HORTUS AGER PAUPERIS ERAT: SUBSISTENCE AND COMMERCIAL PRODUCTION IN THE URBAN GARDENS OF FIRST CENTURY AD POMPEII

by

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ABSTRACT

The garden, or *hortus*, was a core component of ancient Roman life. Over several centuries, the *hortus* underwent a complex process of evolution in Roman thought and space, beginning life as a small, humble plot used to grow vegetables for the table, and growing into a powerful symbol of social display in the early Imperial period. Yet despite mounting scholarly interest in this space, and extensive investigations by Wilhelmina F. Jashemski and other teams in the field, a misconception persists relating to the Imperial decline of the urban agricultural *hortus* and the supposed low contribution of its produce to local life. Such suppositions have led to scholarly interest being weighted towards the recreational garden, namely those owned by the elite. As such, the academic value of the agricultural *hortus*, as an important social tool, and a key source of economic and nutritional income, remains undervalued.

In response, this thesis undertakes an interdisciplinary analysis of thirty-two productive *horti* in Regions I and II of Pompeii, investigating the social, economic, and nutritional contribution of these spaces and their produce to the local population through an analysis of related archaeological, archaeobotanical, paleonutritional, and pictorial remains. Grounded in ancient literary receptions of the *hortus*, including the *hortus*' ability to reinforce and define collective Roman identity and memory, agricultural garden development and use in Pompeii is linked to recent social, economic, and geographical developments in the city, namely the growing commercialisation of Roman urban centres. This includes the first quantification of archaeobotanical assemblages from Campania, allowing hypothetical yields of selected domestic and commercial properties and their monetary and nutritional outputs to be produced, alongside a novel application of spatial syntax analysis of commercial and domestic properties, uniquely uncovering the intricate relationship between garden placement, crops, and use in the city.

The Roman *hortus'* complex process of evolution is found to culminate in a phenomenon of twenty-three new agricultural gardens created in the city's final years, prior to its destruction in the AD 79 eruption. This phenomenon is found to be a direct response to the geographic and economic challenges, commercial opportunities, and elite

social agendas discovered in previous chapters, and serves to underpin the persistent nutritional, social, and economic power of the *hortus* right into the city's final days.

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CHAPTER ONE: Cultivating the hortus

The Roman garden, or *hortus*, is a complex space situated at the core of Roman identity, memory, and society. Imagined as originating as the 'poor man's farm' (*hortus ager pauperis erat*) at the foundation of Rome,[1] the *hortus* came to be characterised as a locus of rusticity (*rusticitas*), simplicity (*simplicitas*), frugality (*frugalitas*), and virtue (*virtus*) by the Roman elite. Though the face of the Roman garden changed as the Empire grew, and a wave of *viridiaria* (see Chapter Two) and pleasure gardens, here signified as the capitalised *Horti* as opposed to the pluralised lowercase *horti*, which signifies the (primarily) utilitarian garden, were established throughout Latium and Campania, the traditional utilitarian connotations of the space persisted. Renaissance reproductions, emerging in late fifteenth-century palaces throughout Europe, have dictated most contemporary impressions of how ancient Roman gardens were constructed and used, an impression which has predominantly been reflected in scholarly accounts of Roman gardens from the late twentieth century. Scholarly assessments of Roman gardens have almost exclusively viewed them through the narrow lens of elite literary representations, only evolving more recently into a preoccupation with their spatiality and sensory impact. This has been a result of, and determinant on, methodology, which my own thesis aims to transform with an interdisciplinary approach.

Broadly speaking, recent scholarship understands domestic and public Roman gardens to be transgressive and liminal loci of personal, familial, and national identity yet, despite advances in garden archaeology, and a growing interest in Roman horticulture, the economic, social, and nutritional value of the agricultural *hortus* remains neglected. Here, I primarily use the term *hortus* to describe the multifaceted space used for food production, commercial activity, dining, display, and recreation in Pompeii, for the reasons I discuss below and in Chapter Two. However, the potentiality of the Roman garden to exist as a *pomarium* (orchard), *vinarium* (vineyard), *caupona* (inn), *viridiarium* (green and luscious pleasure garden planted with 'exquisite' plants),[2] *holerarium* (vegetable garden), and *hortulus* (a

[1] *hortus ager pauperis erat*: Plin. *HN* 19.52.
[2] Purcell 1996, 141.

garden of simple and natural pleasure),[3] sometimes all at one time, should continue to be kept in mind in the below discussions.

Wilhelmina F. Jashemski, a Roman archaeologist and classicist, pioneered archaeological investigations into Roman gardens and dedicated over five decades to the subject in Pompeii. In her memoirs, Jashemski emphasised both the complexity and importance of studying Roman garden space 'because of the intimate relationship of the garden to almost every aspect of Roman life – to architecture, painting, aesthetic expression, horticulture, social and economic life, city planning and religion.'[4] Her interdisciplinary approach, combining literature, art, and archaeology, not only altered our understanding of the landscape of ancient Pompeii, but also wider scholarly perceptions of the multi-use garden as a central feature of Roman society. From the 1960s onwards, Jashemski excavated vineyards and orchards, commercial flower and inn gardens, and domestic gardens in Pompeii, and estimated that productive green spaces accounted for 9.7 percent of the city's space. Further archaeological excavations have grown the number of gardens known to us and brought more evidence related to their varied operation and output to light.[5] Yet, despite her promotion of this space as crucial to Pompeian life, little to no effort was made by her or any scholar since to provide a definition for the agricultural garden, referred to here as the *hortus*, or to examine its complex contribution to local life.

This almost complete absence of interest in urban agriculture in Pompeii, combined with growing competition for resources and interest in sustainable agriculture in modern society, inspired the creation of a thesis which holistically explores the ancient experience of garden agriculture in the town and the impact of urban productive gardens on local nutrition, income, urban development, and social factors. In utilising literary, pictorial, epigraphic, spatial, archaeobotanical, and archaeological evidence from Pompeii in a multidisciplinary study, I will examine the monetary and non-monetary economies operating around the urban agricultural gardens and the many forms these spaces took in domestic and commercial settings in the final decades of the city's life.

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[3] Sen. *Ep*. 21.10.
[4] Jashemski 2015, 5.
[5] For example, the Casa della Regina Carolina Project has focused on excavating the garden area of this property in Pompeii using the methods drawn up by Gleason 2013b.

To achieve these aims, I will explore the dominant discourses surrounding the agricultural garden and how these impacted on the use and placement of these spaces and their produce in the urban centre of early Imperial Pompeii (research question number one). To understand the impact of the agricultural gardens in Pompeii, I will ask how these spaces, and their many different uses, fit into wider Imperial trends of increasing commercialisation in Roman urban centres, as well as the permeation of urban and countryside boundaries (research question number two). Aside from the yield estimates of one orchard and one vineyard provided by Jashemski,[6] questions remain unanswered relating to the output of gardens cultivated in the city. To answer this, I endeavour to estimate the yields of a case study of Pompeii's urban agricultural gardens using archaeobotanical material and consider the potential contribution of this output to local nutritional and income levels (research question number three). Finally, I will establish the extent to which these gardens tapped into consumer and social trends related to rustic produce exchange, consumption, and dining, and demonstrate their uses were rarely siloed (research question number four). By answering these key research questions, I endeavour to expand archaeological and historical enquiries into Pompeii's urban landscape, ancient garden scholarship, and the eating, working, living, and dining habits of its population.

After positioning this thesis within the context of horticultural, nutritional, spatial, and urban debates in Pompeian scholarship (below), Chapter Two provides the contextual setting for the remainder of the thesis and explores the history of the agricultural *hortus* in space, language, and memory. It does so through an exploration of the etymological and physical development of the *hortus* in ancient literary remains, and the application of memory theory, I set out the dominant discourses related to *rusticitas*, *simplicitas*, *frugalitas*, and *virtus* driving the agricultural garden's cultivation and development in first century AD Pompeii. The outcomes of this exploration are then tested within the space of a case study on the pseudo-Vergilian poem *Moretum* to better understand the epistemes which may have influenced the actions of productive garden owners, developers, and gardeners at this time. Through an appraisal of the characteristics and actions of the rustic protagonist, Simulus, this case study

[6] Jashemski 1973, 1974.

demonstrates the interconnectedness of the rustic *hortus,* Roman values, and collective identity which likely influenced Pompeian garden use and placement in the city.

The exercise in defining garden space, and the values bounded within it, provides the foundation for exploring the nutritional and monetary contribution of urban gardens to Pompeii's local population in Chapter Three. For the first time in Pompeian or ancient garden scholarship, this chapter builds the broadest picture to date of the *hortus* produce being consumed in Pompeii via the collation of all records of archaeobotanical remains from Pompeii. I approach the local diet from the 'source' and consider how far urban agricultural gardens in the city had the capacity to contribute to the known robust nutrition and income levels of the local population. In the final part of the chapter, I adopt the methodology used by Jashemski to estimate vineyard yields in Pompeii (for example, in the Large Vineyard at II.5) and estimate the potential yield of one large market garden in Region I.

Chapter Four expands the context, drawing out the economic and social impact of these 'consumable' goods. The first section investigates the journey that *hortus* produce takes through local, regional, and inter-regional trade and socio-economic networks. Epigraphic material from the town combined with literary evidence make it possible to consider the *macella* (markets), pop-up stalls, and *nundinae* (market days of the ancient Roman calendar) as nodes with detectable impact on urban *hortus* produce supply and demand in the last years of the town. The second part is concerned with the social impact of urban *horti* and builds upon the literary evidence featured in Chapter Two to examine the role of *hortus* produce in local non-monetary exchange, namely feasting and gifting. Art is an important window into the social motivations of individuals throughout history, and as such domestic wall art from Pompeii and nearby Herculaneum are examined as sources of information about rustic-produce consumption, exchange, and display. This interdisciplinary examination considers the role of *xenia,* or still-life paintings of rustic produce, in long-term traditions of client-patron relations and the social game of power and *Romanitas* display. The results of this enquiry set up spatial investigations into the placement and use of *hortus* space in the final two chapters.

Chapter Five brings into focus the spatial properties of the *hortus* and their imprint on the urban landscape of Pompeii in its final years. Using case studies of domestic and

commercial properties from Regions I and II of Pompeii, I begin to establish patterns related to the orientation of utilitarian gardens in architectural space. Taking as a point of departure Mark Grahame's 2001 spatial syntax analysis of domestic properties in Region VI of Pompeii, and Katherine von Stackelberg's study of domestic recreational gardens using the same methodology, I seek to demonstrate that urban garden space was placed according to the social and economic needs of the resident household or workers, and influenced by garden contents, the need for display (or not), and access and security needs. Examining a case study of thirty agricultural gardens from Regions I and II, my findings uniquely demonstrate that utilitarian garden space was strategically positioned in commercial and domestic properties for economic and social ends respectively, thus supporting the economic and social conclusions of the previous chapters.

In the final chapter (Chapter Six), I take a town-wide approach to Pompeii's agricultural garden spaces and, for the first time, map those created in the period of 'crisis' between the major earthquakes of AD 62/3 and the eruption of AD 79. This builds upon the preliminary comments made by Jashemski (1977), Pesando (2011), and Esposito (2018) regarding the construction of new garden space on urban land once occupied by properties damaged in the quakes and later demolished. Drawing on contemporary resilience theory, I discover 'new' garden space created or extended in the final years of the town and provide a visual map depicting the ever-growing imprint of agricultural activity upon the landscape of Pompeii.

I aim to demonstrate that *horti* were crucial to the economic, nutritional, and social identity and functioning of Pompeii, an importance which is reflected in the growing number of these spaces in the town's final years. Bringing the outcomes of the remainder of the thesis to bear upon this discovery, I link the growth in new commercial gardens to the rising value and demand for *hortus* produce and cash crops in the first century AD (now in Regions I and II apparently outweighing the demand for residential land), the growing commercialisation of Pompeii at this time, the increasing conceptual and physical permeability of *rus* and *urbs* in the early Imperial period, and the imbuement of collective Roman memory and identity in the

urban landscapes of Roman towns in the mid-first century AD.[7] Such external factors are discussed in former chapters, and all are highlighted by Flohr as interconnected areas of neglect in Roman urban history more generally. I shall return to the significance of these for this thesis below, but for now I hope to outline the scholarly context within which this thesis sits and demonstrate the new contributions it shall make.

1.1 Scholarly context: The state of garden scholarship

One evening, basking in the glow of her first published book and following an *al fresco* meal in her garden, Jashemski pondered over her next scholarly focus with her husband, Stanley.[8] His suggestion was: 'You love gardens; gardens were important to the Romans. Why don't you write your next book about Roman gardens?'[9] This conversation set in motion a career turn that would introduce the world to the architectural, aesthetic, social, and economic potential of the garden as an expression of Roman life.

By 1967, Jashemski and her team of archaeologists had discovered a *caupona* (inn) garden in Region I of Pompeii, the first of its kind in any excavations anywhere. This property, named the *Caupona* of Euxinus (I.11.10-11), was found to have been the scenic serving environment for customers dining under the shade of the trees and vines found growing there, who perhaps even sipped on the wine produced on site.[10] The discovery of this garden improved academic knowledge of Roman hospitality and garden space at the time and progressively altered views of the Roman world in scholarship and beyond.

Jashemski excavated more vineyards, commercial flower gardens, orchards, and kitchen gardens in Pompeii in the years that followed, discovering gaps in the landscape of the Roman garden and bringing to life the types of activities undertaken in each.[11] Her

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[7] These four outcomes are congruent with those outlined by Flohr (2020) in relation to the study of Roman urban-space development in first-century AD Italy.
[8] Jashemski's first publication was *The Origins and History of the Proconsular and Propraetorian Imperium to 27 B.C*, published in 1950.
[9] Jashemski 2015, 5.
[10] Jashemski 1967.
[11] Jashemski and her excavation teams discovered all manner of agricultural equipment, tools, cooking and manufacturing paraphernalia, root cavities, carbonised food, outdoor *triclinia*, shrines, irrigation methods, security measures, and even guard dog kennels. Her teams used new technology, such as the plaster of Paris

findings culminated in four significant volumes which still comprise the lion's share of archaeological knowledge about Roman garden space in contemporary scholarship.[12] Yet a gap in the shape of an urban agricultural garden still remains. This thesis aims to cultivate this space.

External to the work of Jashemski, scholarship in the field of Roman gardens prior to the 1990s was largely limited to discussions of *otium* (leisure) in, and the *locus amoenus* (pleasance) of, the garden, namely in elite Roman gardens, due to a methodological divide between archaeological and literary studies. Most influential was the work of Pierre Grimal who studied ornamental elite Imperial gardens in *Les Jardins Romains* (1969). This focus did not alter until the late 2000s. The subsequent approaches of later garden scholars followed the tradition established by Grimal and Jashemski in their steadfast dedication to the *Horti* found in and around the city of Rome,[13] and elite villas of the Bay of Naples.[14] The *Horti Romani* conference held in Rome in 1995 opened new avenues of interest into Roman gardens, for the first time considering the social influence of garden space upon individual character and vice versa.[15] Yet the historical, literary, and archaeological focus remained fixed upon elite gardens due to an overemphasis on related literature, through which first-hand stories, descriptions, and critiques of these spaces were handed down. Although significant archaeological advances had already been made by Jashemski, the agricultural use of Roman gardens and the social and economic significance of productive gardens was not focused on by scholars.[16] This was despite much of the geographical focus of garden scholarship being

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method for preserving root cavities, and camera balloons (the equivalent of today's drones) to scan for potential garden sites.

[12] *The Gardens of Pompeii Vol. I* (1979), *The Gardens of Pompeii Vol. II, The Appendices* (1993), *The Natural History of Pompeii* (2002), and *The Gardens of the Roman Empire* (2018), the last published by a team of scholars and students eleven years after her death in 2007. This final publication has now been followed by the first online corpus of archaeological gardens in the Roman Empire, for which I was an editor of the Vesuvian sites. This is available on an open access basis. Alongside the cataloguing of over 600 gardens in the *Gardens of Pompeii*, *Volume II: Appendices*, detailed reports of numerous Pompeian excavations were supplied by Jashemski between 1967 and 1995, including a large commercial flower garden (II.8.6), a Shop-House Garden (I.20.5), an extensive orchard-cum-vineyard complete with vegetable plots (I.15.1-3), the suitably named Large Vineyard opposite the Amphitheatre (II.5) (formerly thought to be the Foro Boario), and a *caupona* (inn) with a vineyard attached (I.11.11-12).

[13] MacDougall 1981; Häuber 1986; Bowe 2004; Hartswick 2004; Cima and Rocca 1998a.

[14] D'Arms 1979;Marzano 2014, 2015; Zarmakoupi 2014.

[15] For example see Boatwright, D'Arms, Häuber, and Wallace-Hadrill in the 1998 publication.

[16] Alongside the cataloguing of over 600 gardens in the *Gardens of Pompeii*, *Volume II: Appendices*, detailed reports of numerous Pompeian excavations were supplied by Jashemski between 1967 and 1995, including a large commercial flower garden (II.8.6), a Shop-House Garden (I.20.5), an extensive orchard-cum-vineyard

the urban and 'peri-urban' areas of Rome, both of which were already known to be abundant with market gardens in antiquity.[17] However, a shift in attention was nonetheless underway.

At the aforementioned 1995 *Horti Romani* conference, Andrew Wallace-Hadrill became one of the first scholars to ask whether the focus on the term *'Horti Romani*' was causing researchers to under-value the shifting use of urban and agricultural land over time, most especially in the periods following Roman expansion post-Actium (AD 31). Wallace-Hadrill also considered the neglect of the suburban and utilitarian origin of the *hortus* in garden scholarship up to this point, as it was evident to him that scholars were taking a reductionist approach to a potentially far more complex space. His 1998 paper in the conference volume was one of the first to assess the *hortus* outside of its archaeological physicality or as a tool of *otium,* and to identify 'the socio-cultural context of a specific model of *hortus* that emerged in the late Republic and early Empire', the agricultural *hortus*.[18] Pompeii was his main source, and yet he too fell short of appraising the persistent socio-economic impact of agricultural gardens in Pompeii, or any other cities.

The bias towards elite garden space recognised by Wallace-Hadrill was later echoed by Nicholas Purcell. The term '*Horti Romani*' does not exist in the surviving Latin literature. As a result, in his review of the same conference volume, Purcell criticised the totalising use of the term for referencing elite Roman gardens as monolithic and asked that the etymological development of the *hortus* and its related terms be appreciated for their contextual value.[19] Purcell rightly posited that only in this way might garden study move beyond literary representations of garden space, and their two-dimensional position as an elite memory theatre of Rome, towards a better understanding of their socio-economic position in wider society.[20] Purcell presented new avenues for horticultural enquiry outside of decorative programmes, at the same time continuing the precedent set by Grimal for etymological investigations into what a *hortus* was, what its origins were, and how this impacted upon its

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complete with vegetable plots (I.15.1-3), the suitably named Large Vineyard opposite the Amphitheatre (II.5) (formerly thought to be the Foro Boario), and a *caupona* (restaurant) with a vineyard attached (I.11.11-12).

[17] See Carandini 1988; Morley 1996, 83-90.

[18] Wallace-Hadrill 1998, 1.

[19] Purcell 2003, 3007. In this way, Purcell contributed to the 'Movement Turn'; see discussion below.

[20] Various authors evidence the positive upshot of Wallace-Hadrill's timely intervention in this subject area: Hölscher 2003; Larmour and Spencer 2007; Spencer 2010; Rutledge 2012; Galinsky 2015. The '*Hortus inclusus'* conference held at the British School at Rome (2016) advanced these discussions.

conception in Roman society.[21] His early discussion of *viridiaria* (verdant spaces of green and luscious plants; see section 2.1) to garden scholarship in 1996 raised awareness of the complexities of Roman garden space, and demonstrated the value of considering their potential as simultaneously utilitarian and recreational spaces.[22] The groundwork for this chapter was set in his 1995 chapter emphasised the universality of agricultural production in both country and urban landscapes in and around Rome, as well as the ability for villa owners to gain power through the accretion of food and food sources.[23] In agricultural production and garden space, power was manifested in elite and non-elite Roman lives alike.

Since then, garden and Pompeian scholarship have continued to be marked by an absence of interest in the utilitarian use of Roman garden space, both in *rus* (countryside) and in *urbs* (city), and filling this gap is the central aim of this study. Though Jashemski dedicates a whole chapter to 'Produce Gardens' in her latest (and last) volume, she does not elaborate upon their wider social and economic significance in Pompeii.[24] Nor has any scholar to date explicitly laid out a definition or explanation of what defines productive garden space. This neglect has led to an under-appreciation of the sheer number of these spaces in Pompeii, and their potential for enriching our understanding of the city and its population.

Studies which are devoted to the wider subject of Roman horticulture have developed in parallel with shifting academic priorities over time, from a preoccupation with defining space (the 'Spatial Turn', beginning in Roman scholarship in the 1990s),[25] to literary representations by ancient authors, and the empirical and epistemological construction of garden space (the 'Movement Turn' beginning in the 2000s), [26] and more recently the sensory

[21] For example, see von Stackelberg 2009; Spencer 2010; Pagán 2006, 2016. It is notable that none of these scholars consider why the Latin term '*Horti Romani'* was adopted given its absence in ancient literature.
[22] Purcell 1996.
[23] Purcell 1995.
[24] Jashemski 2018b.
[25] Farrar 1998; Gleason 2013; von Stackelberg 2009. See also Laurence and Newsome 2011 and Fitzgerald and Spentzou 2018 for varied approaches to the Spatial Turn.
[26] E.g., for construction and skill, see Farrar 1998, Gleason 2013, 2017, 2019; for plants, see Hoadley 1996; Ciarallo 2013; Ciaraldi 2008, Jashemski 2002, Jashemski et al. 2018; for water, see Bannon 2009, 2020; Jansen 2018. In relation to gardens and landscape, see Spencer 2010, 2015, 2017; Hartswick 2018; von Stackelberg 2014; Gowers 2014; Jones 2014. For literary representations, see Gowers 2000; Henderson 2004; Frass 2006; Pagán 2006, 2016; Spencer 2010; Gleason 2013, Jones 2014; Zarmakoupi 2014; Myers 2018; Austen-Perry 2019.

experience of the garden (the 'Sensory Turn' of the 2010s) (see 1.1.1).[27] Few studies provide a crossover between these three areas in the garden,[28] while others have more recently chosen to promote the importance of robust garden archaeology given its ongoing neglect during excavations.[29] The crux of this study is that, while all of the above studies have significant value, none have yet taken an holistic approach to agricultural *horti* and their produce in the ancient urban centre of Pompeii.

The 'definition' of garden space (in terms of its physical manifestations and construction) occupied many ancient horticultural discussions of the 1990s. At the turn of the century, Linda Farrar's descriptive approach to Roman garden space provided a much-needed outline of this subject with her practical emphasis on garden types, contents, and design.[30] Farrar advances Grimal's findings by amplifying garden studies with consideration of the construction and features of the Roman garden (for example, tools, garden features, techniques, and so on), in this way also marking a movement towards Jashemski's combined literary and archaeological approach to garden space. However, Farrar undervalued the equally important non-residential garden and thus missed the opportunity to develop the complexity of approach holistically. Listing market gardens, public parks, public portico gardens, and funerary gardens under the non-residential category, Farrar dedicates only one small chapter to the discussion of all four types, thus epitomising the wider scholarly preoccupation with the recreational garden attached to a residence.[31]

Despite a clear crossover between public and private, recreational and utilitarian, and *rus* and *urbs*, in many of the garden types described,[32] Farrar also chose not to engage with the established public-private dichotomy characterised by Wallace-Hadrill to derive a better understanding of the reception or design of gardens in antiquity.[33] Nor does she consider the

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[27] Baker 2018; Platts 2019; Venner 2021; and more generally, Betts 2011, 2017a, 2017b. Flohr (2020, 23) introduces these 'turns' in his study of Roman urban space.
[28] E.g., Pagán 2006; von Stackelberg 2009; Venner 2021.
[29] See Miller and Gleason 1994; Malek et al. 2013; Macaulay-Lewis 2018.
[30] Farrar 1998.
[31] Farrar 1998, 175-86 (esp. 176-7).
[32] The *rus/urbs* dichotomy is a popular subject of interest in Roman scholarship, most especially in relation to a tension between them in physical and literary terms, e.g., Spencer 2010; Venner 2021. *Rus* is most often understood from a natural and rustic standpoint, or 'natural soft elements from the realm of *rus'* (Venner 2021, 9), while *urbs* can relate to the manmade and ordered, hard elements. From an economic standpoint, see Zuiderhoek 2018. On the subject of tomb gardens, see Brundrett 2011; Bodel 2017; Campbell 2008.
[33] Wallace-Hadrill 1994.

conceptual space of the *hortus* in the light of historical contexts, as Pagán, Spencer, and von Stackelberg do so successfully.[34] As such, Farrar's otherwise useful and influential overview missed the opportunity to establish a more developed understanding of the garden as a reflection of cultural priorities and values over time, or as a crucial functioning component of society.[35]

Jones went some way toward remedying this when he brought memory theory to bear upon garden space.[36] In appreciation of the human ability to structure space cognitively through memory and world experiences, and by applying this to Roman garden space, Jones demonstrated that the Roman garden was a 'secluded' and bounded reflection of the wider world and Empire, and a collection of individual impressions of space over time. Drawing on spatial theory, Jones was able to develop an image of a layered imaginative space within which free thought and movement, towards the achievement of an experience of *otium*, were encouraged. Such ideas are congruent with the social study of space by Edward Soja (see below, section 5.2) in which the 'real-and-imagined', or the empirical and epistemological, are combined to create the concept of 'Third Space'.[37] The theories of Soja provide a foundation for the arguments of Spencer, particularly in reflection of 'real-and-imagined' landscapes in Roman literature via 'geographic, representational, social, political, historical, imaginary, and perceptual elements and signs.'[38] She uses this framework to dismantle the symbols hidden in descriptions of 'real' sites, via imagined journeys on the page. In particular, the ekphrastic descriptions of villa settings by elite writers, hyperreal in nature though in reality imbued with carefully selected symbols of meaning (for example, plane trees to symbolise Epicureanism, and their shade to symbolise pastoralism, in Pliny's villa descriptions), cause the lines between reality and fiction to blur (hence 'real-and-imagined' space).[39]

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[34] Pagán 2006; von Stackelberg 2009; Spencer 2010.
[35] Farrar's later edition (2016) provides an even broader overview of ancient gardens and their design and cultivation in different historical periods, but still fails to progress from the 'Spatial Turn'; see below for a discussion.
[36] Jones 2014.
[37] Soja 1996.
[38] Spencer 2010, 99 (see also 76, 98, 113).
[39] See Spencer 2010, 113-34.

Given that space is conceived both through memory and the imagination, and by implication the choices made by the individuals creating and using space are reflected in their physical manifestations,[40] we must not allow new points of focus cause an undervaluation of the dominant elite discourses for understanding garden space. Jashemski (2018) argued that the study of gardens was impossible through archaeology alone and viewed ancient literature as essential to our comprehension of garden space. The challenge is how best to balance the silent and invisible against the voluble and explanatory; the difficulty of the task at a macro level is evident in K. Sara Myers (2018) overview of literary receptions of the general category of Roman gardens. It is excellent and thorough on a particular kind of literary reception that nonetheless makes little mention of all gardens' potentially undocumented or irrecoverable productive capacities.

Nonetheless, first-hand Roman records of experiences in garden space contribute significantly to our understanding of their conception, use, and evolution in Roman society. Memory theory is of crucial importance in The memory theories of Jan Assman (1995) and Paul Connerton (2006) have been hugely influential in cultural memory, both having demonstrated that to better understand a society as a whole, one must look for the discourses and views of the dominant members of that society (the Roman elite).[41] For these discourses shape physical and conceptual landscapes over time and allow for the concretisation of carefully chosen memories for the aims of the dominant group. Using cultural memory to understand the discourses produced, preserved, and perpetuated by the Roman elite in relation to 'the poor man's farm', as well as its produce and the people who cultivate it, will therefore allow a window to be opened onto the varied empirical and epistemological functions of this space.[42]

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[40] Thomas 1992;Ferris 1999; Bergmann 1994; Assmann 2003; Larmour and Spencer 2007; Alston 2008; Galinsky 2015; Elsner and Squire 2015; Orlin 2015; Popkin 2016; Hanses 2020; Mawford and Ntanou 2021.
[41] For examples of the application of their work in Roman scholarship, see Galinsky (2014) and Elsner and Squire (2015).
[42] If these epistemes are applied to wider memory theory, a filtering of attitudes from the 'dominant' groups in society (the elite) down to the more 'ordinary' individuals in society, referred to rather controversially as the 'middling class' by Mayer (2012), seems plausible when one witnesses a change in garden use and construction over time. See also Wallace-Hadrill 2013 for a review of this work and the controversies raised by Mayer's hypotheses.

John Henderson ventures where other scholars do not in shifting his focus from *otium*-centric elite garden experiences in capitalised *Horti*, to the *practical* cultivation of the prosaic *hortus* in 'lived' space and the Roman imagination. Providing updated translations to Columella, Palladius, and Pliny the Elder, Henderson demonstrates the entrenchment of Roman culture in the cultivation of garden space with a focus on *utilitas*. This view is shared by von Stackelberg and Spencer who produced separate interdisciplinary studies revealing the elite social anxieties of the early Imperial period, and the rhetorical and visual representations of utilitarian horticulture rooted in the Golden Age virtues seen in Henderson's chosen texts in 'real-and-imagined' space.[43]

Both Spencer and von Stackelberg understand the value of combining history and space for understanding garden reception and use in the Roman period. Yet we see an all-too-frequent gap between urban space and historical contexts in Roman studies of space. Flohr (2020) recently identified this lacuna in scholarship and identified three areas in need of further attention. These are:

> 1) The growing density of urban centres which were increasingly acting as sanctioned and unsanctioned memory theatres of Roman culture,
> 2) The increasing commercialisation of space in Roman urban centres, and
> 3) The growing permeation of boundaries between country and city from the late Republican period onwards, as well as the social effect of this upon individuals and Roman culture more generally.

All three points place an emphasis on the importance of geographical and political contexts for understanding early Imperial urban developments. The *hortus* is an ideal case study capable of providing insight into all three areas, and as such inspire the structure for the remainder of the thesis. Using Flohr's points of enquiry as a starting point requires me to place the archaeological site at the centre of my enquiries and examine *hortus* space in Pompeii within the frame of spatial and movement theory. The scholarly context supporting the methodologies used in wider 'spatial' and 'movement turns' helps to explain why a

[43] I take a similar approach when I assess the real-and-imagined *hortus* of the fictional gardener Simulus in Chapter Two.

multidisciplinary approach grounded in archaeology is essential for achieving the aims of this study.

1.1.1 A spatial-movement approach

The overarching theme common to many Roman-space studies is the Foucauldian (1986) view that space impresses upon the individual or community as much as the individual or community impresses upon space. This concept is also referred to by Lefebvre as 'social production'.[44] Common to Foucauldian and Lefebvrian theory is the manifestation of social power in space, and, when applied to Roman space, the preservation of the social hierarchical system upon which Roman culture was based.[45] Applications of these theories to Roman society have found that urban centres contained nuances of Roman culture and identity, in public buildings, streets, and domestic properties. This process was most helpfully summarised by Spencer, who in her 2017 paper on the Graeco-Roman landscape argued that:[46]

> …imperialism gave an impetus to synthetic study of how cartography and epistemology could support aspirational imperial rhetoric... Rather than taking on a monolithic impetus, however, discourses of space and its representation… found value in a progressive, dialogic quality around the edges of geographic knowledge, responsive to its ebbs and flows and in tune with shifting cultural norms.

