursery (Macaulay Lewis 2007). *Amphorae* reused as planters and purpose-made *ollae perforatae* were sometimes used in the same gardens, as at Hadrian's Villa (Salza Prina Ricotti 2000: 41-44). These two types of planting vessels, so different in size, may have housed different plants.

### Planting techniques and horticulture

Planting pots are highly useful in the propagation of plants via aerial layering. In the process of aerial layering, a branch, often cut open, but still attached to the parent, is planted with soil in a ceramic pot (today tin and plastic pots are used) or a basket and left hanging for an extended period of time. The plant puts down roots. Once a root system develops, the branch is then cut from the parent and can be planted. Aerial layering (rather than raising a plant from a seed) is a desirable means of propagation because it guarantees that the new plant(s) would be identical

to its parent. Once a new plant had been grown from an aerial layer, a planting pot allowed easy transportation of a plant from a nursery to a garden.

The planting of trees and other plants in pots also had the positive effect of preserving water. By planting a plant in a pot, less water was needed, because a base hole enabled an *olla perforata* to drain more effectively. The conservation of water was essential in the creation of gardens due to hot summers that were experienced in many parts of the Roman Empire. Furthermore, side holes may have allowed a plant's roots to grow more effectively, giving the roots something to grip as they grew (J. DeLaine Per. Comm.) and may have protected the roots.

By potting plants in pots and then planting them in the ground, an ancient gardener maintained total control over his garden, enabling him to produce interesting and "unnatural" horticultural and topiary creations. When a plant was potted, it could be trained. By keeping a plant in a pot and preventing it from growing, a gardener could dwarf or stress a plant. For example, when a fig's roots are restricted by a pot, fig trees start to bloom and produce fruit regardless of season. Thus, a Roman gardener could theoretically create a garden like that depicted in the wall paintings of the subterranean garden room at Livia's Villa at Prima Porta. If they were in planting pots, plants could be swapped in and out, as desired. Or if a plant died, it could easily be replaced.

The creation of such displays was time consuming. Slaves and gardening staff were essential, not only for the creation of *ars topiaria*, but also at a more basic level they had to care for potted plants. Each potted plant required more care than a plant simply planted in the ground. While these pots could have been used for topiary displays, often the roots of the plants were allowed to grow and break the pots. In other cases, the pots were shattered before they were planted. Alternatively, gardens with intact pots may have been failed due to a lack of water or care. *Ollae perforatae* in a garden required a great deal of human effort and resources. The use of such vessels suggests that Roman horticulture was highly intensive and expensive. The ability to have a garden, which required a great deal of slave labor and expense to maintain, attested to one's wealth and social status.

***Nurseries, the commercialization of plants, and the ancient plant trade***

The presence of planting pots in Roman gardens also informs us about the place of plants in ancient Roman trade patterns and economics. The presence of planting pots throughout the Roman world suggests a commercialization of plants and the advent of a plant trade. Aerial layering presumably did not take place in one's garden, but in nurseries or commercial plant centers. The presence of pots at the Garden of Hercules and other commercial gardens at Pompeii suggests that plants were raised for a commercial market. The *ollae perforatae* in the garden of the House of the Greek Epigrams at Pompeii contained different soils from that of the garden (M. Robinson: Per. Comm.). In other words, the pots came from outside the garden and, thus, are additional evidence for the commercialization of plants and plant trade.

The existence of nurseries and the increasing commercialization of plants also reflect a demand for specimen trees and mature trees. Just as in modern gardens, certain trees and plants survived and others did not. Plants that died needed to be replaced with mature plants. The raising of plants at nurseries could have allowed Romans to plant more mature plants and trees in their gardens, bypassing the two-to-three-year period during which one had to wait while saplings grew. This use of pots to transport plants from different nurseries to a villa may suggest an increasing commercialization of the plant trade and increased demand for plants for ornamental gardening.

While the presence and use of *ollae perforatae* in the Roman world suggests an increasing commercialization of plants and the development of a market for expensive, high status plants, *ollae perforatae* fail to shed light on a fundamental issue, mentioned by Pliny the Elder: interregional trade (Plin., *HN*, 12.7.15-16). All the *ollae perforatae* found in the Vesuvian region are local. Furthermore, no *ollae perforatae* from the Vesuvian region, where there is the largest number of surviving *ollae perforatae*, have appeared in other parts of Roman Italy or in the Roman empire. The pots from Jericho, which have been tested archaeometrically, appear to be local (Yellin, Gunneweg 1989: 85-90), as do pots from Petra (Bedal 1998: 353; 'Amr 1987: 198; Gunneweg *et al.* 1988: 342). In all regions except Roman

Britain, *ollae perforatae* are produced and used locally.

In Britain, the possibility of regional trade exists. In the 1970s, over thirty pots with three unique, triangular side-cuttings and a single base hole (with the exception of one pot) were discovered at a Roman villa and kiln site at Eccles, Kent (Detsicas 1981: 441). *Ollae perforatae* wasters in the kiln confirm the production of the pots on site. The Eccles kiln not only produced *ollae perforatae* for the local market around Kent, but two pots manufactured at the Eccles kiln were also discovered at Watling Street in London. These pots, originally misidentified as chimney pots, have the same unique side triangular cuttings and single base hole. They were also composed of the same fabric. The pots date to AD c. 50-75/80 (Detsicas 1981: 441). Along with the *ollae perforatae*, other examples of Eccles wares – bricks, roofing tiles, and flue tiles – of a similar fabric confirm a non-local distribution of Eccles wares in London (Davies *et al.* 1994: 36).

At least in Roman Britain, some *ollae perforatae* moved from a rural site to the nearest urban center. Therefore, we can only confirm that *ollae perforatae* were used as vessels in which plants were traded on a local and regional level. However, considering that trade of plants was largely done by the exchange of saplings or young plants rather than seeds in the pre-modern world (T. Walker: Per. Comm.), we may not have found *ollae perforatae* that were traded.

## Conclusions

This paper has tried to introduce *ollae perforatae*, establish a typology of these pots and discuss what these pots say about gardens, plants, planting techniques, horticulture and plant trade in the Roman world. *Ollae perforatae* are a highly informative lens through which we can examine Roman gardens. They inform us about what plants grew in a garden, how they were planted and the design principles of the Roman garden. The use of these pots in Roman gardens demonstrates that Roman horticulture was time-intensive and costly. There were probably nurseries, which supplied Roman gardens with plants. Often *ollae perforatae* contained costly mature or specimen plants. Furthermore, by planting plants in these pots and then placing them in the ground, plants required

constant attention and resources – an approach which seems to reflect broader Roman attitudes to nature – that nature should be controlled and shaped. These purpose-made pots appear to be used primarily during the Roman period – either within the bounds of the Roman Empire or in neighboring kingdoms that the Romans influenced. The presence and use of *ollae perforatae* may reflect a specifically Roman approach – one that was highly intensive, expensive and controlling – to horticulture and gardening.

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