As a general approach, studies drawing on the 'Spatial Turn' have been concerned with gaining a better understanding of the processes of urbanisation, and the social impact of these processes, via spatial, literary, and temporal contextualisation.[47] Grounded in the theories of Lefebvre and Foucault, Roman studies within this turn emphasised with new focus a view of the ancient city as a network of buildings composed of intermediary spaces of social interaction (for example, corridors and streets). The aim of many has been to translate the 'semantics' contained within Roman space for better understanding how Romans viewed their

[44] Lefebvre 1991, 26. For a broad summary of spatial theory, see Valentine et al. 2004.
[45] E.g., Grahame 2000; Wallace-Hadrill 1998; von Stackelberg 2009.
[46] Spencer also echoed this in her 2015 paper, 171-2.
[47] Laurence 2011, 82.

world, particularly in terms of power dynamics and relations implicit in-built space and urban landscapes.[48] On a micro level, Roman houses came to be appreciated as reflections of identity and 'extensions of the self-signalling social and genealogical status to the world outside'.[49]

Using material evidence, Allison showed that movement and room use in the Pompeian *domus* was neither predictable nor able to be 'labelled' in the Vitruvian fashion.[50] Similarly, Wallace-Hadrill's study of the social structure of the Roman *domus* (1988), and his later in-depth look at case studies from Pompeii and Herculaneum (1994), clarified the means and methods by which social space was commonly articulated in the Roman house, importantly bringing to the forefront the enactment and preservation of social hierarchies structuring Roman society.[51] Fashioning one's own social identity, the contents of the *domus*, and the movement of a host and his or her guests within, were of the utmost importance and significance for social advancement and survival. Of this effect, Hales says:

> Ritualised domestic activities involved the playing out of *mores*, traditional customs and values, bringing such constructs of Roman behaviour to life in order to justify one's identity as Roman… the permanent arrangement of rooms in the house plan to accommodate the occurrence of these rituals can be seen as a constant confirmation of the householder's Roman identity.[52]

Wallace-Hadrill captured the social dynamics encapsulated in the *domus* in a public-private axis (Figure 30) and, significantly for this study, discovered that the commercial and domestic aspects of Roman life were not siloed in the manner that post-industrialist Westerners are

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[48] Roman images operate as a 'semantic system' or language, the translation of which can only be made if one is fluent in (or at least moderately familiar with) the culture in which the images are placed; see Wallace-Hadrill 1998; Hölscher 2004; Elsner 2006, 274-6 and 2014; Trimble 2011; Elsner and Squire 2015. From an economic point of view, it is essential to view a city as part of a network; see Laurence 2007, 2011; Newsome 2011; Laurence and Newsome ; Fitzgerald and Spentzou ; Flohr 2020.
[49] Bergmann 2018, 225. In a review of Wiseman's combined literary and archaeological investigation into the location of Augustus's home on the Palatine, Lipps (2019) correctly states that the hermeneutic issue of Rome's topography can only be properly investigated in an interdisciplinary fashion, as Wiseman does, even if this does make such investigations more complex.
[50] For example, see Vitr. *De arch*. 6.7.4.
[51] The most comprehensive discussion assessing the operation of Roman social hierarchies is summarised by Edwards 1994. For a discussion of social hierarchy in Roman domestic space, see Cooper 2007.
[52] Hales 2003, 3.

most familiar with.[53] As is customary of studies in the Spatial Turn, Wallace-Hadrill's outcomes were derived from a combination of literary and cartographic analysis. However, a scientific methodology which considers the random movement of individuals in space had still not been applied to Roman scholarship.

Grahame, recognising the limitations of using literature to analyse (and label) space, and of previous cartographic methods which did not 'account adequately for the actual pattern of relations present within it', turned to a stronger methodology which would consider the random movement of individuals.[54] This came at a time when the natural progression from the cartographic and structuralist approaches of the 'Spatial Turn' began to evolve into the 'Movement Turn'. Flohr attributes dates the 'Movement Turn' in Roman scholarship to the 2010s, though many scholars, including Grahame, were ahead of the curve.[55] David Newsome pinpoints the earliest movement away from an analysis of two-dimensional space to a preoccupation with movement in urban space in the seminal work of William MacDonald (1986), around the same time as Wallace-Hadrill's earlier conclusions. However, despite MacDonald importantly demonstrating the value of studying urban streets as organising units of ancient cities, the absence of an adaptable methodology in his work led to spatial syntax analysis becoming the default technique for studying urban space articulation.[56]

Grahame became one of the first Roman scholars to adopt the methodology developed by Bill Hillier and Julienne Hanson, spatial syntax analysis, to study movement in domestic properties in Pompeii.[57] Later studies used the same technique to map foot- and cart-traffic

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[53] Post-industrial Westerners are familiar with the concept of factory production outside of the home, or at least siloed from the domestic sphere. This distinction was not as clear-cut in ancient and Medieval societies; see Hawkins 2012; Temin 2013; Zuiderhoek 2018, esp. 138. See also Allison 2008 for manufacturing and craft in the *domus*.

[54] Grahame 1997, 146.

[55] Flohr 2020.

[56] See Laurence 2011, esp. 2. The spatial analysis of syntaxes in street networks can also be related to the field of network theory. The eleven networks listed by Smith-Doerr and Powell , 382) summarise decades of anthropological investigations into networks, marking the incitement of new investigations into economic networks in the ancient world, e.g., see Malkin et al. 2009, Malkin 2011, Leidwanger 2014 et al. (a manifesto established related to the study of Mediterranean maritime networks), and Taylor and Vlassopoulos (2015). More recently this culminated in the 'Networking in the Ancient World' conference, held at the University of Liverpool in 2018.

[57] Hillier and Hanson 1984. Spatial syntax analysis is a method used to quantify movement in space. Its aim is to establish the accessibility of individual spaces within the 'global' area of a property and the relations between each. In other words, this approach looks to quantify the '"syntaxes" that underlie spatial order' as a 'language'

movement in the urban street networks to get closer to the daily lives and motivations of its inhabitants, while von Stackelberg, as we have seen, chose to apply this methodology to the study of domestic garden space in properties in and around Pompeii.[58] The outcomes of spatial studies in Pompeii have begun to reveal the planning decisions made by property owners and urban developers in relation to economic advantage, security, ease of access (predominantly for workers and customers), and even social status,[59] though excluding von Stackelberg, gardens have not yet been included in wider analyses.[60]

The 'Movement Turn' was followed by the 'Sensory Turn' from the mid-2010s onwards in Roman scholarship,[61] exploring the psychological impact of touch, sight, sound, smell, and taste in various Roman settings, including gardens.[62] Similarly to the former two turns, in which semantics were encapsulated in space, sensory experiences were used to communicate power and messages in the garden. The sensory experience of the agricultural garden is not the focus of this thesis, but it does provide a basis from which future studies in this area can be developed. The application of memory theory to these analyses will allow some of the most productive complexes of continuing innovation in interpreting Roman garden space to be observed. This holistic and interdisciplinary view of the rustic garden requires an appreciation of the connection between thought and space.

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communicated and understood by 'competent' members of Roman society. This technique is explored and applied in detail in Chapter Five.

[58] Some of the case studies analysed by von Stackelberg (2009) used literary evidence instead of archaeological evidence, presenting more issues with regards to the accuracy of spatial syntax analysis. In Pompeii, the main studies were by Kaiser (2011), Laurence (2011), van Nes (2011), Poehler (2016, 2017b) and Hartnett (2017). Kaiser's publication *Roman Urban Street Networks* continued the work of Laurence (2011) in verifying the wealth of information to be drawn from viewing streets as the common network which brought the city together, directing the movements of individuals and therefore their experience and reception of urban space. His quantitative approach to the organisation of Roman urban space was later extrapolated by Poehler and the interdisciplinary volume edited by Laurence and Newsome, in which architecture, archaeology, and history were combined.

[59] Laurence 2011.

[60] Though Grahame criticises Laurence for applying spatial syntax analysis in an ancillary fashion only, Newsome is correct in stating that Grahame's is a more appropriate the use of this methodology. Without a historical and contextual framework, the outcomes of any spatial syntax analysis would fail to have any meaning.

[61] Toner 2014; Haug and Kreuz 2016; Betts 2017c; Baker 2018; Platts 2019, 2020; Fox 2021; Venner 2021.

[62] E.g., Baker 2018. Platts (2019) recognised the usefulness of combining all three 'turns' to holistically understand the sensory experience of Romans in space. A special focus on health in ancient gardens has arisen out of 'Sensory Turn', perhaps encouraged by recent modern preoccupations with the mental benefits of green environments. Scholars studying the salubrious and sensory experience of the Roman garden frequently note a literary preoccupation with air quality and the appropriate utilisation of outdoor (or outdoor facing) architecture for achieving health.

Spencer importantly demonstrated how memory structured the way that Romans understood and placed themselves within urban space and combined elite literary and aesthetic perspectives to prove this. Similarly, von Stackelberg applied both movement and sensory theory to garden space to find that it fit comfortably into the hierarchical organisation of the *domus* established by Wallace-Hadrill (in other words, the discourses communicated by the elite).[63] Grahame found the same in relation to indoor domestic space.[64] This interconnectedness between thought and space is further explored by Pagán in her 2006 volume on Roman garden literature. Pagán presents the *hortus* as a transgressive space through the diverse analysis of manuals, satire, histories, and autobiographies. Yet, despite her aim to promote 'the garden as an expression of culture and society in Roman literature', which it certainly is, Pagán does not fully engage in the 'Spatial' or 'Movement Turns'. Her work would have benefitted greatly from a deeper application of spatial theory to her examinations of Columella, Horace, Tacitus, and Augustine as this would have allowed her to test the applicability and relevance of their views in the context of 'lived' architectural space. Arguably, too, Pagán falls victim to over-generalisation in failing to pin down an historical context to better interpret real or imagined garden space in its many forms throughout Roman history, something which she remedies in her thorough and comprehensive survey contribution to *Oxford Handbooks Online* (2016).[65]

To conclude, the Spatial, Movement, and more recent Sensory turns have advanced scholarly perceptions yet very rarely have they been applied to garden space using literary and archaeological contexts to build conclusions about the *hortus*. Even the aforementioned *Gardens of the Roman Empire*, the most comprehensive approach to Roman gardens to date, lacks attention to an interconnected approach.[66] Though setting a 'baseline' from which garden scholarship could advance, this volume was, by its summarising nature, also vulnerable to reductionist interpretations of the 'Roman garden' seen in other garden studies. What is evident is that an emphasis on descriptions of the spaces or elite experiences of them, and on conceptual innovation, persist. As put by Flohr: 'an unintended consequence of this

[63] See Spencer 2010, 2018.
[64] Grahame 2000.
[65] While Henderson (2004) also does this in the preface to his selected horticultural translations, he nonetheless has an excellent command of the inherent social power of garden space as understood by the Roman elite, an understanding which allows him to bring the social and political *modi operandi* behind the Latin texts to life.
[66] Jashemski et al. 2018.

emphasis on conceptual innovation has been that approaches to Roman urban space have often remained relatively insensitive to historical change; there remains a significant gap between the study of Roman urban space and the study of Roman urban history.'

Only through a multidisciplinary approach to garden space, one which combines the social 'movements' above and crucially considers historical contexts of autochthony, power, and socio-political change, can one reconstruct with an approach to authenticity the empirical and epistemological forms of the utilitarian garden in first century AD Pompeii. Without this, we continue to limit our understanding of the daily experiences of garden space for a large portion of the Roman population and fail to see the potential of what can become a new, truly interdisciplinary approach, supported by historical context, to urban agricultural *horti* and their role and use in the first century AD.

CHAPTER TWO: The literary landscape of the Roman hortus

> *The reader who entered the garden through a text discovered a space of ancient virtues, mythic landscapes, and contemporary pleasures (and vices). The visitor who entered the garden through its architectural framework found an operative part of the household with both ornamental and productive capacities.* von Stackelberg 2009, 48.

> *Our interest in lieux de mémoire where memory crystallizes and secretes itself has occurred at a particular historical moment, a turning point where conscious- ness of a break with the past is bound up with the sense that memory has been torn – but torn in such a way as to pose the problem of the embodiment of memory in certain sites where a sense of historical continuity persists. There are lieux de mémoire, sites of memory, because there are no longer milieux de mémoire, real environments of memory.* Nora 1989, 7.

For a thesis which investigates the social impact of rustic space on the population of an ancient city, contextual knowledge of the dominant discourses driving human behaviour in wider society, is required. For this, an assessment of elite literary remains, the main source of information on this subject, can provide a starting point. The interdisciplinary discussions which follow will make continuing use of the conclusions drawn in this chapter. Each will help to form an understanding of the epistemological construction of the urban agricultural *hortus*, and the impact of these upon developing empirical structures of this space up to the first century AD.

In the temporal and geospatial context of this study, first century AD Pompeii (Figure 1), significant changes to the ways in which gardens were used and perceived in society were underway. Rooted in the ancestral foundation stories of Rome, the Roman *hortus* (formerly *heredium*, see below) came to be associated with the identity of the Roman *populus* and, by extension, the function and preservation of the Roman state. Ancient discourses interested in Roman identity, growing in number during an extended period of political and civil unrest in the first century BC, expose elite anxieties related to increasing levels of luxury and greed. This was fuelled by expanding access to foreign cultures, traditions, customs, and goods.

Traditional understanding of collective Roman identity and ideals of practice were coming under increasing scrutiny as the distance between the Roman citizen and the land was conceived to grow wider.[67] The associated anxiety which arose out of this perception of loss and manifested itself in multiple ways across civil society is summarised by Diana Spencer: 'Rather than ease and tranquillity, the end of labour signals civic and communal dislocation, destructive passion, families ripped apart, and identities shattered.'[68] Enter the Roman *hortus.*

A major cause of the distancing between the Roman *populus* and agriculture was the expropriation of land from veterans and their sale into (wealthy) private ownership in the late Republican period, versus the former, publicly-owned *ager publicus* which was subject to rent.[69] Instead of personally tilling the land, as the mythological citizen-farmer hero was said to have done, slave and free labour were used instead. To mitigate the negative effect of this trend upon the 'distinctiveness and superiority of Rome and her ruling elite',[70] the hermeneutic potential of the *hortus* was realised.[71] Through the perpetuation of epistemes linking the *hortus* to Roman virtue, the *hortus* was cultivated as a *lieu de mémoire*, otherwise known as a site or realm of memory, in the early Imperial period.

[67] As emphasised by Pliny, proper maintenance of the land ensured general stability and continuity (*HN* 18.11). See Edwards 1994 (esp. 176-7) for a discussion of the relation between *virtus* and the land.
[68] Spencer 2010, 43. Hollander 2018b, 14 describes agriculture as a teacher of virtue in Roman society.
[69] Roselaar (2010, 2019) has been influential in relation to the *ager publicus*.
[70] Reay 2003, 19.
[71] Hermeneutic potential refers to the power of interpreting the garden not simply as a green space, but in terms of its historical, political, and symbolic meaning, gathered by one or more societies over centuries.



Figure 1: Map of Pompeii, including unexcavated areas (as of 2019). Image: Author's own.

Pierre Nora describes *lieux de mémoire* as the fundamental remains of memory which are materially, symbolically, or functionally preserved when the real environments of memory, or the *milieux de mémoire*, cease to exist.[72] These sites, or realms, exist to perpetuate the history deemed most favourable, useful, or worthy of preservation by historians or the dominant members of society. In this way, these sites can reinvent memory and enable memory-keeping to link a society's history to its ancestors, as well as to myths and origin stories. We see this in Rome, for example in Romulus' (likely hypothetical) hut, preserved on the Palatine Hill as a monument to the founder of Rome, as well as to the values embedded in the traditional form of the one-roomed dwelling of early Roman settlers.[73] *Lieux de mémoire* often occur at points in history when 'an immense and intimate fund of memory disappears'.[74] Nora constructed his argument around the supposed loss of French memory at his time of writing, but in application to the early Imperial period, and the 'realm of memory' of the *hortus*, a clear link between a loss of virtue to luxury (and a perceived shift from hardship to plenty) can be witnessed. Within this we may observe the symbolic value of the *hortus* which later came to be constructed upon interrelated memories and virtues associated with the space, including figures of memory (discussed in more detail below).

This process caused the *hortus* to become a *lieu de mémoire* partially aimed at preserving *romanitas* and, by implication, Rome as a state. As related by Nora to monuments of war, archives, sanctuaries, and even anniversaries (the *lieu de mémoire* need not always be empirical), I promote the Roman *hortus* as serving, in some contexts at least, as a powerful conceptual container of memory.[75] The advancement of a conceptual space of memory which did not necessarily exist in the real world, but instead in memory or a distant place (as in the heterotopia, see below), enabled the elite to transmit ideologies beneficial to their own aims, namely the maintenance of power and stabilisation of political structures, to individuals of

[72] Nora 1989, 7.
[73] The hut not only conjures up images of the first ancestors of Rome, but also simple living (*simplicitas*) and frugality (*frugalitas*), two key pillars of Roman virtue and identity. The preservation of these 'memories' in Romulus' hut is referred to as concretisation, which I shall cover in more detail below. This term refers to memory which is given tangible form. Concretised memories therefore act as symbolic representations of the values and events associated with them (thus, in the case of Romulus' hut, the founding of Rome and ancestral virtue).
[74] Nora 1989, 12.
[75] Nora 1989, 12.

lower ranks via the process of emulation. This specific process depended on wider fluency in the semantics being contained within, and communicated through, the *lieu de mémoire* of the *hortus* and other related terms, such as *viridiaria*. As described by Brendon Reay:[76]

> The challenge [of the Roman elite]… was to negotiate the gap between these real circumstances, and the agricultural and pastoral situation of the culture heroes in whom the Roman elite located [distinctive] Roman ethics. How, in other words, could the estate owner "be" a latter-day Cincinnatus or Romulus?

Within the very DNA of the Roman state existed agricultural and pastoral pursuit, and the success of the Republic was understood to be rooted in the virtues of *maiores nostri* who, by and large, contributed to the politics of the state at the same time as managing the homestead, including agricultural land. This dualism was increasingly felt to be lost as Rome moved into the Imperial period, meaning the interconnection of Roman values and the land thus had to be preserved in some other way. The preservation of these values in the 'site of memory' of the *hortus* not only reveals the worth of these standards to the identity and stability embodied in the state, but also the perpetual importance of the empirical space of the *hortus*.[77] This chapter investigates how this important realm of memory came to be, how the *lieu de mémoire* of the *hortus* was constructed and utilised by the Roman elite, and how the values encapsulated in the space may have been communicated and emulated to and by individuals living and working in first century AD Pompeii.

The many gardens uncovered in Pompeii to date make up approximately one-third of the city's urban landscape (Figure 2).[78] This is far above the average of modern urban centres, in which green space (public and private) typically makes up around one-quarter of urban space.[79] In this chapter, I set out the etymological and physical development of the utilitarian garden in ancient society with the aim to discover how and why epistemes of *rusticitas,*

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[76] Reay 2003, 20.
[77] As shall be discussed, this symbolism could also lie within the plants themselves, dependent on their popular association with traditional rustic activity (for example, cabbages grown in a cottage garden). Such plants also came to be depicted in food wall art, or *xenia*, as discussed in section 4.3.3.
[78] Jashemski stated this in 2002, and this figure still stands, even following further excavation (approximately thirteen hectares of the excavated portions of the city is taken up by 'green' space, both public and private).
[79] World Cities Culture Forum 2021.

simplicitas, and *frugalitas* operated within the space of the *hortus*, and their significance for how the *hortus* continued to be entangled with elite values. This contextual investigation of the hermeneutic potential of the rustic *hortus* outside of its economic and practical uses is important: it enriches the range of conclusions available for this thesis, allowing my study to propose nuanced evaluations that move beyond what is possible from any one methodological perspective.

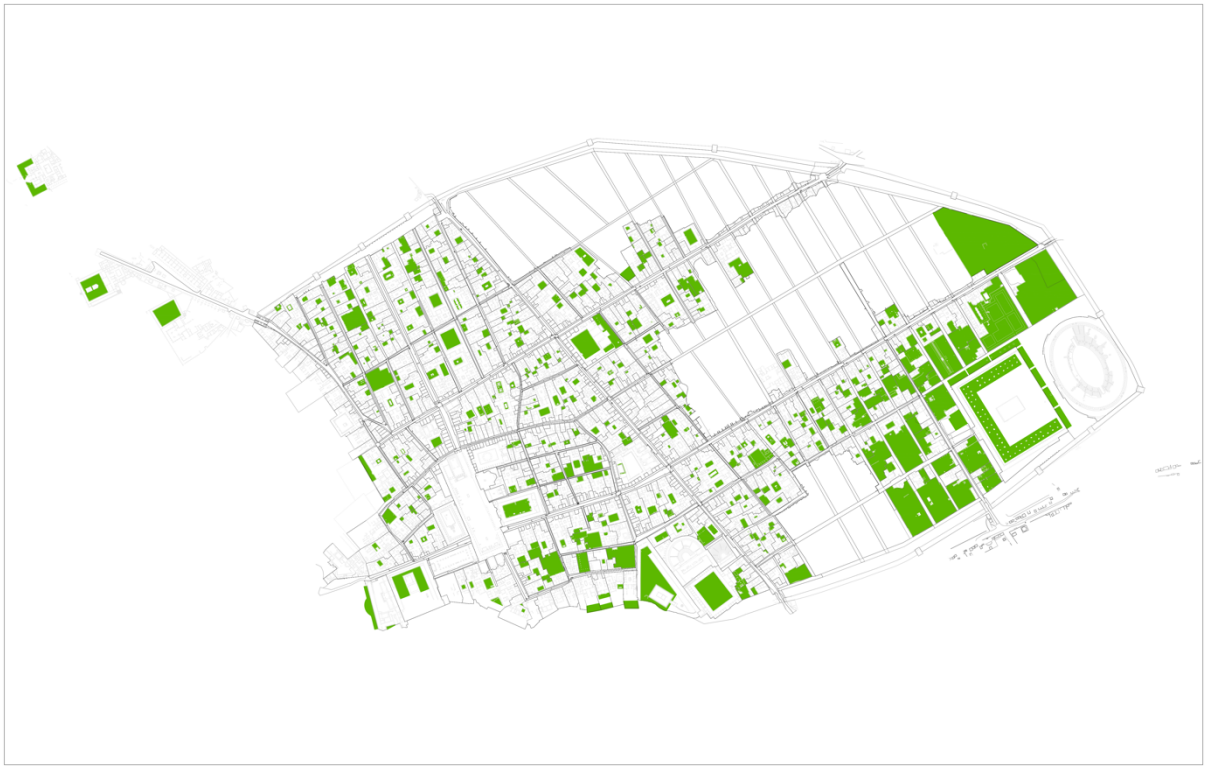


Figure 2: Map of all excavated green space in Pompeii (as of 2021). Image: Palmer and Gleason (2021).

The first section defines the space of the *hortus* and its associated terms in the Latin language. Following this, the evolution of the *hortus* in the first century AD is described within broader historical contexts, illustrating the impact of Imperial conquest upon utilitarian Roman garden use and the growing literary interest in *hortus* produce during this period. In so doing, the epistemological value of the *hortus* and its exploitation as a symbol of morality by the elite will be shown to impact on the ways in which this space, and the figures associated

with its cultivation, were utilised for the preservation of collective Roman identity. In the final portion of this chapter, these findings are supported by a literary case study, demonstrating the strength of the agricultural 'figure of memory' when positioned in the imaginative, 'heterotopic' space of the productive *hortus*.

2.1 Origins of the hortus

As underlined by Victoria Austen-Perry, the familiarity of the garden, 'a feature of practically every human culture', makes a definition of this space difficult to isolate.[80] Yet it is this ambiguity which makes a description of the Roman garden as dynamic and colourful as the space itself. Scholars variously define the *hortus* in terms of its physicality rather than its epistemological constructions in the Roman period, most commonly viewing it as an enclosed space planted with all manner of cultivars and/or food. More recent summaries have focused on the etymological development of the '*hortus*' and its related terms, revealing a complex hermeneutic of *utilitas* (utility or usefulness) and *otium* (leisure), shifting from the former to the latter during the early Principate. The most proscriptive of these descriptions are those made by Gowers (2000), Pagán (2006), von Stackelberg (2009), and Austen-Perry (2019) who agree that the *hortus* was both a marginal and liminal entity and one which was able to reflect the priorities of its owner and, by implication, society as a whole.[81] As mentioned in the introduction, however, few have yet considered the role or significance of the productive *hortus* in any depth.[82] To ensure that the etymological and empirical development of this space is explored with a new and precise focus on the agricultural and urban contexts of this study, the most salient points from scholarly summaries of the agricultural *hortus* will be considered to arrive at a definition of this space.

In Roman thought, the boundaries between utility and recreation in the *hortus* are not as defined as they are in contemporary scholarship, as will be demonstrated in later case studies in Pompeii (see Chapter Five); to modern scholars, the capitalised and pluralised term

[80] Austen-Perry 2019, 12.
[81] Gowers (2000, 130) describes the rustic garden as 'a world within itself, but also an afterthought; limited on the outside, rich on the inside; a source of subsistence, but a despised one.'
[82] Jashemski dedicates the most space to the assessment of Roman *horti* in terms of their productive uses over various volumes (esp. 2002). Gowers (2000) provides an excellent summary of Roman literary reconstructions of the productive *hortus.*

Horti is typically used to refer to 'luxurious and private retreats of Rome's elite, used for dining and walking', while the lower-case *horti* can also be used for the plural of *hortus*, a rustic and/or domestic garden.[83] As Spencer astutely recognises, however, scholarly preoccupations with defining the term have caused continuing nuances of the word 'garden' to be overlooked. Taking for example the Gardens of Versailles, this is at once a royal estate ('*horti* as collective plural'), a collection of planted gardens ('*horti* as individuating plural'), and a sprawling green sanctuary in an urban centre.[84] They are 'Gardens' in the same sense that Kensington Gardens are, for both are filled with different forms of singular 'gardens', be they utilitarian, recreational, decorative, aquatic, formal, informal, or ideological. As put by Spencer:[85]

> 'Gardens' in the plural still suggests an expansive and multi-use landscape… [implying] narrative or metaphorical complexity. The singular 'garden' suggests smaller-scale space, though perhaps every bit as complex in structure, planting, and symbolism.

In the following, the scheme adopted by von Stackelberg and Pagán will be employed: the capitalised and pluralised term '*Horti*' will refer to elite public and private garden estates created for *otium* and 'the extravagant display of wealth' and power (which may also simultaneously contain other manifestations of the garden; see section 2.3 below).[86] Alternatively, the lower case and singular '*hortus*' will refer to the general manifestation of a garden under the management of members of the general populace, in a commercial and/or residential capacity, and containing different, often but not always, delineated areas of different use.[87] It is, however, important to note that the capitalised term *Horti* is not found in ancient literature.[88] For example, in referring to a poor (*pauperis*) garden in the *Eclogues*, Vergil uses the term '*horti'*.[89] Similarly, Juvenal uses the term *horti* to refer to both a

[83] Macaulay-Lewis 2013, 103.
[84] Spencer 2010, 140.
[85] Spencer 2010, 140.
[86] Pagán 2006, 38.
[87] von Stackelberg 2009. The lowercase *horti* is the plural.
[88] Purcell 2001.
[89] Verg. *Ecl.* 7.34.

vegetable garden and an Epicurean garden, the latter most closely aligned with the modern notion of this term, as a space of educated leisure.[90]

To properly differentiate the multifaceted garden space, or *hortus*, being described in this thesis from the more elaborate *locus amoenus* of elite *Horti*, it is important to introduce associated horticultural terms as a point of comparison, beginning with the noun *`rium* and the adjective *viridia* in a garden context. The common translation of *viridia* is green, and as such implies lushness and plants, particularly those which are exotic. They are intended to be decorative but may also be useful (as medicine or food). The term *viridiarium* thus refers to the space in which *viridia* are planted, in a designed and planned fashion, and often in a paved or enclosed area (thus being delineated from other areas, both cultivated and uncultivated).[91] Their size, however, could vary greatly. For example, the large peristyle *viridiarium* discovered at the Villa Arianna in Stabia, once sprawled along the cliffs looking out over the Bay of Naples, held an orderly display of shrubs, trees, herbaceous borders, and vines, and was well irrigated.[92] The space was used for taking leisurely strolls among the carefully designed views of different plants (all of which were maintained by skilled gardeners), and thus acted as an important space of social display.[93] As such, Purcell's description of the *viridiarium* as a green space of 'specialised and concentrated luxury' captures the essence of this, and other *viridiaria*, well.[94]

In the Latin texts, *viridia* were chiefly viewed through the frame of windows or doors.[95] Lena Landgren interprets the *viridiarium* as 'similar to viewing the garden in art', which can be best seen in the series of rooms facing onto the large swimming pool and gardens in the Villa di Poppaea in Oplontis. Between walkways, in open spaces, *viridia* were 'framed' by windows and backed by wall paintings, or *trompe l'oeil*, designed to reflect and extend the beauty of the scene before them, providing an illusion of depth (Figure 3).[96] The series of outdoor *viridiaria* in this luxurious villa is reminiscent of Pliny's garden

[90] Juv. *Sat.* 3.228, 13.123.
[91] For an in-depth discussion, see Landgren 2004.
[92] Gleason 2009, 11; Gardelli and Howe 2016.
[93] For more on the 'art' of the garden at the Villa Arianna, see Howe 2018.
[94] Purcell 1996, 143.
[95] Cic. *Att*. 2.3-4; Purcell 1996, 141; Landgren 2004, 156-7.
[96] For a discussion, see Bergmann 2018; Gleason 2019.

descriptions, in which he describes being able to view attractive displays of *viridia* from inside areas: '[a marble seat facing a bedroom] is built of shining white marble, extended by folding doors which open straight out into *viridia*; its upper and lower windows all look out into more verdant displays of shrubs and trees above and below.'[97] The emphasis is, as in the Villa di Poppaea, on viewing, a seat having been strategically placed for this purpose. Another possible example can be found in the House of the Ephebe, in a fenced area dedicated to verdant plantings, complete with a marble bench directed at the verdant area, irrigation, and *trompe l'oeil* garden frescoes on the wall behind (see section 5.3.1). Despite the furrows discovered here, 'as is characteristic of vegetable gardens', the irrigation, decoration, and delineation of this space point towards the Roman term *viridiarium*, thus demonstrating the potential crossovers between spaces primarily thought of as recreational, with those perceived as utilitarian (for example, the *holerarium*, or vegetable garden; see below).



Figure 3: View of a *viridiarium* in the Villa di Poppaea in Oplontis, including images of *viridia* and *figura* fountains.

[97] Notably, there may also be a link between *viridiaria* and water, as Pliny references the need to water his own *viridia* with pipes Plin. *Ep*. 5.6.40.

Notably, the act of viewing *viridia* appears to be prioritised over the plants themselves, despite their symbolic potential for viewers (particularly the more exotic, imported specimens, and any traditional produce associated with early gardens in Rome, such as cabbages and garlic). What one could *not* see was also important; the *viridiarium* was intended to deny a view of the city as, for example, in the *Horti Maecenatis*, where the *viridiarium* was accessed via a downward ramp in a sunken court, thus intentionally excluding views of Rome from the tranquillity of the garden.[98] In my own spatial and isovist analysis of the House of Julius Polybius in Pompeii, I discovered that the exquisite and native plants growing in the peristyle (importantly including citron, an excellent example of a newly imported exotica), were able to be viewed by the more privileged guests, or *amici*, rather than simply members of the 'public' or *clientes* (Figure 4).[99] Alongside citron, fruit trees and flowers were also grown here. As this area would certainly have been verdant, was to some degree enclosed, was visible from, or framed by, windows and doors around the peristyle, and contained exquisite plant specimens, it can be identified as a *viridiarium*. As summarised by Gleason and Palmer, 'the peristyle looked into a central *viridiarium*, lending strollers changing views of artworks and plantings as they moved around the peristyle.'[100] This house thus crucially demonstrates the easy permeability of utility and recreation in horticultural space in Roman society, and the danger of siloing the two in research; though luxurious, the *viridiarium* in the House of Julius Polybius was also serving a purpose to the household in providing food for the table.

[98] Purcell 1996, 148.
[99] For the method behind the calculation of each graded area, see Chapter Five.
[100] Gleason and Palmer 2018, 373.

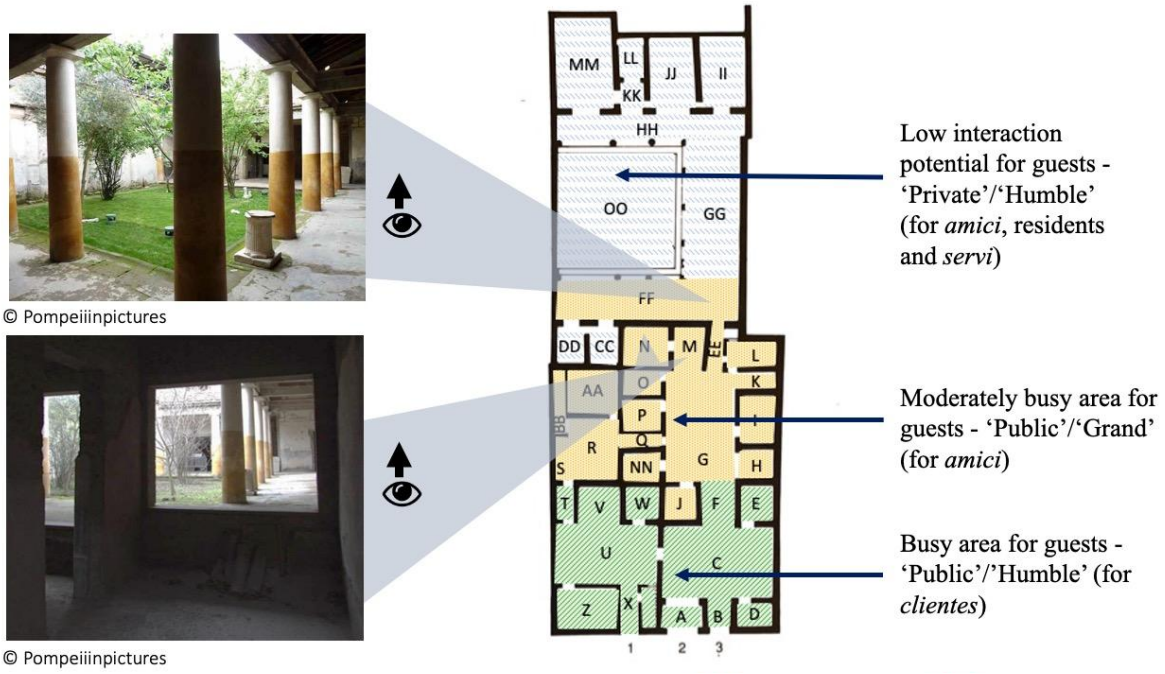


Figure 4: A stippled spatial-syntax map of the House of Julius Polybius, showing areas of house guest and resident interaction and movement according to accessibility (green being the highest, yellow moderate, and white low accessibility/interaction potential). The *viridiarium* is located at OO. Images: Pompeiiinpictures (2021) and author's own. See Chapter Five for further discussion of spatial-syntax maps.

The next term, *holerarium*, refers to a space exclusively used for growing vegetables. As shall be outlined in the proceeding chapters, no evidence has been found to date to suggest that vegetable gardens were purely a standalone entity in Pompeii. Instead, evidence for vegetable growth has been found between vines, below fruit trees or, in the literary remains, in pots and window boxes. The noun *holerarium* is derived from the cognate noun *holus/olus*, and refers to 'edible greens, predominantly brassicas, lettuces, and garden herbs, which formed a large part of the Roman diet.'[101] Despite the similarity between the definition of the *holerarium*, and the rustic space commonly referred to as a *hortus* in elite Roman literature, the term *holerarium* is rarely used in a garden context in ancient literary sources and instead commonly denotes the place where vegetables are sold.[102] This supports the archaeological finds in Pompeii, which reveal a lack of evidence for standalone vegetable gardens, this

[101] von Stackelberg 2009, 16.
[102] TLL 6.1.2856.20; von Stackelberg 2009, 16.

produce instead commonly growing among or alongside other cultivars. Similarly, while fruit trees are also found interspersed with other cultivars in Pompeii, the *pomarium*, or orchard, was in the literature considered a spatially distinct area in a wider estate or garden complex (see below). As such, neither of the terms *holerarium* or *pomarium* are especially useful for investigating variegated utilitarian garden space in Pompeii, in which utilitarian and recreational functions are rarely siloed, but are nonetheless important to keep in mind.

With a basic understanding of the origins of the *hortus* and its related terms, a more in-depth investigation into the varying epistemological and empirical uses of the term *hortus* may be made. In so doing, I will first consider how the general term 'garden' is perceived as a general term, before exploring the construction and use of *hortus* space in the Roman period, in order to provide important context for investigating the utilitarian *horti* of first century AD Pompeii.

Today, a garden is generally defined as an outdoor space 'whose foundation is soil', set aside for the cultivation of plants for enjoyment or economic benefit.[103] This definition is congruent with the six key elements commonly marked out as characteristic of a *hortus* in ancient literature:

1. Fertile soil;[104]
2. Good topography;[105]
3. Orientation appropriate to the plants within;[106]
4. Adjacent to a water source (i.e., a stream or spring);[107]
5. Enclosure by a wall or hedge;[108]
6. Containing plant life controlled by human intervention.[109]

[103] Pagán 2006, 6.
[104] Col. *Ag*. 1.1.7, 2.2, 10.6-22; Var. *Rust.* 6-7; Sen. *Ben*. 1.2, *Cons*. 4, *Ira* 15.1-3, *Prov*. 4.14.
[105] Var. *RR*. 6-7.
[106] Var. *RR*. 6-7.
[107] Col. *Ag*. 10.23-26.
[108] Col. *Ag*. 10.27-28, 10.362.
[109] Cat. *Ag*. 1.8, esp. 10. The references in the above list are only illustrative key sources as all exist in many different works. Lists of the conditions for the cultivation of a garden can be found in: Col. *Agr*. 10.6-34; Plin. *HN* 17.204, 19.52-60; Cato *Agr*. 1.1.7; Var. *Rust.* 15.

To this list, Pliny adds that the *hortus* should be attached (*iungendus*) to a *villa* (in this instance likely referring to a country-house), while Cicero notes an out-building and drain as essential traits of any decent *hortus*.[110] The addition of a Priapus, god of the garden and protector of produce, may also serve to keep thieves (and in some cases unwanted witches) at bay.[111] From an archaeological point of view, Pagán lists the following as features which may aid in the identification of a Roman garden due to their normative presence in these spaces, revealing once again the emphasis placed on their recreational use: 'architectural specimens [for example, columns], furniture, sculptures, altars, sundials, planters, pots, pools, and water fountains, as well as gardening tools and implements.'[112] Furrows, irrigation, cisterns, root cavities, and archaeobotanical material (including carbonised plant material and pollen) can act as useful indicators of productive *horti* and, as seen above, appear in various literary accounts of this space.[113]

All gardens must at some point go through a process of planning and construction including, but not limited to, the demarcation of a boundary, the levelling of ground, the laying of soil and beds, and irrigation. Calculated and careful planning is even more crucial for garden spaces which are terraced, requiring the levelling, and often movement, of soil, fountains and other water features, pavilions and fixed dining areas, colonnades, and architectural structures, such as outhouses.[114] Extensive construction and landscaping experience would therefore have been required for the conversion of land occupied by properties destroyed or demolished during the major quakes in Campania in AD 62/3 (see Chapter Six for a discussion), including the importation of proper soils (for example, soil at subgrade level and topsoil) to cultivate young plants. Planning would also have included budgeting and the management of workers, timelines, and materials. The quick turnaround of many new, extended, or converted utilitarian gardens in Regions I and II post-AD 62/3 (see Chapter Six for the full discussion) over other houses and public buildings in the town which

[110] Plin. *HN* 19.60; Cic. *Fam*. 16.18.2.
[111] A Priapus statue may also be made by a farmer from the wood of a dried oak tree, as in the *Vergiliana Priapea,* where he is placed to guard the cottage and meagre garden (*erique villulam hortulumque pauperis tuor*).
[112] Pagán 2016. See also Farrar 1998.
[113] Many of these features were employed by Jashemski in initial pre-excavation assessments of open space in Pompeii, when attempting to identify market gardens in the city.
[114] Gleason and Palmer 2018, 372.

still had not been repaired by the time of the eruption, is testament to the skilled planning involved.

A good example of a garden subjected to careful planning in the second half of the first century AD is the House of the Ship Europa, where evidence for quarrying prior to the construction of two man-made terraces for the utilitarian cultivation of produce for the market can be observed.[115] An inordinate amount of planning and expertise from numerous parties would have been put into coordinating these two construction events, along with a great deal of manpower to transport quarried materials away, to level the ground with soil imported from outside the town, and to finally plan, plant, irrigate, maintain, harvest, and process crops in its space. The latter would have required the in-depth agricultural knowledge not only for the intercultivation of pulses among the hundreds of vines grown here, but also for growing the multiple fruit and nut trees, and two large vegetable plots, in approximately half an acre of urban space.[116] Furthermore, as we shall see below in more detail, the upper terrace with contains the oldest vines in the garden, suggesting that the terraces were planned in order to preserve established income from the former layout of the garden, and supplement it with new plants (vines, trees, and vegetables).

When constructing a garden, the first port of call is the demarcation of a delegated space from the natural or urban landscape with a wall, border, or hedge.[117] This act of division is what defines a garden. Then, to the delimited space of the garden, the influence of human agency and control may also be added; without human agency, the space of the garden returns to its natural state and ceases to comply to the conditions of a 'garden'. In the absence of a border, security and claims to ownership are compromised, with the garden becoming prone to absorption into the surrounding landscape. For example, Juvenal likens the need to protect one's wife from other men to the enclosure of a garden for security reasons: 'when no one feared their cabbages and fruit would be stolen, and all lived with gardens unenclosed'.[118]

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[115] For a discussion, see p.116.
[116] Measurements taken using the 'Area' tool in the 'Pompeii: Navigation Map 2' (Poehler 2017a).
[117] Gowers (2000, 129) says: '… in Rome, the word *hortus* meant an enclosure before it came to mean vegetable garden.' See also Grimal (1969, 44).
[118] *cum furem nemo timeret/caulibus ac pomis et aperto uiueret horto*: Juv. *Sat*. 6.17. Translation from Gowers (2000). This reflects further upon the efforts of Augustus to stem the dilution of Roman identity through the preservation of family inheritance and marriage.

However, as Columella emphasises, borders were not only to keep men out, but to keep animals in also; it is unlikely that there was a time in Roman history when gardens were not enclosed.[119]

Importantly, notions of enclosure and utilitarian function are contained within the etymology of the Latin term *hortus*. The Greek root of the term *hortus*, *chortos*, implies both its enclosed nature and utilitarian use by a household; the root of *chortos* is *gher, meaning 'to grasp, enclose'. This word appears in Homer as 'the city wall', but later also as 'the prairie'.[120] The former case promotes the delimitation of 'rural field space', while the latter does not. However, von Stackelberg reads the Greek *chortos* as an enclosed, open-air space dedicated to the upkeep of livestock, and the cultivation of food for their maintenance, though her definition is derived from later (biblical) uses of the term.[121] Further, *chortos* shares its meaning with the Latin *cohors*, which is used by Varro, Cato, Columella, and Ovid to refer to an enclosed space, such as a court, a yard, or a pen, as well as a company of soldiers in an army.[122] Post-Classical European and proto-European roots of the word 'garden' continued to share the same connotations as the Latin, as in Old English *gyrdan* 'to gird' or *geard* 'fenced enclosure or garden', Sanskrit *ghra-* 'house', and Breton *garz* 'enclosure, garden', to name a few.[123]

In the bountiful imagery of the gardens of Alcinous and Laertes in Homer's *Odyssey*, the cultivated vineyards, orchards, and vegetable gardens are 'enclosed' within the space of the 'garden', some of these being subdivided further within the boundaries of a hedge (such as the orchard).[124] Upon visiting the *kēpos* owned by his father Laertes, Odysseus first arrives at an orchard enclosed by a hedge, where pear, pomegranate, apple, sweet figs, and olives are cultivated. The olive trees he notes for their inheritable quality.[125] Beyond this lies a vineyard,

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[119] See *heredium* below (page 34).
[120] Homer *Il*. 11.774, 12.640.
[121] von Stackelberg 2009, 9. Neither of the early references refer to livestock or cultivation but instead imply the open, uncultivated porticoed space found at the centre of a Greek *oikos* (house); see Matt. 6:30, 13:26, 14:19; Mark 4:28, 6:39; Luke 12:28; John 6:10; Corinth. 3:12; James 1:10-1; Peter 1:24; Rev. 8:7, 9:4.
[122] Var. *Rust.* 1.13.2; Cat. *Agr*. 146, 29; Col. *Agr*. 8.3.8, 7.3.8; Ov. *Fast*. 4, 704. For all references to this term, see Latinitium 2019.
[123] Harper (2021) **gher- (1),* "to grasp, enclose". See also Austen-Perry 2019.
[124] Homer variously employs the terms *kēpos*, *orkhatos*, and *alōē* for enclosed garden space and talks of the various produce grown there ('apples, pears, figs, grapes, olives, and herbs'), see Giesecke 2007.
[125] The Greek proverb 'A society grows great when old men plant trees whose shade they shall never sit beneath' finds root.

with areas for labourers to dry and tread grapes. Finally, Odysseus reaches an area of ordered beds, 'with plants of every kind', where flowers and vegetables were grown.[126] 'Plants of every kind', cultivated in a well-ordered fashion, may represent an early form of the later Roman *viridiarium*. Importantly, however, this area remains under the general heading of *kēpos*, the early equivalent of *hortus.*

Throughout this extensive *kēpos*, the water of one of the two springs is fed through for irrigation, while the other spring extends towards the 'great house'. Though the orchards, vineyards, and vegetables are cultivated in separate areas, all come under the heading of the *kēpos*. The characteristic qualities of Laertes' garden continue to resonate in garden descriptions by Latin authors and remain significant in understanding the longevity of these typologies within archaeological examples in Pompeii and the surrounding *villae rusticae* in the Campanian countryside. In these, irrigation methods are complex enough to deal with the demands of different varieties of plants and the hot Mediterranean sun and different cultivars are often dedicated specific areas.[127]

Looking further back in history reveals that the delineated and controlled notion of the garden in the Classical period had hardly changed since its earliest forms in the Mesopotamian and Egyptian empires and the later royal estates of Persia. Modelled as *paradeisoi* (from *pairi*, 'around', and *daeza*, 'fence'), Persian 'gardens' were enclosed areas designed to mimic the landscape of the Empire in miniature and provide a space for hunting wild animals and cultivating food.[128] Archaeological evidence for ancient Persian gardens is almost exclusively from elite gardens, though the Mandala garden (an enclosed square with a central circle feature, thought to contain a central tree and a just-off-centre basin) is known to have been common across central Asia in the ancient period.[129] The courtyard, or *hayat*, a smaller and inward version of the Mandala garden and a typical feature of modern Iranian architecture, was likely also mimicked by 'ordinary' Persians in their own homes, before

[126] Hom. *Od*. 7.78-132.
[127] Despite the relative normality of these descriptions, the idealistic all-year-round blooming of flowers and fruit trees (a theme which arises centuries later in the work of Vergil) reveals the fantasy of this space, a heterotopia of the true garden and the one which exists in legend.
[128] Austen-Perry 2019.
[129] Shirvani 1985, 25.

being adopted by the Greeks, and later Romans, as a space which joined (*coniungitur*) the villa together, hence the military *cohors* (and the related term *hortus*).[130]

The first evidence of dividing crops by type to facilitate the irrigation of plants according to individual requirements is found in descriptions of the gardens of Sargon II (r. 722–705 BC).[131] His gardens, and the elaborate techniques employed to acclimatise foreign plant varieties, were an extension of the practices established by Sargon II's predecessor Ashurnasirpal II (883–859 BC), who planted and distributed exotic plant varieties collected on his conquests as a display of kingly power. The link between power and garden cultivation was echoed in the city-states of archaic Greece, as idealised in the fantastical royal gardens of Alcinous and Laertes. Though fictional, the subdivision of a broad range of cultivars within an enclosure, and the implementation of complex irrigation methods in these gardens, were very likely based upon real sites at the time. Later developments of such gardens can be found in other Greek texts, for example, of Plato and Aristotle,[132] while ceramic pots, woven baskets, and stakes are known to have been used at home on a smaller scale.[133] By the Roman period, we see such practices and design in both *viridiaria* and, on a broader scale, *Horti*.

Connotations of enclosure, utilitarian cultivation, and subdivision are 'inherited' by, and deeply engrained in, Roman perspectives of *horti* by the mid-first century AD, as seen in the list of characteristics above. The grouping of orchards, vineyards, and vegetable gardens under the heading of the *hortus*, however, does not seem to have been carried over in a straight-forward manner. For example, prior to the first century AD, Cato the Elder (*Ag*. 1.1.7) referred to the *hortus inriguus* (watered garden, or vegetable plot) as a separate entity within the total space of a farming estate, categorising it as second only to the vineyard in

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[130] Varro *Ling*. 5.16.88. Hayats were common features also of ancient Persian palaces; see Dalley 1993, Shirvani 1985.
[131] Bowe 2019, 2; Dalley 1998.
[132] E.g., Plat. *Ti.* 77c-d ('cutting channels in gardens, to the end that it might be irrigated as it were by an inflowing stream'); Arist. *Part. an.* 3.668a ('The system of blood-vessels in the body may be compared to those water-courses which are constructed in gardens: they start from one source, or spring, and branch off into numerous channels, and then into still more, and so on progressively, so as to carry a supply to every part of the garden.') Both are describing the blood vessels in the bodies of animals.
[133] E.g., Theophr. *Caus. pl.* 1.4.4.2-4. He also records a list of items which may be grown in pots, all of which were varieties known to have been grown in and around Pompeii; see Krasilnikoff (2010, 109) for the list. The annual festival of the Gardens of Adonis saw individuals plant lettuce, fennel, or barley in broken pots, before leaving them on the rooftops to wither quickly, as 'a reminder of life's transience'; Bowe 2010.

terms of its profitability.[134] The economic point of view of Cato differs from Alcinous' garden descriptions, which are designed to contrast Odysseus' difficult and fragmented, rootless position, with the ordered unity of his well-watered and luxuriant vineyards and orchards. Nowhere in this description are the separate entities of the orchard, vineyard, and growing beds collectively categorised as a 'garden'. Nonetheless, we are witness to the familiar site of the ordered and segmented farming estate in Alcinous' garden: an orchard of pears, apples, figs, and (surprisingly) grapes is bordered by a hedge, while next to this is a vineyard which also has a level ground set aside for drying and treading. At the end of each row of vines is a garden bed 'of every sort', presumably both flowers and vegetables, which, like the rest of the garden, is watered by one of the two streams (the other being directed towards the house). It 'sends its water throughout all the garden', much in the fashion of irrigation systems excavated in the gardens of Pompeii (incidentally often with flowers, young trees, or vegetable plots).[135] In other words, the vineyard, orchard, and vegetable plot could be meaningfully characterised as separate entities from Homer, up to second century BC Rome (when we see the separation of entities, as in Cicero above, for example) and into the late and early first centuries, under the heading of *latifundium* (farming estate) or *villa*. The word *latifundium* is not, however, seen in Latin literature prior to Augustus, suggesting both a change in terminology over time, and a physical development from viewing the *villa* as a country house with utilitarian output, to a large, landed property or farm in the early Imperial period (we have already seen the great uptake of land by wealthy landowners).[136]

The Greco-Roman tendency to separate the 'garden' from the vineyard and the orchard is reflected in the pseudo-Vergilian *Moretum*, written in the first century AD. In this poem, the utilitarian garden is maintained when all other tasks have been completed on the 'farm' or on bad weather days. The same is advised by Cato and Columella.[137] Following the trend of other Latin authors, the author of the *Moretum* does not include fruit trees or vines in the category of the *hortus*. Instead, the label '*hortus*' is reserved for vegetable plantings. This may be due to its ancestral, raw, and rustic nature, for the earliest Roman gardens were

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[134] An equivalent to the *hortus inriguus* is the aforementioned *holerarium*.
[135] For example, the House of the Garden of Hercules (II.8.6) is a flower garden with a complex irrigation stream running throughout the garden.
[136] For an extreme and deliberately hyperbolic example, see Trimalchio's estate descriptions in Petronius (*Sat.* 48).
[137] Cato *Agr*. 2.4; Col. *Agr*. 2.214.

latterly believed to have been cultivated with vegetables as, for example, seen in Pliny.[138] Otherwise this may represent a continuance of the views of other Latin authors. For example, the practice of separating cultivars on the 'farm' is evident in literature from a generation or two previous; Cicero, writing in 44 BC, states that the *hortus* was referred to as *succidiam alteram* ('second flitch') by farmers (*agricolae*),[139] and considered as 'one facet of the larger project of farming'.[140] In the same essay, Cicero marks the *hortus* out as a multiplicitous category of productive value and separate to the orchard on the country estate,[141] meaning that the '*hortus'* he refers to was likely reserved for vegetables and flowers only.

However, only shortly later, we see the term *hortus* used to refer to the space where vegetables, vines, and trees are collectively cultivated in Vergil's *Georgics* 4.[142] Ovid, writing sometime in the early first century AD, refers to 'sweet, succulent herbs' alongside fruit trees and an elm tree covered in vines in the Goddess Pomona's garden.[143] Here it is clear to see that the once siloed area of the utilitarian *hortus*, and the activity of cultivating it, were increasingly being enveloped into other garden spaces. For example, in Pliny's Book 19, dedicated to agriculture and horticulture, we are treated to lengthy descriptions of what he refers to as '*omnia hortensia gaudent'*, or 'all garden plants'.[144] These he limits exclusively to vegetables and herbs; fruit and nuts are not contained within this description. Similarly, olives do not appear to be widely grown in *horti* and seem to instead be mentioned in a farming context; Pliny the Elder separates orchards from olives, as do Cato and Varro.[145] This

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[138] Plin. *HN* 19.52. In Characters, Theophrastus (*Char*. 21.20.9-10) describes characters of 'bad taste' who have cisterns of cold water in their home and a garden filled with lots of fresh vegetables (likening this sort of house to a guest-house, or inn).

[139] *Agricola* generally defines a cultivator of the land, but can concurrently refer to a farmer, a ploughman (Cato *Agr*. 1.2, Cic. *Rosc. Am.* 16: to describe a good farmer and man) and an individual devoted to agriculture and cattle breeding (e.g. Sen. 16, Hor. *Sat*. 1.1.9). As seen above, agriculture can refer to a variety of cultivars, including grains, vines, orchards, flowers, and vegetables. The patron gods of agriculture, such as Ceres, Bacchus, and Faunus, are described more generally in 'agriculture': '*agricolarum duces di*' (Varr. *Rust*. 1.1.4) and '*Redditur agricolis gratia caelitibus*' (Cat. *Tib*. 2.1.36).

[140] Cic. *Sen*. 15.56. 'Second flitch' is a term used to refer to a cut of meat from the side of a pig which is preserved by hanging. The implied meaning is that the *hortus* was a source of sustenance, as much as meat was (cured meat was an essential for getting one through winter). Notably Simulus has meat hanging by his fireplace and, as we see in the poem, rarely buys any from the market. For further on the maintenance of the garden alongside other areas of the farm, see Pagán 2006, 6; see also Gowers 2000, 124; Henderson 2002, 113, 130.

[141] Cic. *Sen*. 15.54.

[142] Vergil does state that this garden plot was not fit for vines, however (see Verg. *G*. 4.127-129).

[143] Ov. *Met*. 14.655-665. Ovid (14.623-625) even refers to Pomona's speciality as 'garden-culture' ('*qua nulla Latinasinter hamadryadas coluit sollertius hortos nec fuit arborei studiosior altera fetus*…')

[144] Plin. *HN* 19.39.

[145] Plin. *HN* 4.131; Cato *Agr*. 1.7.Var. *Rust*. 7.9 (referencing Cato).

separation is not surprising as all three authors either belong to or favour the pre-Augustan values associated with horticulture and farming, including a clear division between vineyards, orchards, vegetable gardens, and recreational outdoor space. The frequent crossover between the utilitarian and the recreational in early Imperial Roman gardens must therefore be kept in mind in the following, as must a clear definition of the *hortus* in the early Imperial period be establish. This is, however, difficult to obtain without a closer look at its etymology.

For this, we may look to Pliny the Elder who, in his interpretation of the terminology employed in the Twelve Tables, points out that the term *hortus* referred to the 'farm' in earlier centuries:[146]

> *in xii tabulis legum nostrarum nusquam nominatur* ***villa****, semper in significatione ea* ***hortus****, in* ***horti*** *vero* ***heredium****.*
>
> In our Laws of the Twelve Tables the word 'farm' (*villa*) never occurs—the word 'garden' (*hortus*) is always used in that sense, while a garden is denoted by 'hereditary property' (*heredium*).

The word for farm or estate used in his own time, '*villa*', was not widely used at the time the laws were originally written (449 BC). Rather, the term '*hortus*' was used to denote a farm, a collective space of all agricultural and pastoral activities. Pliny also tells us that prior to the use of the term *hortus,* the early Romans used the word '*heredium*' to refer to the same space of collective cultivation. Varro helps us to understand this distinction more clearly: at the foundation of Rome, Romulus is said to have assigned two *iugera* to each citizen, the equivalent to one *heredium* in Roman land measurements, 'as the amount that could be transmitted by will'.[147] This continued as a feature in centuriation within the Roman army, and in towns such as Pompeii, at the foundation of the pre-Roman town (and more so after

[146] Plin. *HN* 19.50.
[147] Varro *Rust*. 1.10.1–2; *Ling*. 5.35; Plin. *HN* 18.7.

Roman colonisation, when the regular layout of the '*Aldstadt'* was extended with even more regular *insulae*).[148] This space was later referred to as the *hortus*.[149]

The *heredium* could not legally be subdivided or sold outside of the original owning family and as such found its definition in origin and inheritance. As such, the *heredium* consisted of both a residency and a space for small-scale farming, the latter most often found at the rear of the property. Theodor Mommsen's original view that the *heredium* was not of a size large enough to support a family on a self-sufficient basis throughout the year has been well accepted by scholars.[150] So, too, continued the co-existence of the inherited *heredium* alongside the state-owned *ager publicus*, the latter remaining undivided and in the ownership of the general populace. Their co-existence suggests that the *heredium* was a fixture used to supplement the diet, rather than to sustain the diet of households or for achieving self-sufficiency, as food was being distributed or made available to the public via other means.[151]

If, as Pliny suggests, the *heredium* was the original word for *hortus*, it is likely that the inheritable qualities of the *heredium* remained engrained in the space of 'the poor man's farm'. So, too, would the original use of the *heredium*, for the cultivation of vegetables and herbs, have persisted into its later status as a '*hortus'*. I can thus conclude that the enclosed and cultivated spaces which have so far been uncovered in Pompeii were recognisable as '*horti'*, for they frequently contained vines, fruit and nut trees, vegetables, flowers, and the odd olive tree growing together. However, I have also found that referring to the produce grown in Pompeii's gardens as '*hortus* produce' is perhaps not the most conceptually appropriate way of …. Rather, the term rustic produce is more suitable, for fruit and vines (typically associated with larger estates outside of the urban centre) are being grown in the city, alongside the more traditional 'garden produce' of vegetables and flowers: 'Nowadays indeed under the name of gardens people possess the luxury of regular farms and country

[148] Festus *Gloss. Lat.* 47L; Varro *Rust*. 1.10.2. For an overview, see Gargola 2012. For evidence of centuriation at Pompeii, see Moormann 2007, 439, 441, 445. 'The expansion of the city would have been the product of one single action [of development]': see Geertman ibid. (esp. 83) for a discussion.
[149] E.g., see Viitanen 2020 and Nappo 2007 (on the original grid layout of Pompeii).
[150] Mommsen 1894, 239.
[151] Earlier residents of Rome likely also hunted, fished, and gathered food from the wild; see Drogula 2012.

houses actually within the city'.[152] With these definitions in mind, I am able to assess the reception and use of the *hortus* in first century AD.

2.2 Inheritable horti

We have seen that the importance of boundaries is built into the term *hortus*. So too is its realisation of the significant bonds connecting people and place, and families and their property. I previously also established that the root of the term *hortus* can be found in the Greek *chortos*.[153] The link between the sentiment of inheritability and the space of the *hortus* can be observed in the related Latin term related to *chortos*: '*ortus*'. The term *ortus* is etymologically related to the term *'orior'*, which means to spring or originate from. *Orior* is often used when describing an early race of people, birth, or the act of rising.[154] Thus, as with the term *heredium*, sentiments of inheritance and origin are inferred in the derivative term *hortus*.

That many Roman authors dealing with the subject of the *hortus* (or *heredium*) use it as a symbol of ancestral virtue and collective Roman identity is therefore unsurprising, particularly considering the imbued connotations.[155] The terms *ortus*, *heredium,* and *cohors* are not only related in etymological thinking developing in the late Republic, but also empirically and epistemologically. This occurred through 'figures of memory' such as Lucius Quinctius Cincinnatus, a citizen-farmer who, after saving the Republic, returned to his field in an act of *virtus* (see below). His story was especially popular in this era. The development of related horticultural terms also occurred in relation to the early origins of the *hortus* as a place of produce, hard work, and as a locus of *maiores nostri* ('our ancestors'). As such, the space of the *hortus* came to imply Roman origin and descent to the elite writing in the first century AD. I will talk more about how this may have permeated society more broadly, below, as well

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[152] *iam quidem hortorum nomine in ipsa urbe delicias agros villasque possident* (Plin. *HN* 19.50).
[153] This was also related to *cohors*, in reference to the act of bringing together, and the later, English, term courtyard.
[154] Related derivatives: *origo -inis* ('beginning, source', e.g., Cic. *Leg*. 3.8.19, or of plants, 'springing up, growth', e.g., Lucr. 5.211); *aborigines* ('race of pre-Roman people', e.g., Var. *Ling*. 5.53); *cooriri* ('to spring forth, to be born', e.g., Plin *HN* 2.36.36) and *oboriri* ('to rise up, occur', e.g., Plaut. *Curc*. 2.3.30); *suboriri* ('to come into being', e.g., Lucr. 1.1036).
[155] Some key examples of this: Plin. *HN* 19.52; Suet. *Ter*. 5; Nep. *Milt*. 5.4; Calp. *Buc*. 2; and, of course, the *Twelve Tables* (Luc. 7.4a-b).

as the benefits of communicating these sentiments. However, first I will spend more time on the concept of inheritance and the garden.

We have already witnessed two instances in which the productive garden was an inheritable entity, in both the garden of Laertes and in the passage from the Twelve Tables, where the *hortus* is referred to as an *heredium*. It is therefore unsurprising that the modern term 'inheritance' also finds its root in the Latin term *heredium*.[156] Laertes' garden in the *Odyssey* is equivalent to the concept of the *heredium* established by Romulus; as Odysseus walks through the *lieux de memoire* of Laertes' garden, navigating the trees planted by his father, he is introduced to the histories and virtues embedded in the soil of his ancestral 'roots' and made aware of his duty to continue this when he becomes an old man himself.[157] The garden was highly significant in achieving this meaning. Henderson summarises the epistemological impact of this act in the locus of the garden as a model through which: '… his father's attempt to inculcate in him the gardening habit… would tie him to the cultivation of a local knowledge and settle in him an internalised body memory'.[158] Inheritance of his father's cultivated orchards, vineyards, and vegetable plots would metaphorically and physically imbed Odysseus in the traditions of his father, and with them the virtues of his forefathers: 'Odysseus is placed now as the son, the inheritor, and he is to inherit the trees (which produce food, which are rooted in the soil of the *oikos*, which need human care across the generations).'[159] Such connotations continued with Romulus' *heredia* and onwards.[160]

Roman virtue was cultivated in the soil and tended by the "good farmer". The good farmer, a man of robust character and strength, was considered by numerous Roman writers to have founded Rome, for these individuals supposedly made the best soldiers (prime examples being the moral exemplars of Cincinnatus, Manius Curius Dentatus, and others).[161] On the virtues of the good farmer's character, one of the greatest political powers in the world was

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[156] Lewis and Short 1879.
[157] Falkner and de Luce (1989), Thomas (1992), and Thibodeau (2001) provide useful summaries of the old man, or *senex*, and his link to the garden in ancient thought.
[158] Henderson 1997, 100.
[159] Goldhill 1991, 19.
[160] For example, in Cato and Horace's separate inheritance of 'Sabine farms', which include kitchen gardens attached a cottage.
[161] E.g., Cato *Agr*. 1.2; Cic. *Rosc. Am.* 16. For a discussion of the "good farmer" in Roman literature, see Spanier 2010.

founded. However, following the Second Punic War, the mass occupation of the *ager publicus* by wealthy individuals, including Roman senators and *equites*, caused the dispossessed poor to flock to the city, though this is perhaps an over-simplified view adopted by the elite for their own moralising agendas. Nonetheless, it is clear that fewer Romans were cultivating the land by hand than ever before:[162]

> The dispossessed poor lost any interest they might have had in performing military service, and could not even be bothered to raise children, with the result that before long all over Italy there was a noticeable shortage of free men for hire, while the place was teeming with gangs of foreign slaves, whom the rich used to cultivate their estates instead of the citizens they had driven away.

The *ager publicus*, state-owned land gained via confiscation following victories in Italy and abroad, was the main source of revenue for Rome.[163] In some cases, whole territories were confiscated, as in the whole of the Campanian territory (*ager Campanus*). The political context of this period is crucial to understand, for it impacts on our understanding of the ownership and use of 'inherited' land by the Campanian people, including the urban land in Pompeii which forms the basis of this thesis, and sentiments of *virtus* and inheritance cultivated in Pompeian soil.

Publicly owned cultivated land was either sold (though theoretically remained under state ownership) or assigned to Roman citizens in full ownership by lot (*assignati*), this being the *heredium* seen above. Any remaining land was available for rent for a fixed number of years (up to 100), which allowed *mancipes*, or state-contractors, to sublet to tenants. In these cases, the land remained publicly owned. Uncultivated land may be let out to tenants, though possession may be retracted by the state when needed.[164] Abuses of the *ager publicus* by wealthier tenants came in the form of unpaid produce (in kind) or claiming property as theirs

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[162] ἐξωσθέντες οἱ πένητες οὔτε ταῖς στρατείαις ἔτι προθύμους παρεῖχον ἑαυτούς, ἠμέλουν τε παίδων ἀνατροφῆς, ὥστε ταχὺ τὴν Ἰταλίαν ἅπασαν ὀλιγανδρίας ἐλευθέρων αι᾽σθέσθαι, δεσμωτηρίων δὲ βαρβαρικῶν ἐμπεπλῆσθαι, δί ὧν ἐγεώργουν οἱ πλούσιοι τὰ χωρία τοὺς πολίτας ἐξελάσαντες (Plut. *Vit. Ti. Gracch.* 8.3, translation by Perrin 1921).

[163] Pliny the Younger (*Ep*. 3.19.8) and Martial (4.37) reference their mutual acquaintance 'Afer' as an illustration of investment in property for income. See also Duncan-Jones 1974, esp. 33-59.

[164] For example, Sulla confiscated such lands for his own friends and soldiers, causing great unrest among the population of Rome in possession of such properties.

when it in fact remained state-owned. The concern was that land was more commonly being purchased rather than inherited, though of course this was likely a hyperbolic impression.[165]

In addition, agitation was increasingly felt among the plebians of Rome from the second century BC onwards as traditional food supply systems were now inadequate to supply the growing population of the city with food. The Gracchus brothers were the first to attempt to standardise food supplies and prices for the citizens of Rome, but their reforms were met with great opposition from the landowning elite who made great profits from agriculture. As such, Tiberius Gracchus, a Tribune of the Plebs, pushed new laws through the Senate which limited the amount of the *ager publicus* held by one individual to 500 *iugera*, a continuation of land assignations introduced by Stolo between 368-7 BC,[166] and redistributed state-owned land to children (250 *iugera* each). The remainder was to be distributed to the poor (thirty *iugera*).[167] However, from 81 BC onwards, public land which had been earmarked for sale by the Senate, but not sold, were … to raise money for the settlement of new colonies in Campania. These colonies would be gifted state-owned land.

At the first meeting of the Senate on the first of January 63 BC, Cicero stood before the Senate to denounce the recent proposals of P. Servilius Rullus which called for the privatisation of publicly owned land. During his speech, Cicero lamented the loss of *vectigalia* (tax) from Campania and marked this and the subdivision of state-owned land as a substantial forfeiture of resource and power for Rome.[168] In highlighting the long-standing link between land ownership, Roman identity, and the 'Golden Age' of the Republic, Cicero aimed to spotlight the threat of land reforms not only to the liberality of individual Romans, but also to their in-built ancestral identity: 'As you now say of your ancestors, "Our ancestors left us this land", so your descendants will say of you "Our fathers inherited this land from

[165] There are many instances of inherited land in the Latin literature. For example, see Plin. *Ep*. 7.11; Val. Max. 4.11; Cic. *Verr*. 2.3.11.
[166] Plin. *HN* 18.17.
[167] Appian believed that the distribution of *ager publicus* to Roman citizens was for the purpose of maintaining the Roman race, a kind who were especially able to handle hardship, and increase the population (Tiberius maintained that this, rather than increasing wealth, was the purpose of his reforms; App. *B. Civ.* 1.11.43. The previous reforms introduced by his brother, Sempronius Gracchus, in 123 BC, set a fixed price on a modius of grain for the plebs and so restricted the power over the grain market that the landowning elite once had (thus limiting the profit to be made).
[168] Jonkers 1963, 50.

their fathers and they have lost it"'.[169] Campania, a key source of nutrition for Rome, was to be lost to growing greed among the elite, and inheritable land was dwindling:[170]

> But we shall be told the land of Campania, the most beautiful in the world, will be divided by this law, and a colony conducted to Capua, a very large and magnificent city... Will you allow the most beautiful estate belonging to the Roman people, the source of your wealth, the ornament of peace, the support in war, the basis of your revenues, the granary of the legions, your relief of the corn supply—will you allow it to be crushed to pieces? When all your other revenues failed you in the Italian war, have you forgotten how many armies you supported by the income from Campanian territory? Or do you not know that the other splendid revenues of the Roman people often depend upon a slight change of fortune or alteration of circumstances?

Like Cicero, Pliny the Elder mourned the loss of state-owned land to the aggressive tactics of the wealthy eating up neighbouring land, leading, in his eyes, to the ruin of Italy.[171] Rather than being maintained by the hands of virtuous Romans, as even the Kings of Rome were said to have done, Roman land was now maintained by slaves.[172] No longer were upstanding Romans self-sufficient, but land was used as a source of rent, rather than produce. And yet, despite these concerns, we find an upsurge in technical treatises advising how to purchase and manage farmland in the manner that an upstanding Roman should. Columella accepts this development with practicality: 'let it be the chief concern of one who owns a farm inherited from his ancestors, or of one who intends to buy a place…'[173] Thus, within the very soil of Roman, and indeed Campanian, land, one may cultivate his *virtus*. Despite generational shifts in the conceptualisation of agricultural land, from the ancestral *heredium*

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[169] Cic. *Leg. Agr.* 2.31.84.
[170] Cic. *Leg. Agr.* 2.28.76, 29.5-8: *At enim ager Campanus hac lege dividetur orbi terrae pulcherrimus, et Capuam colonia deducetur, urbem amplissimam atque ornatissimam... Unumne fundum pulcherrimum populi Romani, caput vestrae pecuniae, pacis ornamentum, subsidium belli, fundamentum vectigalium, horreum legionum, solacium annonae disperire patiemini? An obliti estis, Italico bello amissis ceteris vectigalibus quantos agri Campani fructibus exercitus alueritis? an ignoratis cetera illa magnifica populi Romani vectigalia perlevi saepe momento fortunae inclinatione temporis pendere?*
[171] Plin. *HN* 18.35 (*verumque confitentibus latifundia perdidere Italiam, iam vero et provincias*), 18.17 (in discussing the low prices of earlier Rome: *nec e latifundiis singulorum contingebat arcentium vicinos, quippe etiam lege Stolonis Licinii incluso modo quingentorum iugerum*).
[172] Plin. *HN* 18.35.
[173] Cic. *Agr.* 1. *praef.* 2-3.

to the *hortus* and the *villa,* inheritance of land was held as crucial for the maintenance of Roman identity and, by implication, power. In this way, the rustic *hortus* became one symbol of such sentiments, a *lieu de mémoire* of *Romanitas*.

By the mid-first century AD, the rustic *hortus* had become just one moral alibi for the elite, grappling as they were 'with traditional ethical concerns about gardens and villas in an age when personal luxury was simultaneously a subject for encomium and a potential target of imperial jealousy'.[174] This exploitation of the rustic *topos* in Greek, and later Roman, societies thus authorised elite privilege via the 'positive valuation of ancestral mores'.[175] As Reay (2003) says:

> Agriculture and animal husbandry supplied the basic terms and metaphors with which the Roman elite made sense of their world(s)… [it] impinged upon every aspect of Roman society, from language and literature, to religion and politics, to say nothing of the realities of daily sustenance.

For example, Pliny the Younger promotes his rustic garden (*hortus pinguis et rusticus*) by placing it close to the entrance of his Laurentine villa, in direct view of any new visitor (*Ep*. 2.17.15), while Martial is anxious to communicate his own embarrassment at the sterility (and small size) of his own rustic garden space, humorously describing the inadequacy of its size even to accommodate a cucumber (*Ep*. XI.18).[176] Though the physical act of cultivating inherited land by hand on a day-to-day basis of labour largely fell out of practice from the last century BC onwards among elite landowners, there is evidence for self-sufficient cultivation occurring in lower socioeconomic groups in early Imperial Italy and the provinces, for whom it was a necessity.[177] The cultivation of exotic plants used for food, such as citron, from the early Imperial period onwards in *viridiaria* likely also served the same 'self-sufficient' symbolic purpose as a traditional vegetable garden might, only evolved, with the added

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[174] Myers 2018, 262.
[175] Dang 2010.
[176] See Myers (2018, 258-77) for further discussion of these themes. Given the satirical context of this reference, it is likely Martial was making a play on words for a rather ruder image.
[177] For example, a petition from a tax-paying citizen soldier in Egypt to a centurion in AD 31 appeals for help against members of the village who are illegally using the land he inherited from his paternal grandfather for fishing: his appeal to the inheritable. Though in the Roman province of Egypt, this appeal demonstrates the importance of land inheritance in legal disputes.

benefits of providing a salubrious space for exercise and a pleasant outlook for residents and guests in the *domus*.[178] In whichever capacity, land of the utilitarian persuasion (in Pompeii) forms the foundation of enquiries in this thesis.

The Roman *hortus* of the early Imperial period, then, was a product of centuries of social and political change and cultural influence. In its very etymology sentiments of enclosure, inheritance, and *Romanitas* were bounded, connotations which were firmly cemented by the first century AD. The *hortus* and the values cultivated within its boundaries were intended to be inherited by new generations of Romans, in the process providing a space in which Roman society could protect and nurture collective identity with the 'tools' established by ancestral figures. Despite the epistemological strength of the *hortus*, a new entity threatened to diminish its symbolic power in the early Imperial period: *Horti*.

2.3 When are horti *not* Horti*?*

As discussed above, the traditional *hortus* differs from *Horti* in numerous ways and this distinction is important to make for the purpose of historical context. By understanding this difference, we may better appreciate how far the Roman garden strayed from the image of the traditional *hortus* in the late Republican and early Imperial periods, as well as the implications of this when considering the symbolic use of rustic horticultural space in the pursuit to preserve Roman identity and memory. As established, *Horti* are best described as 'complex gardens and parks' made up of porticoes, *topia* ('a richly evocative place'),[179] *sylvae* (wooded areas or forests), *viridiaria* (lush, green spaces intended for pleasure),[180] and *xysta* ('open walkways among plantations or groves of plane trees').[181] Their often ordered or geometric designs were curated through a careful combination of shapeliness, symmetry,

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[178] For a wider discussion, see Venner 2021.
[179] Gleason 2009; Purcell 2006.
[180] Bodel 2018, 216 (citing ancient literary and legal sources from the Roman period). Also a term for wall paintings depicting outdoor *viridiaria*; see Bergmann 2017. For ornamental plant trimming (*nemora tonsilia*) see Gleason and Palmer 2018; Gleason 2019; Landgren 2004.
[181] See Bodel 2017, 215- Gleason 2013 (esp. 10-1, 16-7), Landgren (2004, 2013), and Venner (2021) for discussions of the techniques used in leisure *Horti* to control nature and create dramatic effects. For the design of Horti, see Landgren 2004, 178-92; Gleason 2013, 16-8. Landgren (2013) and Gleason (2013) believe that an architect would have been aided by a *topiarius*, 'a skilled horticulturalist and designer', to create the elaborate *Horti* of the elite.

correctness, and allocation, though unordered areas, such as meadows, could also be included to invoke the natural landscape.[182]

From the first century BC onwards, when an increase in trade routes altered land-use priorities, *Horti* came to be used as euergetistic displays of power and military prowess in Rome.[183] By the first century AD, the installation of orderly, well-designed *Horti* became almost a prerequisite of political power, and extended into the semi-private sphere of countryside *villae*, as in the famous examples described by Pliny the Younger in his *Epistles*. To mimic these, elaborate gardens for leisure and pleasure began to be constructed in Rome by leading politicians and made available to the public, initially by Pompey, Julius Caesar, and Lucullus in an effort to build upon their own popularity.[184] Public feasts were regularly held by 'generous' politicians in Rome's *Horti*, while more generally these complexes became loci for philosophical debate and healthy strolls, escaping (and diluting) the pollution of the city,[185] appreciating art and flora from around the Empire (in *viridiaria*), finding love,[186] or even acquiring invitations to dinner from social contacts.[187]

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[182] For example, the meadow at Pliny's Tuscan villa, which he compares to a *xystus* for its comparable artistic qualities (i.e., manmade *ars* equates with nature) (*Ep*. 5.6.18). For a discussion of the different design elements at Pliny's villas, see Taegio 2011, 69-70. In *De Architectura*, while considering the proper elements of the Roman *domus*, Vitruvius appears to refer to the agricultural garden only twice (but does not use the term *hortus*): the first to refer to the irrigation of fields, vineyards, and gardens in the Hieropolis region, and the second in reference to *tympana* to water gardens (Vitr. *De arch.* 8.3.10, 10.4.2). He is largely only concerned with what appear to be *Horti*, however.

[183] Spencer (2010, 46) refers to the intellectual zoning of villas as landscapes of *otium*, social display, and culture, the rustic garden representing the 'other' of this.

[184] This practice was widely criticised. For example, Plutarch describes Lucullus as acting like 'a veritable Xerxes in a toga' in his elaborate *Horti*, modelled as they were on Epicurean leisure and philosophy, and as such decidedly Greek and effeminate (Plut. *Luc*. 38.1-4). For a discussion, see Littlewood and von Stackelberg (2013, 144).

[185] In this sense, I am referring to the remnants of everyday urban living in Rome, such as smoke and grime (Horace, see *Carm*. 3.6.1-4), animal and human faeces, discarded food, and other remnants of life, as well as flooding water (rather than pollution produced by the body, sex, or birth and death; see Lennon 2012; Davies 2012. Baker (2018) has demonstrated that the sensory experience of the garden helped to 'balance the humours', namely via 'pure air'.

[186] Love elegies set in the garden were a familiar trope of Greek literature (for example, Anac. *frag* 346.1; Theoc. *Id*. 15) which was then translated into Latin literature; see Hunt 2000, 2004; Littlewood and von Stackelberg 2013, 138-9.

[187] For Horace, the appeal of the garden was not only for its traditional productive purposes, but also its use in escaping the 'irritations and concerns of city living' (see Littlewood and von Stackelberg 2013, 138; Hor. *Carm*. 2.3, 2.11, 4.4 and *Sat*. 2.6). Selius is an example of a satirical caricature of individuals who roamed gardens in search of an invitation to dinner; for example, see Mart. *Ep*. 2.27 and 2.14, 7.20; Foss 1994, 23l; Macaulay-Lewis 2013.

Competition in the elaborateness of these gardens gained traction in the Imperial period, culminating in its most exaggerated urban form in Nero's *Domus Aurea*. This construction conflagrated Roman social *mores* to a new degree, even further than the Horti Luculliani (163 BC) (whose creator was likened to 'Xerxes in a toga'), and later, Hadrian's Villa (for at least this was *in rus*, where a villa of this extent 'belonged').[188] *Horti* such as Nero's were the epitome of Hellenistic luxury, and posed a severe challenge to nature and, by extension, the integrity of Roman identity.[189] Spanning from the Palatine to the Esquiline, the *Domus Aurea* and its *Horti* brought the country villa into the city.[190] Yet it was not, as Hartswick puts it, 'so much the extravagance of this villa garden per se, but its location within the heart of the city that angered the Roman populace.'[191] The transfusion of countryside *villae* to the city by many wealthy individuals before and after Nero caused desperate anxiety among the elite: 'Now indeed under the name of gardens (*hortorum*) people possess within the city itself fields and villas for their delectation.'[192] Varro summarises this shift in priorities through the mouth of Fundanius, and highlights the reversed role of the *villa*, once a locus of utilitarian virtue now transplanted to the city for *luxuria*. To paraphrase, he states that no longer is the size of a cellar, or a good kitchen, in a villa praised. Instead, villas are built to a size large enough to fulfil the owner's need for luxury, rather than the size of crops which should be growing there.[193]

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[188] In reference to his immoral adaptation of his gardens to mimic nature, in the Persian (and Xerxian) fashion; Plut. *Vit*. *Luc.* 39.

[189] Wood 2004; Zarmakoupi 2014.

[190] Nero's landscaped palace infamously gained much critique at the time and afterwards; for example, see Plin. *HN* 36.111; Suet. *Ner.* 39; Tac. *Ann*. 15.37. Mart. *Ep*. *Spec*. 2.4. Milnor (2005, 302) describes its construction as a 'publication of the emperor's privacy'. For an overview of the *Domus Aurea* as '*rus in urbe*', see Wood 2004.

[191] Hartswick 2018, 79.

[192] Plin. *HN* 19.51. Other related horticultural terms can be categorised under the heading of *otium*: The term *viridiaria* (singular *viridium*) is used by Vitruvius (*Arc*. 5.9.5-6, 6.3.10) to describe the healthful spaces adorned with trimmed and shaped plantings of both exotic and native origin, 'particularly those that are imported, skilfully pruned, or propagated', and which regularly occupy peristyles. This is in addition to *ars topiaria*, or 'the art of arranging plants and other elements to evoke places'; see Venner 2021 for a discussion of this term. For a full discussion of horticultural terms in Roman literature, see Gleason 2013, 17.

[193] *Fundanius, Fructuosior, inquit, est certe fundus propter aedificia, si potius ad anticorum diligentiam quam ad horum luxuriam derigas aedificationem. Illi enim faciebant ad fructum rationem, hi faciunt ad libidines indomitas. Itaque illorum villae rusticae erant maioris preti quam urbanae, quae nunc sunt pleraque contra. Illic laudabatur villa, si habebat culinam rusticam bonam, praesepis laxas, cellam vinariam et oleariam ad modum agri aptam.* '"A farm is undoubtedly more profitable, so far as the buildings are concerned," said Fundanius, "if you construct them more according to the thrift of the ancients than the luxury of the moderns; for the former built to suit the size of their crops, while the latter build to suit their unbridled luxury. Hence their farms cost more than their dwelling-houses,[1] while now the opposite is usually the case. In those days a steading was praised if it had a good kitchen, roomy stables, and cellars for wine and oil in proportion to the size of the farm…"' (Varro *Rust*. 1.13.6-7). For a discussion, see Zarmakoupi 2014, 5-6.

Many elite figures in the first century AD expose the moral tension between Roman *mores* and the desire for power at a time when the display of *luxuria* made individuals vulnerable to 'imperial jealousy'.[194] For instance, Seneca the Younger was aware of the danger posed to his personal security by 'the charm of his gardens and the splendour of his villas' due to their rivalry with those owned by the emperor, though ironically his *Epistles* called for practices which worked in harmony with nature, rather than striving to control it.[195] Similarly, Quintus Aurelius lamented on the danger of his own *Horti*: 'Alas, my Alban estate is prosecuting me'.[196] While fundamentally acting as the antecedents to *frugalitas* and *simplicitas* in their exclusion of utilitarian function (as we have seen, two inherently Roman virtues), *Horti* also distanced those who owned them from the moral identities cultivated by their ancestors.[197] Their placement in the urban centre of Rome was just one part of the rural to urban shift in focus in 'Rome's imperial project'.[198]

Yet, despite the emphasis on luxury and recreation in the horticultural pursuits of the elite and those who emulated them, the division between utility and recreation in the garden was not clear cut. This is true even in the early Imperial period when the general impression in the literature favoured a view in which luxury dominated. As we have seen, *viridiaria* provided an opportunity to straddle the two epistemological camps of *utilitas* (representing ancestral mores and Republican values) and *luxuria* (an important factor to display for social survival and advancement) from the early Imperial period onwards. By the time of Ulpian writing in the late second to early third centuries AD, *viridiaria* were perceived as the opposite of productive agricultural gardens and were already a staple subject of wall painting in Pompeii.[199] Of these frescoes, Bergmann says: 'As a rule, no living humans inhabit these schematic viridiaria. The main subject is horticultural design itself as it developed in Italy at the end of the Republic and in the early Empire.'[200] In addition, the increasing using of

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[194] Myers 2018, 262. See also Horace (*Carm*. 2.15.4, 2.18.21; *Ep*. 1.10.22), Seneca the Elder (*Controv*. 2.1.13, 5.5), Seneca the Younger (*Ep*. 122.8, 86.6-7, 122.8; *Ira* 1.21.1; *QNat*. 3.17.2), Martial (*Ep*. 3.58.2-3, 9.75) and Pliny the Elder (*HN* 12.6, 12.13, 16.140) on the immorality of manipulating nature for luxury.
[195] See Myers 2018, Macaulay-Lewis 2013, Landgren 2013, Spencer 2010, Pagán 2007, 2016, and von Stackelberg 2006 for the controversial manipulation of nature in the garden.
[196] Plut. *Sull*. 31.5-6.
[197] The inheritance of Hellenistic gardening practices by the Romans is identified by Pliny (*HN* 19.51) as the turning point for such a shift in priorities.
[198] Spencer 2010, 45.
[199] Bodel 2017 (Ulp. *Dig*. 7.1.13.4).
[200] Bergman 2018, 280.

gardens for healthful strolls and dining, as well as the cultivation of both beautiful and useful plants, show an evolution in how the garden more generally was being perceived and constructed in the early Imperial period in places such as Pompeii.

However, it is with this deeper understanding of an increasing epistemological link between *luxuria* and *Horti* at higher social levels that the symbolic weight of the rustic *hortus* and its produce in the ancient literature can be understood. For example, in Book 19 of *Historia Naturalis*, Pliny emphasises the diminishing use of (lowercase, rustic) *horti* for subsistence use over the period outlined above, and links this to the growing preoccupation with imported and modified goods, as well as a growing competitiveness of wealth:[201]

> At Rome at all events a garden was in itself a poor man's farm; the lower classes got their market supplies from a garden—how much more harmless their fare was then… But I protest, how little does garden produce cost, how adequate it is for pleasure and for plenty, did we not meet with the same scandal in this as in everything else! We could no doubt have tolerated that choice fruits forbidden to the poor because of their flavour or their size or their portentous shape should be grown… The ordinary public declares that even among vegetables some kinds are grown that are not for them, even a kale being fattened up to such a size that there is not room for it on a poor man's table. Nature had made asparagus to grow wild, for anybody to gather at random; but lo and behold! now we see a cultivated variety, and Ravenna produces heads weighing three to a pound. Alas for the monstrosities of gluttony!

The first sentence of this passage speaks volumes about the moralising views of Pliny on the *hortus*. Following his recent overview of the associated terms and their development over time (see above), Pliny reminds the reader of the humble beginnings of the founders of Rome as rooted in the rustic garden. All Romans would have previously sourced their food from the *hortus* (or *heredium*) attached to their home, regardless of status. The garden was once the

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[201] Plin. *HN* 19.52: *Romae quidem per se hortus ager pauperis erat; ex horto plebei macellum, quanto innocentiore victu… at, Hercules, quam vilia haec, quam parata voluptati satietatique, nisi eadem quae ubique indignatio occurreret! ferendum sane fuerit exquisita nasci poma, alia sapore, alia magnitudine, alia monstro pauperibus interdicta… in his quoque aliqua sibi nasci tribus negant, caule in tantum saginato ut pauperis mensa non capiat. silvestres* (wild, undomesticated) *fecerat natura corrudas, ut passim quisque demeteret: ecce altiles spectantur asparagi, et Ravenna ternos libris rependit. heu prodigia ventris!*

macellum of Romans, and so shopping for food made available to all by nature (such as wild asparagus) was preposterous. But now, in a growing age of commercialism, the opposite is the norm. In a contemporary observation, Columella supports Pliny's remark regarding the movement away from subsistence growing to a heavier reliance on the market for sustenance. Rustic produce was indeed still being cultivated, just no longer *en masse* in *domus* gardens.[202] Instead, vegetables were being raised as cash crops.

Pliny's concern that a 'fallout from a disinclination to view the countryside as a source of food and produce', and Columella's observance of a growing demand for *hortus* produce, find their root in the rise in competitive horticulture as a new and fashionable point of interest among the elite.[203] The introduction of the *Lex Fannia Sumptuaria* in 161 BC, referred to by Cato as the *leges cibariae* ('food laws'), was designed to stem fashionable and novel excess at the table.[204] This was echoed by the *Lex Iulia Sumptuaria* which limited expenditure on 'ostentatious consumption', namely for banquets.[205] However, this later Augustan law appears to have had little effect on the competitive 'breeding [of] vegetables into monsters' for sale at the market in the first century AD.[206] In the final two centuries of the Republican period, Columella tells us that varieties of vegetables multiplied five-fold, either as natural variations of native species, or acclimatised cultivars imported from abroad, and notes this recent rise in demand for *hortus* produce as justification for his book dedicated to the subject (Book 10 of *De Re Rustica*).[207] While the new laws discouraged excess, they nonetheless favoured homegrown produce over market ones (as aligned with Augustan values). This created, in a manner of speaking, a 'moral loophole', in which some form of competitiveness among garden owners was encouraged, but only within the frame of *rusticitas*. This may be one reason behind the increase in vegetable varieties in the final centuries of the Republic.

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[202] Col. *Rust*. 10. *praef* 3. Of course, while making these points, supposedly for the benefit of the wider Roman population, Pliny is at the same time making clear that he shares his views with the ancestors of Rome, and, as such, deliberately implies his robust Roman character by association. I will come on to how Pliny and others like him were able to do this through the association of the *hortus* shortly. However, for now it is important to highlight the further impact that *luxuria*, competitiveness, and diminishing land ownership were having on the produce of rustic *horti*.
[203] Spencer 2010, 45.
[204] Macr. *Sat*. 3.17.13. Tacitus discusses the sumptuary laws at length. For example, see Tac. *Ann*. 3.52-55.
[205] McGinn 2008, 9.
[206] Gowers 2000, 136.
[207] Noè (2002) highlights Columella's political agenda for promoting a return to country life, and the author's frequent utilisation of *ratio* to emphasise the scientific nature of agricultural pursuits.

Overall, then, the growth of elaborate, wealthy, and luxurious *Horti* alongside a wider range of rustic produce encouraged by the market,[208] caused the self-sufficient utilitarian *hortus* to become a 'token allusion to old necessities'.[209] In response, the symbolic status of the humble *hortus*, on the 'opposite end of the socioeconomic horizon' to elite *Horti*,[210] grew and began to be cultivated strategically as a 'moral alibi' for the wealthy and a template of behaviour for the general populace by the elite.[211] This is likely also why *viridiaria*, such as the example uncovered in the House of Julius Polybius (see above), were beginning to be incorporated into *domus* plans in Pompeii in the early Imperial period. It also illustrates how blurred the line between utility and recreation in the garden was at this time. How the moral alibi of the rustic garden filtered down from the elite to lower social echelons in practice can be better understood when viewing archaeological *hortus* space through the lens of memory theory.

2.4 The 'memory theatre' of the hortus*: the power of collective memory*

The Roman elite understood the power of collective identity and memory curation in both the physical and epistemological landscapes of Rome.[212] As put by Diane Favro: 'Romans were experienced readers of non-verbal texts. People of all classes read messages embedded in their surroundings.'[213] The Roman link between memory and symbolism is widely accepted in the literature; Quintilian discusses the oratorical technique of attaching meaning to objects in the rooms of the mind, to be replayed in the order of a house as a memorising technique in oratory.[214] As he says: *ut eorum imagine admonentur* ('images remind them'), both of spaces, as well as the meanings attached to those spaces.[215] *Imago*, meaning likeness, mental picture, shadow, or echo of the true image, is conceived of in the imagination and can never be the full truth.[216] The 'echo' of truth can be recognised in Roman

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[208] See Chapter 4 for a wider discussion of growing demands for rustic produce.
[209] Plin. *Ep*. 2.17.15; Gowers 2000, 136.
[210] Pagán 2016, 2.
[211] Wallace-Hadrill 1998, 2.
[212] A great deal of scholarship has been dedicated to the study of Roman memory theory in recent years, the key sources being: Galinsky 2015 (ed.); Orlin ; Popkin ; Hanses ; Mawford and Ntanou . For the tension between history and memory, see Spencer (2010, esp. 44, n. 55). See mnemohistoric constructions of the *hortus* below.
[213] Favro 1996, 6.
[214] Quint. *Inst.* 11.2.
[215] This is the Loeb translation, though it can also be read: 'as they are reminded of by the image(s)'.
[216] The term imago can be translated as 'likeness' in reference to a thing formed in the mind, or as a comparison, in the context of rhetoric; e.g. see Cic. *Inv*. *rhet*. 1.30.49.

historiographical traditions in which the aims of authors dictate the image provided to the reader and cemented, as Cicero states, *historia* as *memoriam deposcere* ('the business of memory').

The values appropriated for the preservation of the cultural identity in any society can reveal the constitution and tendencies of a society as a whole. These values can be observed through the isolation of moments of change in Roman social history and memory through the observance of new recurring imagery.[217] This in turn can reveal the *topoi* which the dominant groups in society hold to a particular importance. Paul Connerton and Ian Ferris separately state that the dominant groups in society, in this case the Roman elite, are inclined to hold themselves responsible for memory preservation by creating a sense of power and influence, locating themselves 'within a linear trajectory of time, in relation to the past legitimising origins'.[218] For the Roman elite, these origins were founded in the behaviour and actions of *maiores nostri*, private land management (in the case of the *hortus*, this was rooted in the history of land distribution, the *heredium*, and later *hortus* inheritance, as seen above), and active participation in political life.[219] As put by Edwards, 'the high point of Roman morality is situated in the past' and, by holding images such as the rustic *hortus* at a distance, the dominant group were able to legitimise their control over society.[220] This was one factor towards a process of, what Greg Woolf terms, 'the unity and diversity of Romanisation' in the early Imperial period.[221]

Mos maiorum combined 'both the real institutions of the Roman state and the value system which supposedly generated and defined [it]',[222] and was a constantly evolving concept from the 'peace time' of the Middle Republic well into the Imperial period.[223] This

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[217] Assman 1995, 133.
[218] Connerton 1989, 19. See also Edwards 1994, 24.
[219] As seen above, *horti* (or *heredia*) were owned by the families to whom they were gifted, the ownership of which was then intended to be passed down to new generations.
[220] Edwards 1994, 25.
[221] Woolf 1992.
[222] Kenty 2016, 429. For a general discussion of *mos maiorum*, and its effect on identity in the Roman Republic, see Steiner 2000. For more specialised discussions, see Kenty 2020 (on Cicero); Elsner 1995 (in relation to domestic art); Tröster 2012 (on Plutarch); Montanari 2009 (in relation to Roman identity). For ancestral tradition and its role in the formation of Roman identity, see Hekster 2015.
[223] Tröster (2012) demonstrates how the period identified as the Middle Republic was 'a time of great men and great virtue among the people' (referencing Plutarch's statements in *Aem*. 2.5, 11.4, see 248), but also presented the first examples of concern around moral decay, exacerbated from the Gracchan reforms onwards. *Mos*

concept became the benchmark against which the internal strength, power, and even happiness of a Roman citizen was measured, thus acting as a barometer of morality.[224] It was also the standard by which the elite were able to affirm their identity in the often precarious public scene, and as the gatekeepers of collective Roman identity.[225] For this purpose, the location of past ideals, such as those attached to the *hortus*, are kept deliberately vague (and distant) for the convenience of the elite narrative.[226] With this in mind, I will now consider how was it that the *hortus* was able to contain power-legitimising codes capable of preserving the privileged position of the elite in Roman society, and assess the effect this may have had upon the function and reception of *horti* among the general population in Roman Italy and Pompeii in the first century AD.

Collective memory is preserved and communicated when societal groups develop a collective awareness of unity and/or peculiarity in relation to other groups, in terms of 'positive ("We are this") or… negative ("That's our opposite")' sentiment.[227] During this, memory goes through a process of preservation. This first occurs verbally, as in poetry or anecdotal tales in Rome, before their 'concretisation' in objects such as buildings, statues, and written text. The latter concretised 'objects' can be characterised as 'vehicles of memory' which are imprinted upon the landscape of cities, and upon the memory of the human mind.[228] The Campus Martius is an exceptional example of the concretisation of 'memory' in public and private *Horti*. This complex space, located north of the Capitoline Hill on a floodplain of the River Tiber, contained vast gardens which displayed art and plants collected during the Imperial conquest. Initially remodelled by Pompey in the late Republic, and later developed by Augustus around the time of Rome's division into fourteen regions (7 BC), the evolving scheme constructed in the Campus helped to produce spaces aligned with a crafted narrative

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maiorum, while generally accepted as concerning one's behaviour in relation to state, religious, or legal matters, in public and private, was nonetheless open to interpretation; see Kierdorf 2006.

[224] Spanier 2010, 41. See also Hölkeskamp (1996, 301-338) and Morgan (2007, esp. 122-59) for a discussion of *exempla* and its foundation in 'remembered experience' which served to manifest behaviours for either emulating or avoiding for societal survival.

[225] Alston 2008, 157.

[226] See Evans 2003, 301.

[227] Assman 1995, 130; see also See Tamm 2008, 501; Lotman 2000, 676.

[228] Assman 1995, 128; Confino 1997, 1386. The term 'vehicles of memory' was coined by Yerushalmi (1982). Assman (1999) categories cultural memory into four: material, based on objects, mimetic, based on imitation, communicative, based on oral discussion, and cultural, based on written and visual information; see Tamm (2008) for a discussion.

of power, glory, and grandeur.[229] As such it became, in Livy's words, a place where 'memory [was given] a tangible place in the cityscape'.[230] Such a process of cultural memory and identity formation can be understood as a 'hermeneutic and epistemological relationship between the topographic entity [the Campus]… and its agreed meaning, value, and significance [power, virtue, and *Romanitas*]'.[231]

While *Horti* were certainly propagandistic mediums designed 'to emulate and transcend the models of their predecessors in an attempt to validate their positions of authority',[232] it would be a mistake only to apply this description to elite *Horti*. In much the same way, the rustic *hortus* was a 'vehicle of memory' in which the ancestral virtues of *simplicitas*, *frugalitas*, and *rusticitas* were concretised, towards the goal of preserving Roman identity, elite power, and the integrity of the Roman state. After all, the 'cultivation of the utilitarian kitchen garden [was aligned] with traditional Roman values' and rooted in the very foundation of Rome.[233] In this sense the utilitarian *hortus* was 'the last bastion of antique frugality', a real-and-imagined 'heterotopia' of virtue and civic potential in which the best and worst versions of Roman identity were played out.[234]

Foucault describes the heterotopia as a 'space in which we live, which draws us out of ourselves, in which the erosion of our lives, our time and our history occurs'.[235] Unlike the utopia, which is an 'unreal' space, heterotopias exist in the material world. They are spaces in which the real world is reflected, represented, and reformed, sometimes contested, and sometimes inverted. Heterotopias are external to all other places, metaphorically and sometimes metaphysically, and exist as 'real places that contain all other places'.[236] As such, the heterotopia resonates with our understanding of the Roman *hortus* as existing as a mirror

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[229] Spencer 2010, 11.
[230] Livy 5.32-55. See also Livy 5.51.1-54.7.
[231] Spencer 2010, 9. As put by Wood (2010, 75): 'Rome's late Republican elite and Julio-Claudian emperors exploited [*Horti*] as an influential (propaganda) medium, seeking to emulate and transcend the models of their predecessors in an attempt to validate their positions of authority… it was through public [*Horti*] that Rome's aristocrats and emperors were able to embrace and truly influence a diverse city-populace, fulfilling their political objectives and cultivating their self-styled public images in the process.'
[232] Wood 2010, 75.
[233] Myers 2018, 261; Plin. *HN* 19.50-2. See also Cook and Foulk 2013, 194. See also Pagán 2016; Spencer 2010, 5-6, 8 (specified as an ethnoscape).
[234] Gowers 2000, 136.
[235] Foucault 1986, 23.
[236] Soja 1996, 158.

of reality (natural landscape or the traditional Roman garden) and of thought (Roman epistemes of autochthony, tradition and *rusticitas*). It can be understood in the moment of occupation only because of the space which it represents or builds upon and, by implication, can only be 'real' because of 'other space… created as a result of passing though the external point of representation to come into being'.[237] In mirroring memory rather than reality, the rustic *hortus* described in Roman literature is neither real nor unreal, while the 'figures of memory' who inhabit them are kept at arm's length from society. This is an effect which Varro picked up on in his deliberate satirising of elite rustic moralising.[238] When viewed as a heterotopia, the liminality of the *hortus* (as 'second flitch' to other endeavours), those who occupy it (namely old men), and its potential as a point of comparison, can be better appreciated.

The analogy of the heterotopia is made even more useful when overlaid with the notion of *habitus*, a concept developed by Pierre Bourdieu to observe social change in literary texts. In the habitus, the habitual recycling of signifiers which mark a group out from others can be perceived, making it a useful vehicle through which the epistemological reception of the *hortus* and its position as a pillar of Roman identity can be understood. Bourdieu defines it as such: 'The *habitus* – embodied history, internalised as a second nature and so forgotten as history – is the active presence of the whole past of which it is the product.'[239] In the context of the Roman Empire, the *habitus* is *mos maiorum*, 'the way of our ancestors', a moral concept which directed and defined individual and group identity. This *habitus* was regularly communicated through the stories of 'figures of memory', often legendary or semi-mythological individuals 'forgotten as history' for they were so securely embedded within the (story of the) identity of the population. In the case of the *hortus*, this allowed the elite to imbue the space with a 'shared semiotic system' in favour of preserving Roman identity.

The *habitus* of *mos maiorum* reveals elite desires to employ the positive exemplary effects of select Republican ancestral figures, and to regain the qualities of the Saturnian race in which hard work, moderation, and frugality marked Rome out from the rest of the world as superior and deserving of its power. This was not only achieved via the physical empirical

[237] Foucault 1986, 24.
[238] See Kronenberg 2009a.
[239] Bourdieu 1990, 56.

space of the *hortus* and its produce, but also through the communication of associated 'figures of memory'. In the following section, I will consider some examples from ancient texts and ask how these may be used to understand horticultural activity in locations such as Pompeii.

2.5 Figures of memory

Jan Assman coined the term 'figures of memory', a term which can be described as fateful events or individuals which are used as signifiers of 'belonging'. The 'figure of memory' is often located on the fixed 'horizon' of thought and is maintained through 'cultural formation' via verbal, and then physical, concretisation (as seen above).[240] Figures of memory provided an object onto which the Roman population were able to project their 'consciousness of unity and specificity… and [derived] formative and normative impulses from it, which [allowed] the group to reproduce its identity.'[241] However, the temporal distance between communicators to the contemporary Roman world (the elite), and the figures of memory traditionally occupying these spaces, allowed the former to make mnemo-historic adaptations (the past as it is remembered, rather than an accurate portrayal) according to the needs and desires of their current generation. Let us consider example of figures of memory to see how this could be achieved in the context of the *hortus*.

The cultivation of the *hortus* was regularly associated with figures of memory whose virtuous actions implicated the space in the business of preserving ancestral virtue and collective Roman identity, creating in the space a means for achieving virtue-by-proxy. Figures of memory existed in the distant past and were concretised often in oral or written mythology or histories (which were sometimes one and the same). One might also attempt to make similarities between oneself and figures of memory by virtue of displaying their horticultural knowledge, or simply by owning (and displaying) rustic garden space. For example, Cincinnatus became the *exemplum frugalitatis* of the literary elite in Rome following his infamous return to the plough and relinquishment of the position of Dictator upon his rescue of the Republic. Similar virtues were encompassed within the image of three-time *triumphator* and farmer, Manius Curius Dentatus, who returned to the humble cottage on

[240] Assmann and Czaplicka 1995, 128-9.
[241] Assman 1995, 128.

his farm after ending the Samnite War. This pattern was later adopted by the Roman general Cato the Elder who favourably compared himself against the high moral bar set by former citizen-farmers; 'Cato has made an *exemplum* of himself through his behaviour, yes… [and] through his own construction of a literary "monument" to his behaviour.'[242] Cicero is one of many to talk of Cato's virtues, cultivated in the garden of the rustic hero in his old age, though as Wallace-Hadrill astutely points out, this was another example of an elite member creating a 'moral alibi' via a figure of memory.[243]

Reay demonstrates how figures such as Cincinnatus were woven so tightly with the moral ideals of *rusticitas*, *frugalitas*, and *simplicitas*, agricultural history, and 'civic achievement' that they became 'part of the cultural fabric', or narrative, into which other wove themselves for personal and political gain.[244] Cato the Elder, for example, aligned his own frugal actions with those of Cincinnatus to position himself as a moral *exemplum*, and thus set a precedent for resemblance by comparison. Cato's exemplary behaviour was further canonised when referenced by Plutarch and Valerius Maximus as showing him to be a 'vigilant guardian of antique Roman morality'.[245] This process was aided by other 'vehicles of memory', such as the Sabine Farm.[246] The 'Sabine Farm', heterotopic by virtue of its containment of other places (namely the ancestral farm on the horizon of Roman memory) and its existence in the material world, features prominently in Horace's poetry as a locus of simplicity and self-sufficiency, and as an escape from the *urbs* to 'a private world of pastoral and Epicurean pleasures' in *rus*.[247] Despite the emphasis on *rus*, negatively associated with *otium* and a 'withdrawal from public life' by the first century AD,[248] the 'Sabine Farm' became a traditional literary model of *rusticitas*.

[242] Pasco-Pranger 2015, 297.
[243] Wallace-Hadrill 1998, 2.
[244] Reay 2003.
[245] Edwards 1994, 176-7. See also Fitzgerald 1996. Polybius (31.25.4-5) talks of Cato's virtues in denouncing excess.
[246] Pasco-Pranger 2015, 300.
[247] Dang 2010, 102.
[248] Macaulay-Lewis 2013, 139. *Virtus* was associated with masculine energies, while pleasure was decidedly feminine, and therefore unvirtuous; see Edwards 1994, 174.

The Sabine Farm occupied a 'cultural faultline' between Imperial and Republican ideals.[249] In the Imperial period, this locus represented a retreat from the politics of the city, as well as Epicurean pleasures and pastoral privacy. We see this most clearly in Horace, who also chooses to highlight the virtues of *simplicitas*, *frugalitas*, and self-sufficiency, yet highlights the first-hand involvement of landowners in the agricultural management of land as being largely lost to time. The Sabine Farm was a habitus for preserving these ideals. For example, Juvenal uses a Sabine Farm as the location for Manius Curius' morally-just behaviour: *Curius parvo quae legerat horto ipse focis brevibus ponebat holuscula* (Curius used to put little vegetables which he had gathered himself from his small garden over his tiny hearth).[250] In the character of Dentatus, Juvenal spotlights the characteristics of frugality and self-sufficiency via the rustic setting of cottage, hearth, wooden furniture, and simple fare ('the equipment an indicator of the kind of food').[251] We are also told that Dentatus refused an offer of gold, being content with the little that he already had in his kitchen garden and cottage. The combined impact of this with the rustic environment, items, and food allows Juvenal to position Dentatus as an emblem of Roman virtue and identity, an *exemplum frugalitatis*, through his juxtaposition with a well-known rustic figure of memory.[252]

Self-comparison with figures of memory and the space of the *hortus* became a common practice among the elite, and evidence in Pompeii exists for demonstrating that this practice spread to the wider public living in urban Roman centres in the early Imperial period. These examples, covered in more detail below, likely found inspiration in the precedence set by the elite. For example, Seneca the Younger discusses Fabricius' cultivation of his own herbs and vegetables and in loyalty to Stoicism describes the *hortulus* as a garden of simple and natural pleasure,[253] and Pliny the Elder promotes the plebs' acts of self-sufficiency and *simplicitas* in their rustic *horti*.[254] We will see later how the display of rustic garden space for similar kudos was achieved by 'ordinary' individuals living in first century AD Pompeii.

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[249] Spencer (2010, 246) uses this term to refer to the dangerous point between social advancement and respect for the humble origins of the Roman people which arose in the early Principate. See also Venner 2021.
[250] Juv. *Sat*. 11.78-79. Translation from Pasco-Pranger 205, 307.
[251] Val. Max. *Fact*. 4.3.5.
[252] Pasco-Pranger 2015, 299.
[253] Sen. *Prov*. 3.6.
[254] Plin. *HN* 19.52. As seen above, Pliny the Younger was able to demonstrate his own virtues of *rusticitas*, *simplicitas*, and *frugalitas* to guests arriving at his Tuscan country estate through the strategic placement of his rustic garden, which he also describes in terms connoting rustic peasanty and fertility: *hortus pinguis et rusticus*.

Exemplary behaviour in the *hortus* ensured the association of the space and its cultivation with *virtus*. Perpetual imagery of this kind also served to reinforce the dominant position of those who emulated the actions of figures of memory: '…imitation, especially of one's exemplary ancestors, ensures the replication and temporal extension of virtues and helps mark out the aristocracy as particularly suited to the power it holds'.[255] As seen above, whether the events and characters were represented accurately was not the central concern, as long as the writer's aim was achieved (mnemohistory).[256] In other words, mnemohistory in Roman horticultural and agricultural accounts was an 'ongoing process of shaping an identity by reconstructing its past', with the aim to preserve society and the dominant position of the elite within it.[257] Via figures of memory and the acceptance of mnemohistoric accounts of *hortus* space, Roman cultural memory was deliberately planted within the idea of the space of the *hortus* and the lived experience of it, thus solidifying this space and its cultivation as a crucial pillar of Roman collective identity.

To appreciate better the full implications of modelling the *hortus* as one of Rome's '*lieux de memoires*', what follows, and concludes this chapter, is a case study. We are fortunate that an original text attributed to a pseudo-Vergilian writer in the first century AD preserves the various mnemohistoric tropes of *rusticitas* described above, yet an in-depth analysis of this text has not been attempted for many years. Instead, it is often taken as a source of information about agriculture in general in the Roman period, or as a mock-heroic, rather than as a way of illuminating about popular tropes and the construction of memory in relation to the *hortus* at this time.[258]

Reading his *hortus* as a 'vehicle of memory' or '*lieu de memoire*', saturated as it is in tropes of *rusticitas*, *frugalitas*, and *simplicitas*, I will demonstrate that Simulus, the rustic protagonist, was intended to be portrayed as yet another moral *exemplum* of *Romanitas*, explicitly by virtue of his association with horticultural activity and space. This will allow me to explore how far the space (and memory) of the *hortus* could connect readers to the past via

[255] Pasco-Pranger 2015, 299. See also Assman 1997, 1999, 2003, 2006.
[256] 'Unlike history proper, mnemohistory is concerned not with the past as such, but only with the past as it is remembered' (Assman 1997, 9). See also Tamm 2008, 501.
[257] Tamm 2008, 501.
[258] For example, see Fitzgerald 1996; Ross 1975; Kenney 1984.

familiar memories, and how ancestral virtue was able to be inherited across centuries, via the locus of the humble rustic *hortus*. The outcomes of the following discussion will therefore support further understandings of the discourses which may have also framed and nuanced the experience of rustic space in the urban centre of first century AD Pompeii.

2.6 Case study: Moretum

As discussed in section 2.4, literary voices preserving details of garden maintenance and use in the Roman period are habitually privileged, wealthy, and elite, meaning that the experiences of the majority go largely unrepresented. However, one possible exception to this representation may exist. Written in the first century AD, the poem *Moretum,* previously attributed to Vergil but now widely considered pseudonymised, is a short poem which tells of the morning routine of a rustic farmer.[259] The reader watches as Simulus gathers and combines the ingredients for a simple meal of bread, garlic, and herbs (*moretum*) from his cottage garden, before beginning a day of ploughing in his fields. The modest portrayal of the traditional Roman citizen farmer, a 'figure of memory' in whose character the moralising of the early Imperial Roman elite can be epitomised, has led Ross and Fitzgerald, the central authorities on this text, to take the *Moretum* as a parody of Vergil's Corycian farmer in *Georgics* 4.[260] However, I argue that this poem can be read as a satire of contemporary moralising, designed to challenge post-lapsarian literary ideals of the early Imperial period, thus making it a good source of information about the epistemological discourses which may have bounded rustic space in towns such as Pompeii. To demonstrate this, I identify the rustic tropes contained within the *Moretum* and use these to explore this work as a commentary on the distance between 'figures of memory' and present realities in relation to the space and produce of the first century AD *hortus*.

Satire, from the Latin *satura* (meaning sated, or in reference to one who has eaten enough), is an ambiguous literary genre which can most simply be defined as a comedic appropriation of other genres and literary traditions to highlight societal or other topical

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[259] In Macrobius' *Saturnalia* (3.11), Servius describes the etymology of different nuts at the dinner table. Coming to '*mollusca'* nuts, Servius references Sueius, author of a pastoral poem named *Moretum*, which 'describes the gardener making this [herbed cheese spread] dish' (fr. 1 FPL). However, the passage he references does not exist in our own *Moretum*, suggesting that other variants of this poem existed.
[260] Ross 1975; Fitzgerald 1996, 395.

matters. Beginning around the Middle Republic, and closing with Juvenal in the Flavian era, Roman verse satire often exists to contradict or undermine epic, saga, and myth, or to mock, in the sense that it imitates a work, genre, or individual in order to ridicule it.[261] However, satire differs from the similar genre of parody in that it is a less overt form of mockery and is more concerned with the exposure or criticism of society's vices than imitation for comedic effect. As Zekavat states: 'In case satire [sic] is employed wisely, it has the potential to contribute to mutual understanding among people and suggest solutions for socio-political and moral problems, hence to promote peace.'[262] This distinction is important to make for understanding the message of the *Moretum* against the horticultural passage in Vergil's *Georgics*.

In *Georgics* 4, Vergil gives the garden only brief treatment when he sings of the horticultural successes of an old Corycian on a formerly useless piece of land, and describes the fruit, flowers, and bees thriving thereupon as a result of his hard toil. At the end of his 145-line description, Vergil confesses that he is too short on time to continue the subject of gardens (*sub fine laborum*) and leaves the task to future writers (this challenge later being taken up in earnest by Columella).[263] Unlike the idealistic image of garden life in Vergil, which I will visit shortly, I will argue that the *Moretum* is a closer representation of what was believed to have been traditional self-sufficiency and the Golden Age ancestors who cultivated cabbage patches on inherited land (or at least this was the intention, as we shall see below).

The similarities in subjects and protagonists lead Kenney and Fitzgerald to view the *Moretum* as a parody of Vergil's *hortus* passage, designed to expose the hypocrisy of rustic moralising 'at a time when the peasant landowner is becoming an object of nostalgia', or a 'figure of memory'.[264] Alternatively, Ross reads the *Moretum* as a mock epic: epic moments enacted by the rustic 'hero' described in the semantic style of Ovid and Homer are trivialised

[261] Greenberg 2018, 10-11. See also Ferriss-Hill 2015.
[262] Zekahat 2017, 2.
[263] Verg. *G*. 4.116; Col. *Rust*. 10. *praef*. 1-3.
[264] Kenney 1984; Fitzgerald 1996, 394.

when the author introduces vulgarisms to heroic contexts.[265] This allows the author to reduce the farmer in the *Moretum* to his most familiar form and thus abstractly comment on his 'present and personal concerns in more universal terms and with poetic significance.'[266] As such, this poem joins others contemporary poems in its mnemohistoric interpretation of a setting which is at once familiar and foreign to first century AD readers.[267]

This proposition is strengthened if we look in comparison at the reasonably contemporary Calpurnius Siculus' *Eclogues*. Newlands argues persuasively that he aimed to reverse Vergilian values of pastoralism in order to comment on the degradation of typical pastoral settings in first century AD literature, as well as more generally in society. This is best illustrated in Siculus' use of the Vergilian term *veteres fagos* ('old beech trees').[268] This term is placed in the context of activities which negate pastoral harmony in both Calpurnius' *Eclogues* and Vergil's *Georgics*; in Calpurnius, Corydon says: *qui veteres fagos nova quam spectacula maviscernere, quae patula iuvenis deus edit harena*, insulting Lycotas in rejection of pastoral convention due to his preference for the old beech trees (located in pastoral history) versus the new, exciting world of the city.[269] In Vergil, we see *veteres fagos* in the scene in which Menalcas breaks Daphnis' bow and arrows in their shade (3.12), and later in 9.9 when we see the tops of the beech trees broken so that they no longer provide the iconic pastoral shade seen in *Eclogue* 1.[270] In subverting the pastoral genre with a term borrowed from Vergil, Calpurnius similarly highlights 'the general decay that pervades the pastoral world' in his and other pastoral poems more generally.[271]

I have found comparative literary techniques in the *Moretum,* similarities which have important repercussions for our understanding of the reception of *hortus* space at this time. In

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[265] For example, the description of Simulus kneading uses paraphrases common to epic literature. This epic image of 'lofty' diction is cut short with the 'vulgar' word *grumos*, 'heaps'. For further discussion, see Ross 1975, 255.
[266] Ross 1975, 262.
[267] This is in addition to the high possibility of these readers being educated, wealthy, and perhaps in ownership of some form of land.
[268] Calpurnius Siculus (*Ecl*. 7.5) echoing Vergil (*Ecl*. 3.12, 9.9).
[269] Calp. *Ecl*. 7.4-6. It is notable that Calpurnius chooses to juxtapose the public *spectaculum* of the arena in the city with the peaceful, countryside setting of the trees, simultaneously commenting on a replacement of the pastoral genre and way of life with the corruption and excesses of urban life (which pastoralism traditionally represented a distance from).
[270] Verg. *G*. 3.12 and 9.9.
[271] Newlands 1987, 221.

creating an image of the dark, tired, and rustic world of Simulus, the author of the *Moretum* presents a startlingly different image to the colourful and rich garden of the old Corycian. Although the *Moretum* is certainly mock-heroic, a common sub-category of ancient parodies, one cannot consider it to be parodic; the poem does not place Simulus in a bad light, as parodies tend to do. Instead, I argue that the *Moretum* subtly satirises the reader by assuming an off-hand approach to land management (a source of anxiety among the elite at the time this poem was written in the first century AD) and thus highlights the stark differences between this group and the rustic hero. Hooley's characterisation of satire as 'blame poetry' explains why: satire is designed to exaggerate and expose the vices of a person or persons, in this case the Roman elite, to shame them into change.[272] The subtleties of satire in *Moretum* are akin to those used by Varro to expose the same elite hypocrisies in *De Re Rustica*. For example, Kronenberg provides an alternative interpretation of the Varonian dialogue between Scrofa and Stolo, well-known 'authorities' on agricultural and rustic endeavours.[273] I would add that this partnership also provides an exposure of misinformation by uninformed experts on rusticity and a tongue-in-cheek reference to the less-than-favourable reality of Golden Age Rome, when the majority lived in primitive huts and survival was directly tied to one's land, the environment, and the weather. As stated by Ross, literary satire and parody 'exists usually only when a genre or form have become sterile or exhausted', so as to make it recognisable to an extent so as to render satire of the form humorous.[274] This poem taps into the well-used genre of rustic moralising at the time.

In support of the Moretum's satirical genre, and thus the implied confirmation of a general familiarity with rustic moralising in Rome in the early Imperial period, we see Simulus positioned as a 'figure of memory', located on the horizon of collective Roman memory in the *habitus* of the rustic *hortus*. In doing so, the author of this short poem challenges society's standards by exposing the hypocrisies of the dominant class who in practice are none of these things.[275] In acknowledging the author's highlighting of elite hypocrisy through satire, I am able to agree with Fitzgerald's assertions that readers of the *Moretum* who view it purely as rustic realism are also missing the point. Instead, the *Moretum*

[272] Hooley 2007.
[273] Kronenberg 2009b, esp. 76-93.
[274] Ross 1975, 254. We have seen above that rustic moralising was an 'exhausted' trope of elite literature by the first century AD.
[275] Hooley , 2.

represents the societal priorities surrounding the *hortus* and rustic figures in the first century AD; without familiar rustic tropes as a base, or familiar horticultural scenes in other texts (such as the *Georgics* 4), the satirical character of Simulus and his *hortus* would have simply become another moralising text.[276] As such, the *Moretum* must be seen less an imitation of another writer's style than an attempt to expose the vices and hypocrisies of the moralising elite. By virtue of association with the space of the rustic *hortus,* the *Moretum* is an excellent example of the dominant virtue-signalling tropes which were actively attached to rustic *hortus* space in the early Imperial period. To illustrate this more clearly, the final part of this chapter makes a direct comparison between the garden in the *Georgics* and the garden in the *Moretum* to illustrate the tensions between the Imperial garden and the rustic, ancestral *hortus* experienced in first century AD literature and, by extension, society. In so doing, I provide an epistemological foundation upon which the following chapters may be constructed, for understanding the position of the rustic *hortus* in the lives of 'ordinary' Romans living in first century AD Pompeii.

2.6.1 Cultivating morality in Simulus' hortus

Vergil's Corycian gardener has variously been characterised as an 'Epicurean philosopher, a Golden Age labourer, and the embodiment of Utopian or anti-social leisure'.[277] In her analysis of the identity of the Corycian, Perkell finds that the gardener and his garden represent 'beauty and uselessness', and that his *hortus* is cultivated for *voluptas* (pleasure), rather than the more honourable *utilitas* (utility or usefulness).[278] This figure is an embodiment of the anxieties held by the elite about the luxurious effects of Imperial conquest upon land use. Placed in contrast, the two gardeners represent juxtaposing sentiments of *utilitas* and *otium*, Simulus characterising the former, and the Corycian embodying the latter. This is further reflected in the language chosen by each author; in *Georgics* 4 nature is described as '*tener'* (2.331) and '*mollis'* (3.435, 4.137), or soft, delicate, tender, and pleasant (decidedly feminine, and therefore 'weak', imagery), while Simulus' garden is described in

[276] For example, we find Columella and Pliny treating Vergil's Corycian as an authority on rusticity, despite the absence of *utilitas* in his horticultural passage. For a discussion, see Doody 2007.
[277] Gowers 2000, 131.
[278] Perkell 1981, 168. Putnam (1979, 7) was one of the first to fully appreciate that the Georgics was not a utilitarian account of horticulture. Macaulay-Lewis (2013, 136) views Alcinous' garden as an ideal of peace and beauty.

practical terms, as a small space (*exiguus spatio,* 62), fertile (*fertilis,* 62), well-watered (*vicinos… rivos,* 70), and well-organised (*varias disponere plantas norat,* 68-9).[279] The descriptions of Simulus' garden are consistent with late Republican and early Imperial descriptions of the basic characteristics of the *hortus*, and are therefore consistent with the practical cultivation of a productive *hortus*. His garden is described as small but rich in herbs (*variis sed fertilis herbis,* 62). Alternatively, the Corycian's garden is a few acres in size (perhaps the size of an *heredium*), yet unfertile (*nec fertilis,* 128), 'not suited to flocks or fit for the grape'.[280]

In the definitions of the rustic *hortus* outlined at the start of this chapter, the concepts of human autonomy and control arose. Notably in the *Moretum*, there is an unwillingness of nature or time to bend to Simulus' will. Time is relentless and cyclical, which is continuously reflected in his movements while creating the *moretum* with the pestle and mortar: *rotat adsiduum gyris* ('spins in incessant circles', 26), *it manus in gyrum* ('round goes his hand', 101), *procedebat opus* ('the work goes on', 109), and *ibat pistillus in orbis* ('the pestle goes on in circles', 110). Alternatively, in true Stoic fashion, the Corycian is in harmony with both nature and time, developing his garden in parallel to key points in Roman horticultural memory. Beginning with humble cabbages and herbs, he later cultivates his *hortus* with white lilies (reflective of Columella's advice to plant this flower between other crops), alongside other flowers and shrubs (130-1).[281] Fruit trees pollinated by the bee follow (134-43) and, at the last lines of the passage, he plants elm and plane trees in rows for shade (144-6).[282] This final stage reflects the movement of the Corycian into the Imperial age in his final years. He plants fully-grown elm and plane trees to provide shade for drinkers (*ministrantem platanum potantibus umbras*), thus creating an image of the Hellenistic garden filled with drinkers at the symposium.

In the early Imperial period, Pliny berates the imported plane tree for its sterility, being useful only for shade, and thus a quintessential symbol of the new Imperial age: 'But who would not be justifiably surprised to hear that a tree has been procured from another

[279] Fitzgerald 1975.
[280] Verg. *G*. 4.127-129.
[281] Col. *Agr*. 9.4.4.
[282] Pliny criticises the planting of trees for shade in the Imperial period, for they provide no practical use; *HN* 12.3.

clime merely for the sake of shade?'[283] The trees planted in the *Georgics* are reminiscent of the perfect rows which King Cyrus of Persia planted with his own hands, much to the admiration of Lysander.[284] This garden Cyrus' guest admires for its sweet scents and orderliness, much in the nature of the Corycian's *hortus*, and contemporary (and factual) elite *Horti*. Much like the Corycian, Cyrus earned his happiness by way of practising his virtues in the garden, planting his plot with his own hands.[285] Yet, while Vergil's garden blooms all year round, reflecting 'perfect nature',[286] time equally does not exist. In this garden, the Corycian transcends the timeline of Roman horticultural memory in just one generation, his own. His movement into *luxuria* and *otium* are perhaps a signal to the end to all generations of the Roman race.[287]

In contrast, the endless toil of Simulus is played on a loop each day, the only break being his trip to market every nine days. The stark reality of his poverty, the looming danger of hunger, and his relentless toil at home and in the fields, remove him from the usual epithets of epic heroism and transport his character into a 'true' representation of a Roman farmer's reality, familiar to readers as a habitus of *rusticitas*. In Chapter Five, I will assess how these sentiments were encapsulated in real *hortus* space in Pompeii, finding that the realities of Simulus' existence were not entirely lost in urban Pompeian examples of the domestic rustic garden. Nonetheless, the image of Simulus was intended to be viewed at a distance from the reality of urban citizens, being written in mind of the audience who would have access to this text and who likely employed lower-status or slave labour for garden cultivation. Simulus, *providus heros* ('provident hero', 59), was not so much an image to be emulated, or a blueprint for morality, but rather a satiric commentary on the detachment of the Roman *populus* from the heroic *mos maiorum*.

2.6.2 Simulus' utopia

[283] Plin. *HN* 12.6 (Loeb translation).
[284] Xen. *Oec*. 4.21-4. In discussion of this, Socrates is keen to point out the connection between the good man's excellent hands-on approach to farm management and his ability to rule others (4.15-18); for more on this link, see below.
[285] Xen. *Oec*. 4.25: 'I think you deserve your happiness, Cyrus, for you earn it by your virtue' (Δικαίως μοι δοκεῖς, *ὦ Κῦρε, εὐδαίμων εἶναι· ἀγαθὸς γὰρ ὢν ἀνὴρ εὐδαιμονεῖς*).
[286] Simons 2014, 187.
[287] This is fitting of a Stoic figure, for 'to the Stoics, time was just a "something" between being and non-being'; Tzamalikos 1991, 535.

With the mnemohistoric constructs of Simulus' *hortus* in mind, we may now take a closer look at his garden and adjoining cottage to consider the specific ways in which this described garden acted as a memory theatre of Roman identity. The poem begins with Simulus waking in the early hours and stoking the dying embers of his cottage fire. He is described as a rustic tiller of agricultural land (*Simulus exigui cultor cum rusticus agri,* 3), perhaps owned by himself in the traditional manner, or rented from an out-of-sight landowner to whom his money goes, thus keeping him in the poverty to which he has become accustomed. He may also have been a sharecropper, a tenant who cultivates the land for a landlord in return for a share of the crop. Perhaps the landlord is one of his neighbours to whom he is beholden in providing fresh goods: *interdum locuples a paupere plura petebat* (64).[288] The author could be referring here either to supplies, or the land itself, for many were not content with what they hand, always looking for more to buy up.

The question of whether Simulus was a tenant or not raises the significance of understanding tenancy possibilities in Pompeii. The archaeological plots in Pompeii were small, fertile, and often well-irrigated (or with access to local water supplies), thus fitting the bill of Foxhall's tenancy category of 'small-scale tenancy for the market'.[289] As found in contemporary examples today, the leasing out of small parcels of land for market-orientated (capitalist) production would not only have allowed Pompeian tenants to maximise output per unit area, for they would have been providing 'uneconomically' large amounts of labour (also known as intensive agriculture), but it would also have provided a profitable revenue stream for landowners. This could occur either through sharecropping, resident-tenancy, wage labour, slave labour, or a combination of two or more of the above. The alternative, too, is the cultivation of the gardens by owner-occupiers.[290] As Simulus also had fields to plough, he may have either been a tenant, likely with slave or wage labour aiding him in the field (though this is not the impression given by the decidedly lonely picture in the poem, likely for hyperbolic effect to aid in his role as a figure of memory), or an owner-occupier cultivating his own land. It does not, however, seem likely that he sharecropped on other land, due to the sheer amount of time dedicated to his own crops. I will discuss the implications of these

[288] 'Sometimes, those rich in lands would turn to the poor man for more [supplies]'. For more on tenancy options, see Chapter Four.
[289] Foxhall 1990.
[290] Foxhall 1990.

possibilities for Pompeii in further detail in the chapters below. However, for now, it is enough to question the possible predicaments of how Simulus' situation is presented and understand the importance of this for appreciating his role in local and wider market and subsistence economies.

Returning to the cultivation of Simulus' garden, we can see that his *hortus* is one part of a wider farming estate, in the fashion described by ancient writers above. As a result, his *hortus* is cultivated on days when the farm is not in need of ploughing, on holidays, or on bad weather days (65-68). In a typical manner, the horticultural plot is kept close to the cottage (*hortus erat iunctus casulae*, 60), is small in size (*exiguus spatio*, 62), enclosed (*calamo rediviva levi munibat harundo*, 61), fertile (*variis sed fertilis herbis*, 62-3), and near water (69-70).[291] An ekphrastic list of the plants grown here creates an image of abundance:[292] beets outstretch their arms alongside flourishing cabbages and herbs noted for their medicinal uses (sorrel, mallows, and elecampane). Beside these, skirret, leeks, and lettuce grow. In the same list, the poet hints at the cultivation of goods for those who are not self-sufficient, and who instead sourced food to their villas via local deliveries or else purchased goods at the market. This, and the possible shift to sharecropping, is reminiscent of the movement from self-sufficiency to a reliance on the market noted by Pliny the Elder above, in which vegetables are fattened for the market, and produce once wild and available to all is now domesticated as a cash-crop.[293]

Pliny's observation is mirrored in the *Moretum* when the author tells the reader that many of the vegetables grown by Simulus are cultivated solely for the market. Among these are the fattened lettuce and cultivated asparagus that Pliny disparages:[294]

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[291] In the fashion of previous generations (and cultures), Simulus directs nearby water in streams around his crops. We also know that water is close by as his slave, Scybale, collects water for him (31-35).
[292] The writing style and manner of this poem mirrors that of Augustan poetry, which itself is derived from epic tradition (hence the conclusions of Ross 1975, 259-260 who views the poem as a mock epic).
[293] Plin. *HN* 19.54. E.g., see Rowan 2016.
[294] Plin. *HN* 19.54: *grataque nobilium requies lactuca ciborum, spinosi asparagi crescitque in acumina radix, et gravis in latum dimissa cucurbita ventrem. verum hic non domini (quis enim contractior illo?) sed populi proventus erat, nonisque diebus venalis umero fasces portabat in urbem. inde domum cervice levis, gravis aere redibatvix umquam urbani comitatus merce macelli.*

> … and lettuce that brings pleasing relief to rich meals: here the roots of spiky asparagus which grow into spearpoints, and the heavy gourd that swells into its broad belly. But this crop was not for the owner (for who more frugal than he?) but for the people; and every ninth day over his neck he would carry his bundles to town for sale. Thence he would return home, with shoulders light but with heavy pockets, and seldom accompanied by purchases from the market.

The satirical genre of this poem makes similarities between this poem and contemporary Latin texts even more revealing of a rustic zeitgeist which the poet is commenting on. The above two passages from Pliny and the *Moretum* echo passages from the *Georgics 4*. In a list of garden produce similar to that in the *Moretum*, Vergil sings of rich gardens ornamented through careful cultivation, and describes 'the gourd, twisting through the grass, swelling its belly' (*tortusque per herbam cresceret in ventrem cucumis*) alongside curling acanthus, 'pale ivy' and myrtle, the latter typically found in ornamental displays of *ars topiaria.*[295] Almost in direct response to Vergil, in Simulus' garden to we find 'the heavy gourd which has sunk to earth upon its belly wide' (*gravis in latum dimissa cucurbita ventrem*, 76).

The satirical message is clear: Simulus, in cultivating his garden and submitting to the whims of the contemporary demand for *hortus* goods, preserves his Roman morality through self-sufficiency, public service (via goods), and hard work. Simulus does not eat the modified goods, for they are superfluous to his nutritional requirements (in this he exposes his virtue of *simplicitas*). Instead, he chooses to profit from these for their demand is currently high.[296] In such a way, Simulus is juxtaposed against elite landowners who have grown accustomed to a reliance on slave and hired labour and the market. This sentiment is heightened by the image of the needy neighbour in demand of the poor, rustic farmer's crops, for he has none of his own (despite being rich in lands). Martial comments on just such a situation in the country:[297]

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[295] For example, see Cic. *QFr.* 3.1.5.
[296] For a discussion of this, see Chapter Two.
[297] Mart. *Ep*. 3.58: *at tu sub urbe possides famem mundam et turre ab alta prospicis meras laurus, furem Priapo non timente securus; et vinitorem farre pascis urbano pictamque portas otiosus ad villam holus, ova, pullos, poma, caseum, mustum. rus hoc vocari debet, an domus longe?*

> But you have a property near Rome, all elegance and starvation. From a high tower you look out over nothing but laurel bushes, and your mind is at ease, for your Priapus fears no thief. You feed your vineyard workers with town flour and in time of leisure transport vegetables, eggs, chickens, apples, cheese, must to your painted villa. Should this be called a place in the country or a townhouse out of town?

A Roman exploiting the hard work of others is not considered to be a good *paterfamilias*, nor is he comparable to the virtuous 'figures of memory', such as Cincinnatus, Dentatus, and Cato, who provided services to society. Rather, such individuals can be likened to Vergil's old Corycian who has an abundance of plants with little practical use (though he is purportedly self-sufficient; *seraque revertens nocte domum dapibus mensas onerabat inemptis* ('at night it loaded his table with unbought supplies'). Instead, they too have their produce brought to them (as seen in Martial above).[298] They have tendencies towards *intemperantia* (intemperance and excess), rather than the more virtuous characteristic of *frugalitas*.

Frugalitas is a well-worn rustic trope seen in many moralising texts of this period. The namesake of the poem, *moretum*, is a rustic dish composed of cheese, herbs, olive oil, garlic, rue, vinegar, and herbs. Once combined, these ingredients create a paste to be eaten with bread. Though meagre, this is the main meal of Simulus' day, due to keep him satiated as he ploughs the fields: *pulsoque timore iam famis inque diem* ('now that fear of hunger is driven away, carefree for the day, 118-19). Simulus' meal of bread and *moretum* is reminiscent in its simplicity of the 'labourer's meal' described by Columella, consisting of salad (chervil, succory, and lettuce), garlic, and beans.[299] Similar descriptions are also provided by Martial and Varro.[300] In rustic food, too, a Roman may express his *rusticitas* and *frugalitas*. Spencer describes this as 'a way of eating oneself victoriously into authentic Roman identity.'[301] While gathering and combining the four garlic bulbs and coriander with

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[298] Depending on how one reads this, the consumption of 'unbought goods' could represent payment in kind through land ownership. Some landowners received rental payments for land as produce, rather than money; see Cato *Agr*. 136. Equipment would sometimes also be purchased in kind; see Hollander 2018a, 48.
[299] Col. *Rust*. 10.110.
[300] Mart. *Ep*. 5.78; Varr. *Ling*. 5.108.
[301] As stated by Pliny (Plin. *HN* 19.59): 'let vegetables also have their honour and do not let things be robbed of respect by the fact of their being common. He goes on to say that the Valerian family were named after the 'noble lettuce' (59-60).

salt and hard cheese, creating an odour so strong it stings his eyes (105-110), we are reminded of Varro's vivid image of *maiores nostri* who 'were men of spirit, even if their words smelled of garlic and onions…'[302]

In addition to *frugalitas*, generalised self-sufficiency was also important, as we saw earlier in Pliny's comments regarding a movement away from the market: 'Whoever buys what his farm could supply him with is a worthless farmer'.[303] At the start of *De Agricultura*, Cato states:

> And when they would praise a worthy man (*virum bonum*) their praise took this form: "good husbandman," "good farmer" (*bonum agricolum bonumque colonum*). One so praised was thought to have received the greatest commendation.

He also stated that from farmers came the best soldiers and the best men (*ex agricolis et viri fortissimi et milites strenuissimi gignuntur,* praef. 4).[304] Cato is clear from the start that a good farmer should only rely on the market for tools and other necessities in cases where materials cannot be sourced from one's own land; a good farmer should be a seller, not a buyer, and any expenses outlaid on agriculture only take away from the farmer's substance.[305] Similarly, Columella states that it is senseless to have a vineyard if you cannot source your own stakes.[306] For Simulus, his garden is the main source of his nutrition, income, and materials; he sources supplies for fencing and shelter from his garden (60-1), and seldom buys items at the market, instead returning with 'shoulders light but with heavy pockets' (78-9). It is noteworthy that Varro's satirical version of Stolo recommends buying tools for proper use rather than show; this is surely extraneous advice for a *bonum colonum,* perhaps instead hinting at some form of consumption for display purposes, a practice which would be alien to hard-working and poverty-stricken individuals such as Simulus.[307] Instead, Simulus' focus is

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[302] Var. *Sat. Men*. 21.
[303] *nequam agricolam esse quisquis emeret quod praestare ei fundus* posset; Plin. *HN* 18.40.
[304] A *bonum colonum* was entrusted with the efficient management of the individuals within the extended *familia* of the patron, and the maintenance of control of slaves and free labour on the farm to ensure its success and later inheritance in its best form.
[305] Cato *Agr*. 2.5-6, 2.7 (see Edwards 1994, 176-7 on Cato as a model of *exemplum*). For humble meals, see also Var. *Rust*. 1.22 and Plin. *HN* 18.41. For a discussion of this topic, see Hollander 2018. On the *paterfamilias*, see Kronenberg 2003.
[306] Col. *Agr*. 4.30.1.
[307] Hollander (2018a, 40) refers to this as a potential 'form of rural conspicuous consumption' in Stolo's case.

on rustic necessities: a mill for grinding grain to make flour for baking, a pestle and mortar for making *moretum*, a plough and oxen, and his hands. The latter, in the style of the first kings of Rome, are his main tools: 'Finally he wipes two fingers round all the mortar' (*tum demum digitis mortaria tota,* 114) and 'At first, lightly digging up the ground with his fingers, he draws out four garlic bulbs with thick fibres' (*ac primum leviter digitis tellure refossa,* 86).

The final point to be made returns us to perhaps the most familiar rustic trope of all: the Sabine farm. Simulus' farm is reminiscent of the Sabine Farm, as we have seen a popular trope of other 'figures of memory'. Via the process of concretisation, the 'real' Sabine farm of individuals such as Cato became *lieux de memoires* in Roman literature and, concurrently, Roman thought. In the story of Simulus, favourable and familiar features of *rusticitas* were applied to create a habitus of Roman rustic memory. In this fictional space, Simulus can act out characteristics of the provident hero and preserve them within the borders of his humble *hortus*. He denies wealth, is self-sufficient, is in regular contact with the urban centres via the market and serves the local community through his provision of essential produce. He does this from within his *hortus* utopia.

Finally, although Simulus' utopic garden shares characteristics with the heterotopia in being understood only because of its external representation in other recognisable imagery, Simulus' *hortus* is nonetheless not 'localised' nor 'real', and therefore cannot be a heterotopia. Simulus too, as an unreal and distant figure of memory, is himself utopic, reflecting an image created in Roman memory and preserved by the elite through wishful emulation. His utopian *hortus* thus encloses centuries of traditions, symbols, and meaning within its homemade reed fence, at once acting as a Roman memory theatre, a habitus of thought, a template of morality, and a *lieu de memoire*. The following quote from Foucault sums up the power of the utopian *hortus* of Simulus:

> In the mirror, I see myself there where I am not, in an unreal, virtual space that opens up behind the surface; I am over there, there where I am not, a sort of shadow that gives my own visibility to myself, that enables me to see myself there where I am absent: such is the utopia of the mirror.

Differing from the generalised heterotopic image of the *hortus,* Simulus' *hortus* has 'no real place' and instead mirrors real sites of rustic endeavour, such as Cato's own Sabine farm.[308] A final example, this time for Plutarch's work on Cato the Elder, relays a familiar rustic scene and epitomises the discussion above. Here I select those parts which best highlight not only the rustic trope of the agricultural figure of memory, but also the recognised power of this image to conjure images of ancestors and their virtues:[309]

> **Near his fields was the cottage** which had once belonged to Manius Curius, a hero of three triumphs… to this [Cato] would often go, and **the sight of the small farm** and the mean dwelling **led him to think of their former owner**, who, though he had become **the greatest of the Romans**, had subdued the most warlike nations, and driven Pyrrhus out of Italy, nevertheless **tilled this little patch of ground with his own hands** and occupied this cottage, after three triumphs.

All the hallmarks of the rustic *hortus* are once again present. By now it is clear that the habitus and the figure of memory are inherently connected; the rustic *hortus* cannot exist without the virtuous *bonum agricolam* and vice versa. So, too, is the implication of servitude to the state. While Simulus is not described as directly engaged in politics, he does engage in providing the community with sustenance, via the market and local, direct trades (to neighbours).

As we have seen, and will consider in more detail in Chapter Four, plots such as Simulus' were an active part of an ancient economy in which 'complex, vertically integrated economic relationships… [and] subsistence and the market are important at all levels'.[310] The *hortus* was central to more than just Roman identity, even if priorities had shifted from subsistence to market in the more recent years. Having discovered and outlined the dominant discourses surrounding the agricultural garden, I will now investigate how such discourses impacted the use and placement of rustic *hortus* space and produce in early Imperial Pompeii. The next chapter begins by examining the food being produced in real rustic *horti* in the city of Pompeii, as well as their economic and nutritional impact on the local population. The

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[308] For more on the utopia and its Roman construction in light of Golden Age virtues, see Evans 2003.
[309] Plut. *Cat. Ma.* 2.
[310] Foxhall 1990, 100.

proceeding chapters will then investigate the engagement of gardeners and their produce in the growing market economy, and the physical space of the *hortus* in domestic and commercial properties, before discovering a growth in gardens like Simulus' in the urban centre of Pompeii in the town's final years.

CHAPTER THREE: The value of **hortus** *produce in Campanian society*

> *Diets are an index of the standards of living. The more we know about them, the more we can inform, refine or adjust putative demographic scenarios. What you eat is also intrinsically linked with what you can or cannot grow. Better dietary data can thus advance our exploration of critical long-term and empire-wide developments, like regional variations in carrying capacity and sustainability, or the evolution of agricultural strategies and wider agro-economic processes. Pinpointing interregional similarities and differences in diet can also elucidate the functioning of surplus and trade networks. A deeper comprehension of how people fed themselves in antiquity is thus essential for tackling Roman history.* Van Limbergen 2018, 1050.

Food was even more 'deeply embedded in ancient social systems' than it is today.[311] Whether consumed at the *convivium* (feast), displayed or gifted to guests in the *domus*, purchased at the *caupona*, haggled for in the streets of the city, or made from scratch in the rustic cottage of a working farmer, food was a highly important tool for expressing the individuality, status, and identity of individuals in Roman society. The dietary status of the residents of Rome and Pompeii have been the subject of much debate over the last two decades. Recently, the theory of a below-subsistence existence in Campania has been disproved from both an archaeological and archaeobotanical perspective by numerous scholars in recent years.[312] Most significantly Flohr, in advancing the methodologies of Wallace-Hadrill in using peristyles and *domus* size to estimate buying power in Pompeii, concluded that up to fifty-five percent of households in Pompeii had access to 'elite' consumer goods.[313] Similarly, Rowan (2016) made great advances in her assessment of archaeobotanical remains from Pompeii and Herculaneum in demonstrating that the majority

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[311] Donahue 2015, 157; Twiss 2019, 129.
[312] Such views in relation to Campania were originally suggested by Jongman (1988). In the introduction to *The Economy of Pompeii* (Flohr and Wilson 2016 eds.) Jongman accepts that his earlier economic assessments of Pompeii were too pessimistic, even if his reconstructions were cautious. Scheidel and Friesen (2009) have similarly pushed this view for the city of Rome. In particular, the latter study estimated a 'middling class' at only ten percent of the population; see Mayer (2014), Zuiderhoek (2018) and Flohr and Wilson (2016) for the most recent and comprehensive responses to this view (esp. Flohr 2016 in the Flohr and Wilson volume).
[313] Flohr 2016; Wallace-Hadrill 1988, 1994. See also Scheidel and Friesen 2009, 83-4. Further discussion is provided in Chapter Four.

of Pompeians had a rich and varied diet made up of both staples and luxury items, with the majority living above subsistence level.

A recent contribution to dietary investigations of this kind includes research by De Angelis et al. on the reconstruction of Imperial diets in Rome. Consumption levels of fruit and vegetables in Rome would have been lower than levels in rural towns.[314] Though highly different from Pompeii in terms of geography and access to food, these finds provide important comparison points for appreciating the higher status of nutrition and income achieved by the majority in Pompeii by the mid-first century AD. For example, in an assessment of 214 human bones from funerary contexts in Rome, De Angelis and his team found that C3 plants, those which make up the bulk of calorific intake the world over (such as wheat, cowpea, beans, nuts, and oats), played a 'pivotal role' in the Roman diet and acted as the staple for the lower class (the *sitos*, or 'staple of the diet').[315] The same study agreed with other studies of dietary habits in Rome in stating that rustic produce, or edible produce grown in the garden, including vegetables, fruits, nuts, and herbs, were mixed with staple foods (namely C3 and C4 plants) by large portions of the population on a regular basis.[316] This was in addition to meat, fish, and eggs which served as key protein supplements to the bulk diet.[317] Due to the region's fertility, and ancient links between Campania and all rustic goods known to have been accessible to Romans at large, consumption levels of this category appear to have been even higher in Pompeii. Paleonutritional finds from the region have supported this

[314] De Angelis et al. 2020; Heinrich and Hansen 2019, 106.
[315] Wilkins and Hill 2006, 53. Isotope analysis is based on the registering of stable carbon and nitrogen isotope levels in human bone collagen, carbon derived from plants and nitrogen from other foods. C4 plants eaten by the Romans include millet, maize, sorghum, and common grasses; Van Limbergen 2018b, 1059.
[316] An example of a C4 plant is sorghum and maize. C4 plants differ from C3 in that they are not truly digestible unless ground into a powder. C4 plants are relied on heavily by humans and nonhuman primates as a main source of food and energy. For a summary, see Meacham-Hensol et al. 2020. The 'carbon and nitrogen signatures' of plants with 'different photosynthetic pathways' (for example C3 versus C4 plants) acted as proxies for identifying components of the Roman diet. However, C3 *hortus* produce (for example, apple and peach) was not able to be distinguished from other C3 plants in this study, thereby leaving open the same questions as in other studies concerned with ancient diets. Many of the vegetables classified as C3 plants were not known to the Romans. These include cassava, potato, tomatoes, and sweet potato.
[317] Rustic goods combined with animal products made up the category known in Latin as *pulmentaria*; Wilkins and Hill 2006, 114. For dietary composition in isotopic analysis, see Laurence 2005; Lazer 2009; Pate et al. 2016; Bourbou et al. 2019; Soncin et al. 2021. For fish in the Roman diet, see Marzano 2018 and Soncin et al. 2021 (the latter shows that males and Herculaneans consumed more fish than the Roman and Campanian averages). Rowan (2016) and Soncin et al. (2021) state that Pompeians consumed a lower level of seafood than Herculaneans, based on the high abundance of seafood remains found at the latter site. A recent study at Herculaneum on 17 adults (Soncin et al. 2021) has shown that males consumed more seafood than females, suggesting that diet differed also by gender and potentially occupation.

impression. However, the usefulness of studying rustic produce as an indicator of diet and the local economy is overlooked. It is as Taivalkoski, Holt, and MacKinnon stated in relation to the study of avian remains in the city: despite the low cost of these items, as with rustic produce (due to their local production and widespread availability; see below), 'the exclusion of these products ultimately serves to undervalue the role that non-elites played within the consumption practices of a site.'[318]

The osteological studies of Lazer (2016), Henneberg and Henneberg (2002), and Bisel and Bisel (2002) support archaeobotanical studies from the region in discovering a well-nourished population living into 'old age' in the two Campanian towns.[319] Common between all these was the conclusion that the fertile environment in which Pompeii was situated allowed a high level of nutrition to be reached, given the regular and affordable access to healthy foods. Pliny the Elder refers to the 'favoured country of Campania' in his description of the region's extensive fertility and agricultural output of high quality.[320] Elsewhere, Columella commends the 'black soil' of Campania (i.e., fertile, *Ag*. 1.24), rich crops (3.4-6), and the ease with which crops may be grown without the need for extensive ploughing or soil preparation.[321] Among these were staple *hortus* goods, many varieties of which were notorious to the region of Campania.

To establish what items were being grown and consumed in Pompeii and their nutritional and economic contributions locally, I will build upon the approaches taken by Jashemski, Murphy, and Ciarallo and conduct the first holistic survey of all archaeobotanical data from the town to date.[322] The quantification of this data will allow conclusions to be made about possible dietary shares of the general population at the time of the eruption, and as such the contribution of *hortus* produce to the Pompeian diet in general. A consideration of archaeological contexts and find locations will help to generate a better understanding of the social-economic status of consumers and of *hortus* produce availability in the town. The quantification of *hortus* produce consumption via archaeobotanical remains will be followed

[318] Taivalkoski et al. 2022.
[319] The recent study of the casts of Pompeian victim found that the articulated skeletal remains inside supported the finds of previous studies, in terms of extensive dental ware (for example, caries and periodontal disease),
[320] Plin. *HN* 3.60.
[321] In reference to Virgil (*G*. 2.184).
[322] Murphy 2015; Ciaraldi 2007.

by an attempt to establish the monetary values of *hortus* goods being cultivated and consumed in the town via an assessment of three shopping lists from the epigraphic record. An outline of the typical nutritional contribution one could expect from this produce will also be made. These two final assessments will contribute to a case study in the concluding part of this chapter, where I produce the first *hortus* produce yield in Roman scholarship of one whole garden from the town through an analysis of archaeological remains excavated there.[323] Through these estimates, I take a fresh and novel produce-first approach to estimating the potential impact that urban agricultural gardens may have upon the economic and nutritional status of Pompeii's population in the mid-first century AD. Before this can be achieved, however, I will summarise the geographical and economic context in which these gardens were being cultivated.

3.1 Campania Felix

Today, the city of Pompeii is recognised as a complex system of economic and social activities seamlessly integrated with the surrounding countryside. Although evidence for its regular and widespread involvement in regional, intra-regional, and international trading networks exists in Campania, the region in which Pompeii sits has long been considered capable of providing for the nutritional requirements of its many towns, or of being 'self-sufficient'.[324] The advantageous position of many of its towns on trade routes (for example, Pompeii was located along the River Sarno and close to key road routes), as well as the high fertility of its soil, leant great power to the region, for in food provision lay great authority and power in antiquity.[325] Importantly, the territory in which Pompeii sits has been occupied since pre-history due to 'its strategic position, amidst terrestrial, fluvial, and marine trading routes of the Italian Peninsula, and to the fertility of its volcanic soils.'[326] Cicero recognised this, referring to Campanian territory as the 'storehouse of Italy'.[327]

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[323] Previously, Jashemski has estimated the output of trees in the Large Orchard (I.22) and the Large Vineyard (II.5) but has never estimated the output of a vegetable garden or multiple products in one garden.
[324] Self-sufficiency is defined as the ability 'to provide everything you need, especially food, for yourself without the help of other people' (Cambridge Dictionary 2021).
[325] For example, see Purcell 2003.
[326] Vignola et al. 2021; Cicirelli and Livadie 2012.
[327] Cic. *Leg. Agr.* 2.32-3.

No doubt influenced by these views, Willem Jongman labelled Pompeii as a consumer city in 1988. A consumer city can be described as an isolated entity living off its countryside and providing little to nothing in return, whose wealth was derived mainly from agrarian-, rental-, and tax-derived elite income.[328] Feeling that Pompeii fit this description, Jongman posited that the town of Pompeii could not grow past subsistence-level or flourish as post-antiquarian cities in the Medieval period were able to do (these Weber (1958) named 'Producer Cities') due to its isolation and elite-derived wealth. While the fact that the core of urban wealth was derived from elite income was certainly true of many towns in antiquity, the integration of Pompeii in wider economic networks (such as the *nundinae*) meant that it did not need to live off their economic hinterland, even if this was possible. I follow the definition of Vogel and other scholars in counting the Sarno River Plain as the hinterland of Pompeii, for the agricultural land within this area was within a distance which would allow them to be economically tied to the town.[329] Even if the hinterlands of other (larger) towns within the regional network of Campania, such as Nuceria and Capua, provided nutrition for the city of Pompeii, the high level of buying power evident at the time of the eruption in Pompeii would still not be explained. Rather, evidence for the integration of Pompeii in wider economic networks allowed it to 'have access to additional sources of income, which may [have boosted] both its population and its wealth beyond the limits of the surrounding countryside', especially in times on need (which I will visit below).[330] Pompeii likely did not, however, have its immediate hinterland provide sufficient surpluses to satisfy the demands of its *populus* given the variety of the diet, the inclusion of exotic items, and the base of C3 goods (grains). Rather, the above subsistence wealth and nutrition levels of Pompeii's population discovered in recent years are consistent with the town's interconnectedness.

The effects of Imperial expansion in the late Republican and early Imperial periods had a direct impact on local diets in Campania as Roman political influence increased in Pompeii. A growth in inner-city specialised labour, outer-city grain processing, and an

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[328] The funnelling of wealth to a small minority tends to generate an inner-city manufacturing class made up of individuals engaged in non-agricultural pursuits, at least for most of the year, who produce goods in answer to the demand of local elites; see Chapter Four for a more in-depth explanation of the cause and effects of the consumer city model and its application to Campania.
[329] For example, see Vogel et al. 2016. I am not counting the wider economic networks that the town was included in (such as the *nundinae*) as the hinterland, as Zuiderhoek does, for these were in some cases very distant to the town of Pompeii and cannot be said to be immediately serving the population in the urban centre.
[330] Flohr 2016, 53.

'emergence [of] long-distance trade' can be observed at the same time that the town was growing commercially in the first century BC.[331] An early Imperial growth in specialised manufacturing in Pompeii contributed to commercial growth in the urban centre, the effects of which can be observed in the growth in new trading points and inns added from the mid-first century BC onwards.[332] Importations to the city only began in the following decade; the importation of 'Mediterranean Triad' (grain, wine, and oil) items would have opened up opportunities for manufacturing specialist and luxury goods in the centre, including highly perishable items such as fruit and vegetables.[333]

The establishment of a diverse and specialised manufacturing economy at Pompeii would have occurred as follows: the sale of citizen-farmer land into wealthy hands, and the subsequent increase in slave and freedman labour in the fields, would have freed up labour and created a population with unused specialised or transferable skills.[334] In the case of Pompeii, demand for manufactured goods is likely to have come from elite Romans living on the Bay of Naples and in villas in the countryside of Campania. The income that manufacturers derived from their goods would go back into rent and taxes, increasing not only the wealth of the local elite, but also the buying power of the population at large. Both groups would spend their disposable income on other goods, including luxury items such as modified *hortus* produce. One example of increasing commercialisation and specialised manufacturing in Pompeii is the growth in agricultural gardens, particularly in the south-eastern regions of the city.

As seen in Chapter Two, urban and suburban horticulture largely replaced any ambitions for self-sufficiency that the elites (or those emulating them) wished to achieve by the first century AD. The urban increase in crop cultivation, the decrease in private land for cultivation, and the engagement of Pompeii in nundinal networks would have altered *hortus* produce supply locally. Demand, too, changed at this time; increasingly competitive displays

[331] Ciaraldi 2001, 159; Rowan 2016; Flohr and Wilson 2016; Flohr 2020.
[332] Again, in contradiction of the consumer-city model, the increase in specialised manufacturing due to the freeing up of time, money, and people invested in the production of Mediterranean Triad goods would have allowed for the distribution of wealth to grow more evenly in Pompeii and Herculaneum. For an in-depth discussion, see Zuiderhoek 2018.
[333] Rowan 2016, 128.
[334] Zuiderhoek 2018.

of generosity at private *cenae* would have impacted local levels of demand for cash crops, namely for exotic or modified varieties (of the kind discussed by Pliny the Elder). Both Columella and Pliny the Elder insist that the poor were being priced out of staple *hortus* goods in the first century AD because of the new varieties being cultivated for the local elite (these carrying higher costs). However, the fertility and increasing availability of agricultural land in and around Pompeii likely offset this,[335] as would the town's interconnectedness with other centres of *hortus* produce supply.[336] As shall be covered in Chapter Four, the regular participation of Pompeii in a regional and intra-regional *nundinae* (rotating market) network likely also decreased the cost of buying staple goods locally, thus reducing the need for achieving self-sufficiency at home.

In support of a high accessibility of *hortus* goods in the first century AD, advances in paleonutritional and archaeobotanical studies have revealed well-nourished populations living into old age in Pompeii and Herculaneum who enjoyed a diverse diet of grain, fruit, nuts, vegetables, herbs, and animal products. High nutrition levels have been witnessed not only among the wealthy, but among those in lower income housing (such as upper-floor apartments).[337] The nutrients and vitamins derived from a diverse range of fruit and vegetables known to have been consumed in Campania are suspected to have contributed to the high level of nutrition seen in the sewage and skeleton assemblages from the two cities. This high level of nutrition and dietary variety would have also contributed to the elevated level of trauma and childhood sickness recovery seen in bone assemblages from the region, with a large portion of the population living into old age.[338]

Despite the known positive impact of *hortus* produce on the local population, few studies have investigated the nutritional or monetary values of these goods, with most of these relying on literary sources to reconstruct ancient diets. As stated by Chryssi Bourbou, 'Textual evidence produced by and directed to the elite rarely gives us a thorough idea about the diet of the common people', and any attempt to generalise the 'Roman diet' over the vast

[335] Rowan (2016) demonstrates that a diverse diet not only culturally significant among Roman citizens, but also that increased buying power in Pompeii and Herculaneum sustained 'substantial food markets'.
[336] Though the majority was likely produced locally, as per von Thunen's model of agricultural supply; see Zuiderhoek 2018.
[337] Rowan 2016.
[338] Ciarallo 2013; Rowan 2016; Pagán 2016; Jashemski 2018.

expanse that the Empire reached in the first century AD is not useful for creating a picture of the average diet in Campania.[339] Walter Scheidel (2005) compiled all known literary references to the monetary values of food in the Roman Empire, a development of the extensive study of economic values by Richard Duncan-Jones (1974), while the macronutrients of different types of food and drink are summarised by various authors in the volume edited by Paul Erdkamp and Claire Holleran (2019). Yet no study has yet taken an interdisciplinary approach to the nutritional and monetary value of food known to have been grown and consumed at Pompeii. The documentation of epigraphic material from Pompeii in Alison Cooley and Melvin Cooley (2004) provides an excellent starting point for studying this, as do literary references to the monetary values of goods over time.[340] Here I advance and refine previous studies relating to *hortus* produce consumption to make clear that the nutritional standards evidenced in the archaeological data are not necessarily solely representative of produce imported to Pompeii, but likely also represent produce grown in the city and immediate suburb. To do this, I first overview the produce being consumed in the town, before cross-referencing this with evidence for their nutritional and monetary values in literary and epigraphic remains.

3.2 Hortus *produce grown in Pompeii*

In literary references to Campania, one is hard pressed to find agricultural products that the region was not famed for. Many of these happen to be those known to have been grown in the gardens of urban Pompeii. By the first century AD, Campania was renowned for its wine production, including one especially well-known example from Falernia,[341] as well as cherries, pears, cabbages, onions,[342] figs,[343] famous roses (including a one-hundred-petalled

[339] Bourbou 2018, 77. Bourbou (2019, 79) defines bioarchaeology as 'the study of human skeletal remains contextualised within the available archaeological and/or relevant documentary evidence when dealing with historic populations.' See also Beerden 2018 in the same volume and Larsen 2002. See also Buikstra and Beck 2009; Baadsgaard et al. 2011.
[340] Scheidel provides a comprehensive summary of such references in an online database (n.d.).
[341] Pliny (*HN* 14.36-8) refers to the Murgentina vine imported from Sicily, now known in his time as Pompeiana, which 'only bears well in a rich soil, just as the horconia vine only flourishes in Campania.' Columella (*Rust*. 3.10) refers to the 'famous slopes of Vesuvius and of Surrentum in Campania', due to their vines. See De Simone (2016, 33) for a summary of the four main varieties.
[342] Cat. *Ag*. 8.1; Col. *Rust*. 10.127–39, 12.10.1; Plin. *HN* 15.53, 15.71, 15.102–4, 19.140. See also Rowan 2016, 115.
[343] Macr. *Sat*. 3.20; Cato *Agr*. 8.1; Pliny. *HN* 15.72.

variety)[344], and 'nobler olive oil'.[345] Fish from the Bay of Naples was also praised, while Baiae became synonymous with elaborate fish farms and pools.[346] Herculaneum was well placed on the Mediterranean Sea, and Pompeii on the River Sarno, meaning that a great trade in fish in both of the towns was possible.[347] Paleonutritional evidence from Herculaneum suggests that this population consumed a wide variety of seafood,[348] while Pompeians appear to have favoured pork due to the great abundance of pig farming the surrounding countryside.[349] Isotopic analysis in the region has supported the high consumption of fish and meat in Herculaneum, and meat in Pompeii.[350] Gender and status played a role in determining which food was consumed and by whom; evidence has recently been found to suggest that males ate more seafood than females, while other foods appear to have been graded by status or wealth.[351] Most importantly, the immediate availability of certain foods thus impacted local consumption. Nonetheless, such differences illustrate the opportunities for nutrition available according to location or regionality, and why evidence from Pompeii and Herculaneum should, for the most part, not be combined and generalised without caution.

A diverse diet was of high cultural significance in Roman society, and evidence abounds for a variety of foods being consumed by the majority in Pompeii and Herculaneum,

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[344] Plin. *HN* 21.15-20.
[345] There are not many agricultural goods for which Campania is not famed Plin. *HN* 3.60-2. Rowan (2016, 115) believes that a larger proportion of land was dedicated to horticulture than vines, as De Simone (2016) suggests in the same volume.
[346] See Marzano (2019) for fish in the Roman diet and large-scale fishing.
[347] See Wilkins and Hill 2006, 113, 143-160. Pompeii was also 'the primary producer of fish sauce [*garum*] in the region'. Pompeii was also home to a flourishing *garum* industry with one family, the Umbricii, holding a strong position in the market; twenty-nine percent of *garum* jars found in the Pompeii and Herculaneum bear the name of Aulus Umbricius Scaurus. Pliny (*HN* 31.43.94) notes that Pompeii was famous for its *garum* production. For studies on Pompeii's *garum* industry, see Curtis (1984, 1988, 1991). For industry at Cosa, see Haley (1990). Speculation regarding a link between the briefly mentioned Scaurus at the *cena* of Trimalchio, and Pompeii's *garum* maker, has been made though is very unlikely due to the unconfirmed date for the magistracy of Aulus Umbricius Scaurus. Duncan-Jones (1974) disputes this identification, while Curtis (1988, 1991) supports this view. See Campbell (2010) for a discussion of Aulus Umbricius Scaurus' epitaph which demonstrates that his tomb was Augustan and provides evidence for the presence of the Umbricii in Pompeii throughout the first century AD.
[348] Rowan 2016, 123-5. For more on fish farming, see Marzano 2013, 2018, 2020.
[349] For example, see MacKinnon 2001; Wilkins and Hill 2016, 113.
[350] Laurence 2004; Lazer 2009; Pate et al. 2016; Bourbou 2019. For fish in the Roman diet, see Marzano 2019. Rowan (2016) states that Pompeii had a low consumption of seafood in comparison to Herculaneum, based on the high abundance of seafood remains found at the latter site. A recent study at Herculaneum on 17 adults (Soncin et al. 2021) has shown that males consumed more seafood than females, suggesting that diet differed also by gender.
[351] Male remains from Pompeii show evidence of having consumed more seafood than female skeletons; see Martyn et al. 2018.

with nutrition levels above those necessary for survival regardless of socioeconomic status. In her study of the Cardo V sewer in Herculaneum, Rowan identified a variety of items as 'goods associated with elite culture', [352] due to their find locations and infrequent representation. Her findings demonstrated that food consumed by the rich and the poor did not differ greatly in terms of food types, but more so in terms of quality or varieties. For example, chicken eggs (widely available in antiquity and highly prevalent in Pompeian assemblages),[353] were well represented across deposits below lower income apartments, while goose eggs appear only in the sewage deposits below wealthy properties.[354]

Rowan suggested that many of the non-staple and exotic food items found in the Cardo V deposit were likely produced locally, perhaps even within the town of Pompeii. Despite this, Rowan also concluded that the gardens in Pompeii and Herculaneum were not large enough to support local needs in any substantial way.[355] In some cases, this was likely true. For example, a very high number of figs have been found in Pompeian and Herculanean deposits would require hinterland cultivation before importation into the urban centres. This is because figs, once harvested, will spoil within seven to ten days if not dried; Lucilius talks of a fig seller in the forum who reduced the cost of his figs as the day went on due to their declining freshness.[356] Grain and olives, two less perishable staples, would have also been cultivated outside of the city *en masse*, thus freeing up room for the cultivation of goods of a higher perishability, but a less essential nature, such as fruit, nuts, vegetables, and herbs.

I make these conclusions based on Von Thünen's Central-Place Theory (1921). This model organises agricultural and pastoral activities according to their distance from the centre of political control and the market, as determined by the perishability and cost of transporting goods. As such, market gardens and dairy farms (highly perishable goods) are often located in

[352] Rowan 2016.
[353] Taivalkoski et al. 2022, 6.
[354] See also Wilkins and Hill 2006, 52. As geese only lay at certain times of year, supply would have naturally been lower than chicken eggs. Though sewage deposits indicate a wide variety of consumables eaten by most of the nearby Herculaneum's population, items associated with 'elite' culture, such as goose eggs, appear only in the deposits of wealthier properties.
[355] While 'Mill stones, olive, and wine presses, and sunken dolia attest to the production of flour, wine, and olive oil in the Bay of Naples' (Rowan 2016, 113), such production likely occurred in the hinterland, rather than the urban centre of Pompeii.
[356] A hawker selling figs in the Forum would have been in the sun all day and so, any figs unsold by day end would likely have been wasted.

the immediate hinterland of ancient cities, followed by forestry, crop rotation, enclosed field, three field,[357] and grazing in concentric circles.[358] At Pompeii, market gardens and flower gardens were in and near the urban centre, likely followed by dairy in the immediate hinterland, and olives, grapes, figs, grains, and livestock further afield (Figure 5). This is supported by high values of Brassicaceae pollen (mustard and cabbage family) which were discovered around the town of Pompeii, with most of the pollen grains attributed to *Brassica oleracea* L., or cabbage and broccoli. Among these, pollen from Amaranthaceae (for example, spinach and beets), Apiaceae (such as carrot and parsley), and Fabaceae (for example, peas and beans) species were also discovered, though in lower quantities. The pollen count of Brassicaceae accounted for just under half of the total taxa from the Roman period sample in the area immediately south of the Terme del Sarno,[359] this area being the southern scarp of the 'Pompeii Hill', the coastline, and the channel of the Sarno river in antiquity.[360]

[357] Three fields are assigned for the rotation of crops, one field being cultivated with legumes, the other with grain, and the other unsown. The rotation of these fields with different crops improves crop quality and yield as the unsown land allows the soil to recover, while the legumes fix nitrogen in the soil.
[358] Von Thünen (1921) developed Walter Christaller's Central Place Theory (1933, 1950) which proposed that there was a distance limitation for different goods based on their deemed value. Instead, Von Thünen approached this from the perspective of the producer and considered the distance he or she would be able to travel with each type of good, based on perishability and cost.
[359] Vignola et al. 2021, 9-10.
[360] For a map, see Vignola et al. (2021).

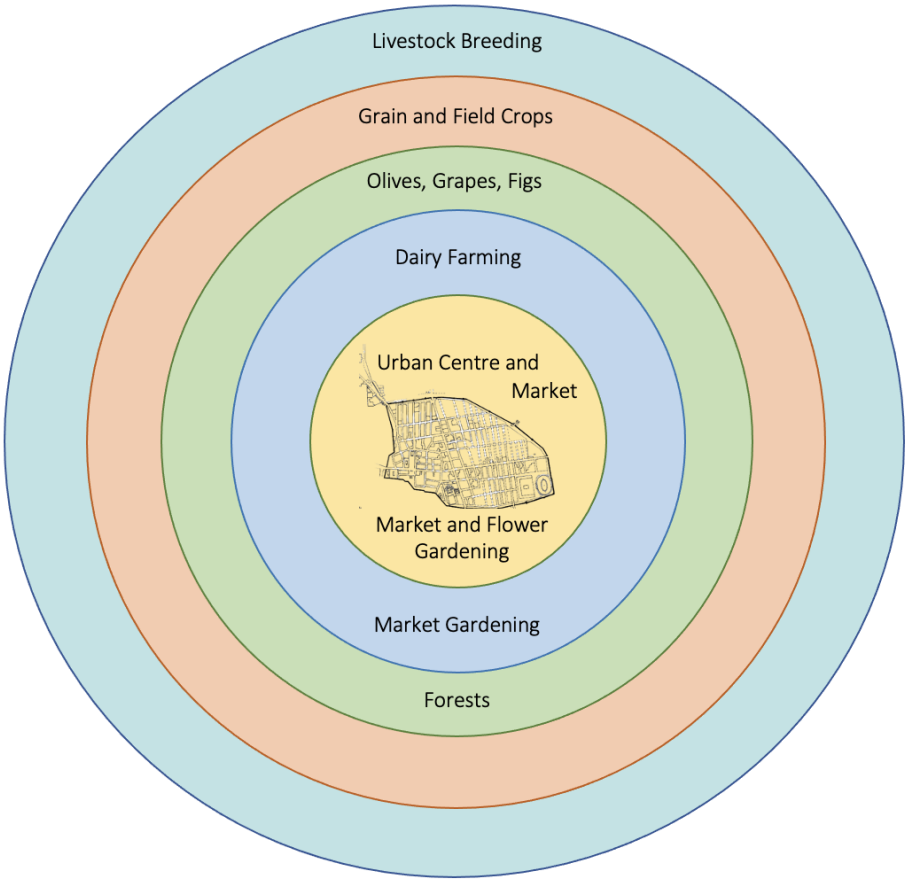


Figure 5: The Central Place Model applied to Pompeii. Image: Author's own.

The high concentration of vegetable cultivation here is unsurprising; as seen in the literature from Chapter Two, cabbages were at the core of Roman horticultural practices, and Campania was renowned for their cultivation.[361] Further, these plants do not produce high values of pollen, further suggesting that many vegetable gardens were being cultivated in the areas immediately around the town.[362]

Soil samples taken by Vignola and his team in the area south of the Terme del Sarno revealed that non-arboreal pollen far outweighed arboreal pollen at the time of the eruption (Figure 6).[363] This may be due to changes which occurred following Roman occupation: in

[361] Col. *Rust.* 10.135.
[362] Pollen samples from throughout Campania support the same view of extensive Brassica cultivation; see Lippi and Ciarallo 1993; Grüger 2002; Lippi and Bellini 2005; Allevato et al. 2010; Russo Ermolli and Messager 2013; Ermolli et al. 2014a; Ermolli et al. 2014b; Weber et al. 2020; Vignola et al. 2021; Ermolli et al. 2022.
[363] Vignola et al. 2021, 7.

the first half of the first millennium BC, the areas just outside of the Terme del Sarno were heavy in trees and ferns. However, across the first century BC to the first century AD, 'the wetland shrunk to the advantage of crop production', and evidence for cabbage fields and olive groves being established can be seen in the soil. Synanthropic plants (undomesticated varieties which grow in proximity to humans and benefit from their surroundings and activities) also began to increase around this time, as did pine and walnut trees. Vines only appear for the first time in the deposits just prior to the eruption.[364] Perhaps surprisingly (given their nativity to Italy), olive pollen is underrepresented in the Roman samples taken from the area and suggests their cultivation further afield (as per Von Thunen's model). On the other hand, walnut and box are visible from the start of the first century BC, around the time when Roman occupation began.

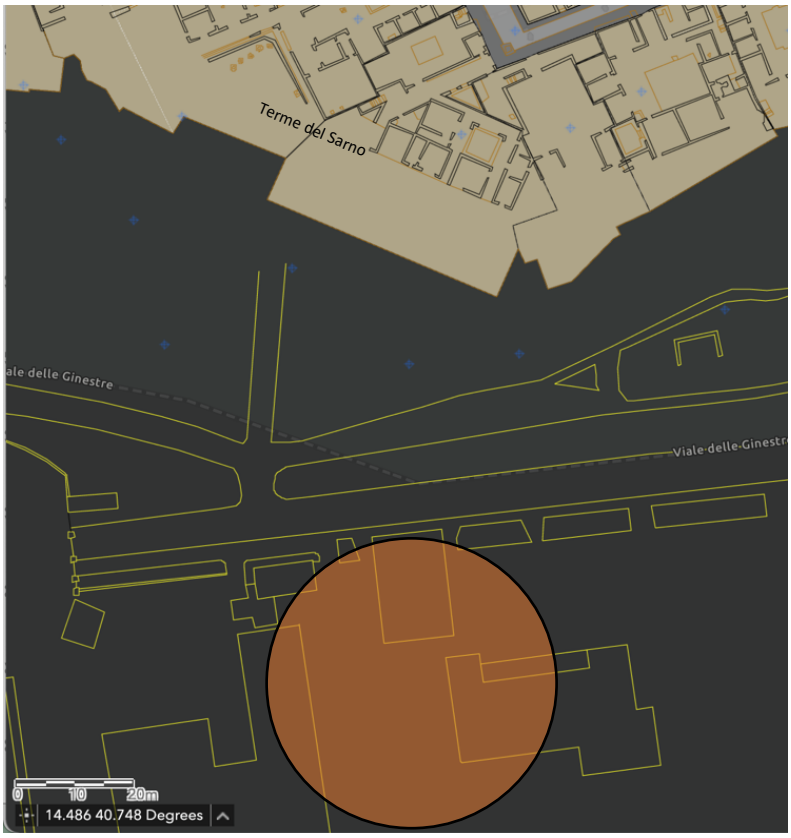


Figure 6: Site of soil samples taken in Vignola et al. 2021, south of the Terme del Sarno. Map: From the Pompeii Bibliography and Mapping Project 2017 (edits Author's Own).

[364] Vignola et al. 2021, 10. Also found here are increasing numbers of pollen for water plants, such as Typha; see Vignola et al. 2021.

The low level of olive pollen discovered here is likely due to an increasing use of agricultural space close to the town for vegetable cultivation from the first century BC. Further out from Pompeii is more space suited to the cultivation of olives, grapes, and figs ('expensive to move yet not so perishable'). Forests, too, would have been cultivated and managed for local wood supplies.[365] Grain would follow on a typical Central-Place model, however no evidence for grain has been discovered in the immediate suburbs of Pompeii from first century AD deposits, likely due to the high-water availability of the soils.[366] The same pattern has been found for legumes.

Grain was most likely to have been grown furthest from the centre of Pompeii, while pastoralism was likely practiced in the hills and estates furthest from the city.[367] As livestock were able to walk to market, they were not too much of a concern in terms of transport, though if the landscape around Pompeii was intensely cropped, this may have proved a challenge (for grazing en-route to market would have been hindered). However, a high representation of coprophilous fungi (a type of fungi which grows on animal manure) has been found in the areas immediately around the town (within 100 metres of the Terme del Sarno),[368] suggesting that animals either grazed here on the way to market or were farmed closer to the town than previously thought. The gathering of seafood and materials for crafts (such as murex for royal purple dye) would have been prioritised along the coast.[369]

Grain, olives, and grapes would have been processed on site in *urbs* before transportation to urban centres in their final form (as flour, oil, or wine).[370] The cultivation of

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[365] Nicosia et al. 2019, 20-1. Evidence for the *quincunx* cultivation of cypress trees and vineyards have been discovered on the Sarno plain, mostly around Messigno (south of Pompeii, before the Lattari mountains). Hatcher 2002; Kuniholm 2002. A high variety of wood types have been found in Pompeii and would likely have been sourced from such local locations; see also Hatcher and Kuniholm 2002.
[366] Further evidence suggests that grain cultivated further out in the Sarno plain would not have been cultivated to the levels reached in the Hellenistic period when an expansion in cereal fields appears to have occurred in the region; Vignola et al. 2021.
[367] Zuiderhoek 2018, 50.
[368] Vignola et al. 2021, 10.
[369] The coast was closer to Pompeii in antiquity, but theories vary on where the coastline originally sat; see Nicosia et al. 2019, 12.
[370] See Murphy, Thompson and Fuller (2013) for evidence of grain processing outside of the city from the first century BC onwards.

hortus produce within the city would have limited transport costs for these items considerably, thus reducing local charges for these goods. In cases where produce was cultivated in gardens with shops attached, the cost of transporting goods would have been removed entirely, thus making mark-ups even lower. There is, however, the possibility that goods being cultivated in the city, may have justified the cost of higher value land, with cash crops designed to attract wealthier clients, as found at a farmers market today, though this cannot have always been the case.[371]

Views regarding the impact of urban *horti* upon local consumption levels in Pompeii vary. Murphy follows the theories of Jashemski in positing that the organic remains found in the area of her focused study, Insula VI.I in Pompeii, were likely grown in the gardens of the city, given the types of remains found (varieties known to have been grown in Campanian gardens); 'Kitchen gardens', as Jashemski refers to them, 'were meant to support the family not only for their own sustenance but also for profit. A kitchen garden large enough for a surplus of fruits and vegetables could be a source of revenue, particularly if close to a town.'[372] In disagreement, Rowan (2016), Ciaraldi (2001), and Pagán (2016) acknowledge a growing industry in specialised agriculture within the city walls, though all assume a highly limited contribution of inner-city cultivated *hortus* goods to the diverse diet of the Pompeians. Rowan states that anything produced in Pompeii's gardens would not have been substantial enough to affect the local diet. Similarly, Pagán takes the view that most gardens producing food for consumption in Pompeii were reserved for personal use, as opposed to exploitation for monetary profit.

Though partly justified due to the volumes achievable outside of the city centre, the choice of Rowan, Pagán, and Ciaraldi to view the botanical assemblages from the city as primarily countryside-sourced nonetheless feeds into the consumer-city model. Indeed, if the contribution of urban gardens were as these authors imply, why would the population have dedicated such a high proportion of urban space to agriculture in the mid-first century AD? We can begin to understand this better with an idea of the possible output of gardens from the town, as well as the nutritional contribution these may have been making on a small scale.

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[371] Holleran (2012) suggests this same effect for goods sold in the macellum, due to the higher rental cost of units there.
[372] Jashemski 2018, 122.

Were they cash crop gardens, an extension of agricultural activities in the suburb of the town (saturated in vegetable gardens), or subsistence gardens for local workers or elite members?

3.3 Nutritional standards in Pompeii

Jongman (1988) and Scheidel and Friesen (2009) separately state that malnutrition and subsistence living were commonplace in Roman Italy, yet elsewhere it has been established that the nutritional standards in Pompeii were high in comparison to other Italian cities in the first century AD.[373] The term 'living population' has been used to describe those discovered in the AD 79 eruption level, all of whom were 'affected equally in terms of death and the destruction of property' in the same natural disaster.[374] In other words, all those killed by the eruption of Vesuvius met their end not because of an illness or other tragedy, but in the same sudden disaster, meaning that their skeletons are important sources for studying the health conditions of individuals living in Campania at that time. However, while useful, analysis of Pompeii's 'living population' does not mean that any assemblage of skeletons available for study are representative of a random sample.[375] Rather, there is the possibility that a large portion of the population had escaped from Pompeii by the time of the first pyroclastic flows around midnight, approximately twelve hours after the start of the eruption at midday.[376]

Further, there exists a probable skew towards higher numbers of the infirm or poor in the assemblages, for these groups were less likely to have the resources to leave the town at a moment's notice. Alternatively the rich, who would naturally have been well nourished, may have had better access to methods of escape and as such may not be as well represented.[377] Such a skewing of… can be witnessed in Herculaneum where evidence for mass escape is

[373] See later development by Jongman in Bowman and Wilson 2009. Garnsey (2009) fails to build an image of the diet in Rome with any certainty, an attempt improved upon recently by De Angelis et al. (2020). For Herculaneum, see Martyn et al. 2018.
[374] Lazer 2016, 137. Henneberg and Henneberg (2002, 174) state that the Pompeian assemblage had an age structure which matched that 'from [other] normal cemeteries of antiquity' studied by themselves. Laurence (2005, 95) also uses this term to describe the Pompeian skeletal assemblage.
[375] Lazer 2016; Henneberg and Henneberg 2002.
[376] Many were also found on the roads leading out of Pompeii. The eruption is now thought to have occurred between the 23-25 October AD 79 (see Osanna 2020) beginning around noon. See Jashemski 2002 for an in-depth discussion of the eruption phases.
[377] There are several limitations to consider when studying skeletal assemblages. Firstly, not all diseases present in the bones of individuals (Ortner et al. 2012; Sharman 2013), while some physical manifestations of disease in bones can sometimes be interpreted in numerous ways (Bourbou et al. 2019). Secondly, the preservation of remains, recording, and sampling limit the usefulness of outcomes when applied to other studies.

seen on the beach front; here no boats were found on the storage crossbeams in the seafront chambers, though approximately 300 victims of the eruption were found dead in their place.[378] Tellingly (for they were likely being protected by male members of the population), a high number of women and children were discovered in the chambers. A proportionately high number of male skeletons (presumably part of the rescue effort) were uncovered on the beach. This example epitomises the importance of considering the unpredictable movement of individuals during the eruption in any paleonutritional analysis and is something to keep in mind below.[379]

In addition to possible skews in data, one must also consider the negative effect of certain techniques of storage, sorting, cleaning, and recording during early excavations, which in many cases led to the loss of material not thought to be important at the time. For example, several studies assessing the osteological remains from victims of the eruption have noted a large under-representation of child bones, likely due to their misidentification as animal bones before their subsequent disposal by early excavators.[380] Despite these drawbacks, a wealth of information about the Pompeians from bones, including age, lifestyle, illnesses, diet, and even occupation, can be gleaned.[381]

The skeletal assemblages from Campania are representative of 'regional continuity in stature and exhibit a high frequency of healed bone trauma in Herculaneum, and a comparatively low level of any observable bone trauma in Pompeii. This may be due to a bias in the assemblages studied, higher occupational risk at Herculaneum or, as mentioned, the exodus of wealthier individuals unlikely to have engaged in physical occupations.[382] A high

[378] Jashemski 2002, 57. To date, Lazer (2016) and Mastrolorenzo et al. (2001) record 345 victims have been excavated in the boatsheds in Herculaneum.
[379] Lazer 2016, 139.
[380] Lazer 2009, esp. 267. For a full discussion of using skeletal remains as a proxy for diet, see Killgrove 2018.
[381] See Bisel and Bisel 2002 for the identification of a fisherman, based on the distinctive marks in his teeth made by pulling rope.
[382] Lazer 2009, 194-6; Bisel 1987, 124-5. Capasso (2001, 998-1002) found similar results to Bisel, and noted the higher frequency of healed trauma among the male population, taking this as evidence for 'gender-related division[s] of labour'. Henneberg and Henneberg (2002) also found that diverse nutrition was available to most Pompeians from an analysis of bone assemblages from the town.

proportion of individuals appear to have also lived into old age.[383] Many survived acute childhood illness, most frequently manifested as linear hypoplasia, and systemic disease, manifested as non-linear hypoplasia.[384] For example, Henneberg and Henneberg conclude that disease rather than malnourishment was behind the lower-than-average stature of children living in first century AD Pompeii;[385] such findings suggest that Campanians more generally were able to overcome health issues as a result of their good nutrition.[386] The dentition records of the samples studied by Lazer, Henneberg and Henneberg, and Bisel and Bisel reveal that the populations living in Campania enjoyed a high carbohydrate diet rich in sucrose. More specifically, the study of thirty-one individuals (twelve males and nineteen females) from Pompeii by Pate et al. revealed a diet dominated by C3 plants (wheat, barley, vegetables, and fruit), alongside meat. The presence of '13C enriched isotopes' among many of the skeletons demonstrated that Pompeian diets were supplemented with marine protein, perhaps sourced from the thriving *garum* (fish sauce) industry in the town. Notably, this isotopic composition showed similarities with studies of other Greek colonies on the coast of Southern Italy, though the population at Pompeii boasted a higher diet in marine protein.[387] The specific items contributing to this diet, however, remain to be established with scientific studies in mind.

It is possible to utilise the dental and skeletal remains to better understand disease and trauma, and to access alternative information about diet, in Pompeii. An assemblage of thirteen individuals from the House of Julius Polybius in Pompeii (VI.17.36), consisting of six adults and six children, plus one foetus in the abdomen of a young female, has proved fruitful for drawing conclusions about nutrition in Pompeii. The group appears to have married young, eaten well, and enjoyed 'relative freedom from disfiguring disease', leading Henneberg, Henneberg and Ciarallo to characterise the sample as 'representative of a

[383] 11.9 percent of adult skulls analysed by Lazer (2016, 150) from the Pompeian assemblage showed signs of Hyperostosis Frontalis Interna (HFI), a condition of internal skull modification found in post-menopausal women.
[384] Physiological stress, such as illness or malnutrition, can cause dental linear hypoplasia to form due to a disruption in enamel growth.
[385] Henneberg and Henneberg 2002, 184-5.
[386] Rowan 2016; Henneberg and Henneberg 2002, 174, 185; Laurence 2005; Lazer 2009. For good nutrition in Herculaneum, see Bisel 1988; Rowan 2016; Bisel and Bisel 2002; Lazer 2009.
[387] This may have in part been drawn from garum, for which there is evidence of a strong manufacturing industry at Pompeii (for example, the manufactory of Scaurus); Pate et al. 2016, 130.

Pompeian household'.[388] However, this house was relatively large and contained facets of elite culture (such as a peristyle and Fourth Style paintings) and so is unlikely to have been as representative of the general population as the authors of this study believe. The skeletons from this household exhibited consistent moderate tooth wear indicative of diet 'of well-cooked foods rich in carbohydrates… sticky and non-abrasive foods… [and a] starchy diet with additional sources of sugar like fruit and honey'.[389] Despite the higher risk of disease in Pompeii, particularly malaria as a result of its proximity to marshland and the River Sarno,[390] households such as the one discovered in the House of Julius Polybius appear to have benefitted from the 'abundant resources of the Vesuvian region', which in turn led to an overall 'good level of nutrition' among the general population.[391]

3.4 Reconstructing the Campanian diet

Having established the above-subsistence nutrition levels of the Pompeian population, and the wider than average availability of disposable income and access to elite goods, the following section aims to uncover the different varieties of *hortus* produce being cultivated and consumed in Pompeii. Producing the first quantification of all known archaeobotanical remains in Pompeii, I assess how far these items have contributed to the nutritional and economic status of the town established above. An important part of compiling this analysis requires a survey of relevant literary and epigraphic records to determine possible monetary values of *hortus* produce varieties to determine levels of accessibility and economic output of locally cultivated rustic garden produce. An overview of general Roman consumption habits is used as a comparison point for the finds from Pompeii.

For this, I will turn to existing archaeobotanical catalogues from the Campania to begin establishing the varieties and quantities of *hortus* produce consumed in the region. These are made up of finds from Pompeii, Herculaneum, and villas located in both city's hinterlands. The proven interconnected relationship of Campanian towns makes an analysis of

[388] Henneberg et al. 1996, 249.
[389] Henneberg et al 1996, 249-58. See also Laurence 2005.
[390] In comparison to Herculaneum which had good air due to its location on the coast. See Laurence (2005) for a discussion of the higher risk of malaria in Pompeii versus Herculaneum.
[391] Jashemski 2002, 477. For the full report on Herculaneum bone assemblage, see Bisel and Bisel 2002, 451-75 (in the same volume).

archaeobotanical assemblages at a regional level beneficial, for it allows a greater set of data to be assessed and does not rule out the great number of finds which do not have a find location (many are simply labelled as located in Museo Archeologico Nazionale di Napoli). Where possible, the find locations of items are considered where status or wealth may have played a role in consumption choices (for example, in notoriously wealthy *domus*, such as the House of the Vestals in Pompeii).

Though my focus is on goods produced in the gardens of the city, it is important to note that grains made up the bulk of the average Roman diet, contributing to around sixty to seventy-five percent of the total calories consumed on average.[392] Grains were most often eaten in the form of bread, or as a type of porridge (*puls*), and were not subject to fluctuations in price and quality as much as other foodstuffs.[393] The remainder of the Roman diet (twenty-five to forty percent) was made up of vegetables, fruit, nuts, herbs, and animal-derived products, though given the availability of fresh goods in Campania, this was likely higher in Pompeii.[394] Currently, scholars believe the two of the three components of the so-called 'Mediterranean Triad', olives and grapes, contributed to between five and twenty percent of daily food intake in antiquity.[395]

The positive nutritional effects of Imperial conquest, particularly following the Roman colonisation of Pompeii in 80 BC, can be witnessed in the archaeobotanical remains of the town. For example, around the turn of the century excavators note a significant increase in figs and olives (likely mass-produced in the hinterland of Pompeii, as we saw above) and of imported items such as black pepper (India) and dates (Middle East), as well as an almost complete reduction in home grain processing.[396] Several factors escalated this, most

[392] Foxhall and Forbes 1982, 74; Garnsey and Whittaker 1983; Jongman 1988, 79-80; Erdkamp 2005, 309-10; Purcell 2003. Garnsey (1999) suggests a figure of 60 percent or higher. For a discussion of grain contribution to the Roman diet, see Heinrich 2019, 107-8.
[393] The Roman state endeavoured to mediate grain prices throughout its history, causing tension regularly due to its crucial role in the survival of the Roman population. See Erdkamp (2015) for a comprehensive study of the grain market in the Roman Empire and Hollander (2019). See also Casson (1980) for the state's role in grain production and trade.
[394] For example, pork was consumed in higher quantities in Campanian towns than Rome due to the high volume of pig-rearing in the Campanian countryside; see MacKinnon 2001.
[395] Van Limbergen 2018a, 1061.
[396] Murphy 2015.

significantly the increase in the reach and number of trade routes.[397] However, to establish which rustic produce made up the non-grain portion of the Pompeian diet, and in what proportion, I will need to reconstruct the average non-grain diet in the city from the available archaeobotanical evidence.

A straightforward, detailed description of the Roman diet does not exist in Latin literature, and nor should it.[398] As emphasised by Van Limbergen, historical and geographical influences shape local and regional culinary traditions, meaning that 'no such thing as a single classical Roman diet exists.[399] Even if there were such a thing as a universal Roman diet, the biases inherent within elite sources would still throw up the same issues. However, it is nonetheless safe to assume that the basis of the Pompeian diet did not differ greatly from the food items most frequently discussed in the literature. For the average Pompeian, the day likely began with a grain-based meal (e.g. *puls*), perhaps seasoned with salt or covered with *moretum* (a simple herb spread for bread; see Chapter 3) and supplemented with nuts or a small sausage. This was likely replicated for the midday meal. For the evening meal, Gowers categorises the courses of the Roman *cena* as follows:[400] beginning with 'the containers of early life', such as roots, vegetables, eggs, and fish, the first course was followed by 'the *cena* proper', consisting of sacrificial meat (if you could afford it),[401] before 'atoning' in a return to the primitive with fruit and nuts.[402] A final indulgence was the *secundae mensae,* or dessert, likely fruit based. Though we cannot know with certainty what the 'average' meal consisted of, or for whom this was 'average', consistencies across literary accounts of the *cena* point towards this format. When not eating at the *domus* of patrons, the fifty to fifty-five percent of individuals with access to 'consumer goods commonly associated with elite culture' in Pompeii,[403] likely also dined in privacy at home or at the *caupona*.[404] For such people, the three-course meal would likely be redundant for most of the week.

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[397] Study of material undertaken in the Casa di Amarantus. See Rowan 2016, 126. Evidence from Campania points towards a thriving intra- and inter-regional market network which would have increased the volume and variety of goods available to the population of Pompeii; Murphy, Thompson and Fuller 2012; De Ligt 1993; MacMullen 1970; Holleran 2012, 2019; Rowan 2016, 126.
[398] Gowers 2000, 7; Heinrich and Hansen 2019, 107.
[399] Van Limbergen 2018, 1049.
[400] Gowers (2000, 16) records this variation as being between the traditional two courses recorded by Servius, and the seven protested against by Juvenal in his own day.
[401] Animals remains are a common find in Pompeian shrines; see King 2002.
[402] See also Roberts 2019.
[403] Flohr 2016.
[404] Flohr 2016, esp. 80; Wilkins and Hill 2006, 52.

To test the example diet provided by Gowers and Roberts, the temptation would be to start by following the approach adopted by Schiedel, Jongman, and Flohr in investigating whether the people of Pompeii were living at subsistence level. A fully self-sufficient Pompeii would need to be able to source all required grain and alternative sources of essential nutrients from its urban garden sites and hinterland. However, as we know, this was not the case in Pompeii.[405] Instead, the archaeobotanical and paleonutritional evidence indicates that any further analyses now require a produce-specific focus if we are to better understand the *types* of food contributing to the above-subsistence diet of the population, as is the approach of this chapter.

3.5 The methodology

Many of the organic items in the towns and villas surrounding Vesuvius were carbonised during the AD 79 eruption, allowing archaeologists to identify assemblages of food items with a high level of accuracy. Meyer and Jashemski (2002) contributed greatly to the cataloguing of material from Pompeii, Herculaneum, and several rustic villas in the surrounding countryside. These and subsequent studies, most especially those of Ciaraldi (2007), Murphy (2015), and Rowan (2016), have allowed the development of a detailed overview of the foodstuffs being grown, exchanged, and consumed in AD 79, as well as their potential nutritional and monetary contributions to the residents living in Pompeii at the time of the eruption. The dataset used below was sampled in a method also applied by Murphy, who used a 'blanket sampling strategy' to assess deposits found in a wide variety of archaeological contexts. These included roads, gardens, inns, houses, wells, shrines, and manufactories, to name a few.[406] In the following, I take a deductive method and construct hypothetical figures of non-grain assemblages from related information using a combined dataset from Jashemski, Meyer, and Ricciardi (2002), Ciarallo (2007) and Murphy (2015). I then use a similarly deductive method to apply this information to a case study from the city to create an image of the level of output possible from one urban agricultural garden.

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[405] De Simone (2016, 30-2) estimates the territory of Pompeii to be 12,070 hectares. Cicero's assertions at the beginning of this chapter suggest that Campania could achieve this, though this was likely hyperbole to support his oratory aims of turning the *populus* against the land reforms of Rullus which were to reduce state access to Campanian produce.

[406] Murphy 2015, 26-7.

The interpretation of archaeobotanical remains from Campania are, like all areas in archaeology, limited by ambiguous data. A lack of consistency in recording methods over the centuries of excavations at Pompeii have meant that scholars are only able to quantify archaeobotanical material where a measurement of finds is specified and, even then, this is never a full representation of the actual state of things at the time of the eruption. Other limitations include data inconsistencies, of the kind seen in the paleonutritional studies above (for example, vulnerability to excavation and taphonomic biases). Furthermore, a high quantity of organic materials kept in The National Archaeological Museum of Naples do not have accompanying information regarding find locations, and so this data set must be classified as Campanian, rather than Pompeian. However, the data sets from Murphy and Ciarallo are exclusively derived from Pompeii, while the excavation reports and volumes by Jashemski provide clear find locations where possible.

Conditions of preservation are also not consistent across all foodstuffs or find locations.[407] For example, the hard exocarp of a seed is more likely to have been preserved in the conditions of the eruption than the fleshy part of a fruit. Vegetables and herbs are even more difficult to come by due to a lack of seeds and sugar to allow carbonisation and subsequent preservation and identification. It is therefore the case that many of the archaeobotanical records available are contingent upon the outcomes of natural preservation and human conservation, and not necessarily representative of the true quantities of produce available at the time of the eruption. Accurate numbers of remains are not always specified, meaning that conclusions about the abundance of certain goods cannot be made with accuracy. Despite these drawbacks, Campania arguably provides the most extensive catalogue of archaeobotanical material in the Roman world, and a unique opportunity to assess the Roman diet at a very specific point in time.

Figure 7 shows a quantified share of non-grain food types by numbers of items excavated from Pompeii, Herculaneum, and a selection of rural villas in the Campanian

[407] Many organic items in Herculaneum were carbonised by the pyroclastic flows, due to the proximity of the town to the volcano (and therefore the higher heats hitting the town). As the pyroclastic flows had cooled down slightly by the time they arrived in Pompeii, the conditions of preservation tend to differ, with less material carbonised.

countryside to date.[408] Overall, this combined case study shows fruit making up ninety-two percent of the non-grain diet, followed second by pulses, then nuts, vegetables, herbs, and medicinal. I will focus on the share of pulses in the diet first, before fruit, nuts, vegetables, and herbs, and consider why fruit might be so well represented in the Campanian samples. This discussion initially comprises of a catalogue by food category before an analysis of the data in the following section.

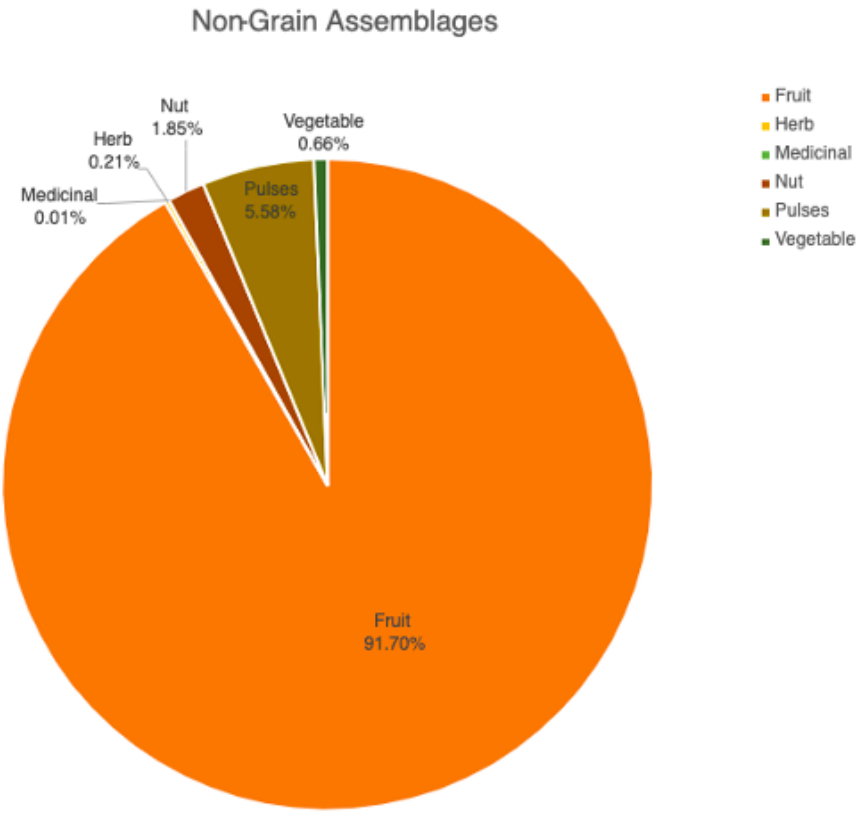


Figure 7: Share of food types from the assemblages catalogued by Jashemski, Meyer, and Ricciardi (2002), Meyer (1980), Ciarallo (2007), Murphy (2015) in Campania, divided into the categories of fruit, vegetables, pulse, nuts, herbs, and medicinal.

[408] This is from the catalogues and samples provided and analysed by Ciarallo (2007), Jashemski, Meyer, and Ricciardi (2002), and Murphy (2015). The analyses of Rowan (2016) in Pompeii and Herculaneum are also considered but do not form part of the data sample for this chapter.

3.5.1 Pulses

Given the staple status of pulses in the Roman diet, as indicated by the isotopic analysis seen above,[409] one might expect the category's share of the non-grain diet to be higher than six percent. However, this might be evidence for the seasonal availability of pulses. Researchers have previously found ethnographic evidence for a higher consumption of pulses in the months following harvest (October onwards), likely due to the progressive reduction in value and price caused by the hardening of outer shells in storage (thus increasing fuel costs for cooking).[410] At the time of the eruption in October in Italy, most pulses would not yet have been harvested, or at least not in a proportion high enough to be reflected in the assemblages. However, details provided by Pliny and other agricultural writers suggest that legumes were placed on a rotational scheme with wheat (*triticum*).[411] The first year would be wheat, followed by pulses (lupines, vetch, or broad beans), then emmer (*far*) in the third. This was an alternative to continuous cropping (*ager restibilis*) or fallowing (which would have limited the crop output for the farmer).[412]

As such, the low representation of pulses in the Campanian assemblage is more likely an outcome of archaeobotanical challenges and taphonomy (preservation in the archaeological record): in the Roman period, pulses were commonly converted into a dry meal or flour by grinding or milling to make dishes such as *lomentum*, making tracing processed pulses in the archaeological record challenging.[413] The least likely reason for low representation is the possibility that this share reflects a lack of demand due to their status as a staple good. Pulses are a cost-effective option for cultivation as they can be grown on land with low fertility and exhibit low associated production costs, thus earning them the reputation of a famine food, or the 'poor man's meat',[414] and as a key component of animal fodder.

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[409] Kaszab-Olschewski 2019, 195; Heinrich and Hansen 2019, 119-20.
[410] Heinrich and Hansen 2019, 120; Akroyd et al. 1982.
[411] Plin. *HN* 18.187, quoting Verg. *G*. 1.71. See White 1970, 284.
[412] White 1970, 282-4.
[413] Alternatively, pulses generally require processing before eating to 'soften and detoxify… [mainly via] soaking or leaching' or dehulling; Heinrich and Hansen 2019, 119. Evidence exists for pulses being sold unprocessed; Bagnall 1993.
[414] Wilkins and Hill 2006; Heinrich and Hansen 2019, 119-21; Donahue 2015, 98-9. Beans were also connected to various physical maladies, including favism and flatulence (see Heinrich and Hansen 2019).

Given their ability to reintroduce nitrogen to the soil, pulses are a good choice for gardeners practising crop rotation, or plant inter-cultivation or polyculture, the latter of which are known to have been practised at Pompeii in several gardens (for example, see case study below).[415] The adaptability of pulses would have allowed Pompeian gardeners to maximise space in gardens located in urban centres.[416] Beans excavated by Jashemski among the vines in the garden of the House of the Ship Europa indicate that the inter-cultivation of pulses and grapes was occurring here.[417] Among the varieties of pulse found in the Campanian archaeobotanical record are chickpea, lentil, broad bean, cowpea, chickling vetch, horsebean, and garden pea. Cooley and Cooley (2004) list examples of *amphorae* in Pompeii labelled with pulse products, including a large *amphora* labelled with 'lentils' in Greek letters at VII.5-6.15, and another containing lupines for fodder and medicine at I.7.7.[418] We also see beans referenced in a shopping list from an atrium wall in a house in Region IX of Pompeii (IX.7.24-5, see Figure 11 below). Pulse flour, or a mix of grain and pulse flour, may have created the 'plain bread' or 'bread for slaves' on the same list;[419] pulse flour, such as *lomentum* (ground beans), was found by Heinrich to increase loaf-volume and baking quality of 'commercial leavened white bread' and so would have presented an opportunity to reduce baking production costs and increase income levels.[420] Pulses would also have been eaten in soups, stews, and as the aforementioned *puls* (with *puls* also mentioned on shopping lists from Pompeii). The macronutrients of the main pulses consumed by the Campanians make them a key source of carbohydrates and protein, with the protein content of some varieties as high as forty-five percent.[421]

3.5.2 Fruit

At ninety-two percent, fruit makes up the greatest share of all non-grain food material found in Campania to date. Within the fruit assemblage, the highly valued status of the fig in

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[415] Heinrich and Hansen 2019, 119. Vines low in nitrogen generally produce less crops with lower vigour. Soil can be 'fixed' with pulses planted in the ground which reintroduce nitrogen to acidic soil, as at Pompeii (due to the volcanic matter in the earth). Manure can also increase the acidity of soil.
[416] 'Pulses, unlike cereals, are not solely dependent on the amount of available bioactive nitrogen in the soil' and can be grown in fallows and pastures; Heinrich and Hansen 2018, 120; Vignola et al. 2021, 11.
[417] Venner 2015; Jashemski 1974.
[418] Cooley and Cooley 2004.
[419] Donahue (2015, 98-99) discusses the ranking of pulses by status.
[420] See Rizzello et al. 2014 and Heinrich and Hansen 2019.
[421] Heinrich and Hansen 2019, 121-22.

Roman society is reflected, making up seventy-eight percent of all fruit. Dried figs keep for several years if stored correctly and were recognised by the Romans as being more flavoursome and of a higher sugar content (and thus beneficial for bulking up the diet) than fresh figs.[422] Given that more dried figs can be counted per *libra*, the nutritional content of figs is increased upon drying. Approximately seven fresh figs make up one *libra*, while around forty-four make up the same weight when dried (see Table 1).[423] The energy provided by both fresh and dry figs was high either way. As such figs, like pulses, were useful in times of famine and acted as a key source of nutrition for the poor and slaves who, by occupational hazard, generally required a high calorie intake.

The possibility for long-term storage may have contributed to their high representation in the archaeological remains in Campania. Strabo importantly notes the fertility of the fig tree and subsequent importance as a key source of nutrition in antiquity,[424] though the 'small' fig tree in his tale of the competing prophets was unlikely ever to have held 9,999 figs, more like 625 figs for a mature tree per year,[425] this is still not an insignificant yield; assuming that one pound of figs was priced at one *as*, one mature fig tree would have made a gardener around 31 *sestertii* per year.[426]

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[422] Donahue 2015, 96. Cato (*Agr*. 1.99) recommends coating dried figs in boiled amurca (a by-product of unfiltered olive oil) and storing them in an earthenware jar.
[423] All figures are taken from Nutrionix (2021).
[424] Verg. *G.* 14.1.27. Strabo (*Geog*. 14.27) recalls a story told by Hesiod in which the prophet Calchas meets an oracle, named Mopsus, more skilled than himself near Clarus. Turning to Mopsus, Calchas says: 'I am amazed in my heart at all these figs on this wild fig tree, even though the tree is small: can you tell me the number?' To this, Mopsus replied: 'There are 10,000 figs, and their measure is a *medimnus* [approximately a bushel and a half], but over there is one fig over this number which you cannot put in the measure.' Having himself estimated the number of figs incorrectly, Calchas accepted defeat, closed his eyes, and died.
[425] Based on findings by Abo-El-Ez et al. (2013), a 7-year-old fig tree will produce around 25 kilograms of figs, though this will increase with maturity. This includes the boni-crop (first of two) and the main crop, the latter of which is significantly larger and more edible. Suetonius talks of Augustus eating the boni-crop, the first of two per year (around spring), likely in allusion to its humble (and presumably cheaper) status: 'He particularly liked coarse bread, small fishes, handmade moist cheese, and twice-bearing green figs.'
[426] Pliny (*HN* 18.17) states that in Rome in 150 BC, 30 pounds of figs cost 1 *as*, though this is clearly an exaggeration, even when accounting for inflation. To put this into context, in reference to his present day (writing between 50 and 70 AD), Pliny quotes one *sestertius* per pound of turnips, or two *sestertii* during times of scarcity (see Scheidel 1996, 5).

One Roman *libra* (329g)	**Calories**	**Fibre (g)**	**Fat (g)**	**Sugar (g)**	**Protein (g)**
Dried (approx. 44 figs)	917	36.5	3.5	176	11.9
Fresh (approx. 7 figs)	259	10.5	1.1	56.7	2.7

Table 1: Nutritional information for figs (dried and fresh).

There are numerous pieces of evidence to suggest that figs were grown in Pompeii. Several remains of fig trees have been uncovered in gardens, including root cavities (for example, see I.xii.8). An especially vivid and accurate portrayal of a fig tree was immortalised on one of the painted walls in the House of the Fruit Orchard, alongside other trees known to have been grown in the area. The Large Orchard (I.22) (the garden area measuring around 1,800 square feet) contained 300 trees; three of the oldest trees shading the *triclinium* in the orchard may have been figs.[427] As Jashemski emphasises, fruit and nuts often grew alongside one another in orchards.[428] Columella recommends planting the fig, apple, and pear tree at the end of vine rows in a vineyard so as not to shade the grapes; in the Large Vineyard excavated by Jashemski (1970) in Pompeii, tree roots are in most cases located at the end of rows or around the edges of the garden against the outer walls. Table 2 lists the fifteen other fruits found in the Campanian assemblages.

Fruit	**Latin name**	**Nutrition by Roman libra**
Apple	*Malus sp.*	171 calories; 0.6g fat; 45g carbohydrates; 7.9g fibre; 34.2g sugars; 0.8g protein
Bilberry	*Vaccinium myrtillus*	Nutrition not available
Bird cherry	*Prunus padus*	208 calories; 0.8g fat; 52g carbohydrates; 6.8g fibre; 44g sugars; 3.6g protein

[427] Jashemski 2018.
[428] Jashemski 2018, 141.

Citrus	*Callitris quadrivalvis*	96 calories; 1g fat; 31.2g carbohydrates; 8.4g sugars; 3.7g protein
Date	*Phoenix dactylifera*	920 calories; 1.4g fat; 243.8g carbohydrates; 26.2g fibre 207g sugars; 7.8g protein
Grape	*Vitis vinifera*	228 calories; 0.5g fat; 59.6g carbohydrates; 2.9g fibre; 50.9g sugars; 2.3g protein. (For wine, see below).
Hackberry	*Celtis occidentalis*	Nutrition not available
Melon	*Cucumis melo*	111 calories; 0.6g fat; 25.9g carbohydrates; 3g fibre; 25.9g sugars; 2.8g protein
Mulberry	*Morus alba*	140 calories; 1.3g fat; 32.3g carbohydrates; 5.5g fibre; 25.3g sugars; 4.6g protein
Olive	*Olea europaea*	Fruit: 472 calories; 49.6g fat; 12g carbohydrates; 10.9g fibre; 1.2g sugars; 3.6g protein. Oil (one *sextarius*): 4641 calories; 546g fat; 0g carbohydrates; 0g fibre; 0g sugars; 0g protein
Peach	*Prunus persica*	136 calories; 0.9g fat; 34g carbohydrates; 5.2g fibre; 30g sugars; 3.2g protein
Pear	*Pyrus communis*	180 calories; 0.5g fat; 48.6g carbohydrates; 9.9g fibre; 30.6g sugars; 1.2g protein
Pomegranate	*Punica granatum*	280 calories; 4g fat; 63.6g carbohydrates; 13.2g fibre; 46.8g sugars; 5.6g protein
Rowan	*Sorbus domestica*	Nutrition not available
Sour cherry	*Prunus cerasus*	(see cherry above)
Strawberry tree	*Arbutus unedo*	Nutrition not available
Sweet cherry	*Prinus avium*	(see cherry above)

Table 2: List of fruits known to have been grown in Campania in the first century AD, according to the archaeobotanical and literary record.

There is evidence that fourteen of the fifteen taxa were cultivated in the urban gardens of Pompeii. The only exception is pomegranate: no remains of this tree have been discovered in Campania, though a one-ton pile of carbonised pomegranates was excavated at Villa B, a warehouse complex in nearby Oplontis (close to the Villa of Poppaea).[429] It is likely that such a large quantity of fruit was ready for distribution to the surrounding areas or further afield by sea transport. Alternatively, this stock may have been destined for use in the tanning of leather.[430]

Other fruits in the list are more common in the area by the mid-first century AD. The excavation of peach remains in Campania (for example, in the Pompeian property at II.2) may suggest local growth, due to their short shelf life, or else importation, made possible through preservation.[431] Apicius suggests a method for preserving peaches in a mixture of salt, brine, and vinegar.[432] Preservation in this manner would have allowed transportation of the peach further than its shelf-life span of around five days. A *dolium* in a farmhouse at Scafati (in the hinterland of Pompeii) contained peach endocarps and stalks, together with walnuts.[433] This may have been a medicinal concoction; Pliny examines the medicinal uses of peaches, as well as peach juice, peach leaves, and peach pits,[434] and he notes the walnut for its curative properties.[435] We know that peaches were likely being imported or exported from Campania as many remains have been found in the palaeo-seafloors in Naples harbour, either from loading and unloading, or from refuse.[436] De Caro (2001) states that Pompeian farmers grafted a new species of *Prunus persica* onto apricot and plum trees.[437] Of the peach, Pliny says:[438]

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[429] Jashemski 2002, 152.
[430] Roberts 2019, 68-9. If destined for consumption, these pomegranates would have provided a high number of calories and essential vitamins (namely vitamin C) per unit.
[431] For peach macro remains, see Jashemski 1979; Meyer 1988; Ciaraldi 2000, 2008; Robinson 2002; Ciarallo 2004; Borgongino 2006.
[432] Api. *Coq*. 1.28.
[433] Sadori et al. 2009, 51.
[434] Plin. *HN* 23.132.
[435] Plin. *HN* 23.147-9.
[436] From the first to fifth centuries AD; see Sadori et al. 2009, 51.
[437] See also Sadori et al. 2009, 46.
[438] Plin. *HN* 15.11: *...pretiumque iam singulis triceni mummi fuere, nullius maiore, quod miremur, quia non aliud fugacius: longissimi namque decerpto bidui mora est cogitque se venumdari.*

> …peaches before now have fetched 30 *sestertii* each, a price exceeded by no other fruit – which may surprise us, because there is none which keeps worse: the longest time that it will last after being plucked is two days, and it compels you to put it on the market.

The high value of peaches is perhaps reflected in their scant representation in the first century AD archaeological record; the largest quantities of peach remains are found in deposits from the second century AD onwards.[439] Martial lists *Persica praecocia* ('early peaches') as a gift option for guests (*xenia*; see Chapter 5), describing them as a new and improved species imported from more favourable crops abroad. This may well be what the *xenia* showing green peaches on a branch in the House of the Stags in Herculaneum was intending to depict (Figure 26 inset).[440] Robinson has noted an absence in peach in pre-Roman strata from Pompeii, suggesting that Martial's date for acclimatisation in Italy in the first century AD is accurate. Depictions of the peach tree have also been found in *domus* wall paintings in Campania.[441]

Pears (*Pyrus communis*) were considered far more commonplace than peaches. This variety is referenced in a list of 'humble' items of food by Martial (*Ep*. 5.78) and can be seen in multiple wall paintings from Pompeii and Oplontis (for example, the west atrium wall in the House of Menander in Pompeii). Most significant is the discovery of a carbonised tree trunk of a pear tree in the garden in the House of the Hotel (III.19-18/1-2), Herculaneum. Dates, while only evident in one archaeobotanical record (a pit remain in the House of the Ship Europa) and not acclimatised in Italy at this time, are among the most prolific in wall paintings from Campania.[442] Plums are also commonly found in the wall paintings of wealthy properties, such as a painted glass bowl of quinces and blue and purple plums in the Villa di Poppaea at Oplontis and a similar one in the villa at Boscoreale.[443] The depiction of many

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[439] Sadori et al. 2009, 52.
[440] It may be significant that most depictions of peaches in art are from Herculaneum (see Jashemski 2002, 151-2 for a list), traditionally associated with a wealthier clientele.
[441] Ciaraldi 2000; Robinson 2002; Ciarallo 2004; Sadori et al. 2009.
[442] Jashemski 2002, 140-1.
[443] Now kept in the Metropolitan Museum in New York. As expected, given the increasing popularity of peach and established popularity of pear in the region of Campania, both are well represented in art remains from Campania. Two striking examples can be found in the House of the Fruit Orchard (I.9.5) where various other varieties of fruit can also be witnessed. In the first room (off the atrium), viewers are treated to a view of a lemon tree 'loaded with yellow fruit', a cherry tree covered in red fruit, and strawberry trees. On the walls of the second room (to the east of the peristyle) are depicted a highly-detailed fig tree laden with ripened figs, its tree encircled by a snake, another strawberry tree, a pear tree, a lemon tree, a pomegranate tree, a cherry tree, a plum tree with

different fruits from the Campanian assemblage in the *viridiaria* paintings in the *trompe l'oeil* style in the House of the Fruit Orchard (I.9.5) in Pompeii (Figure 8), for example, demonstrates broad familiarity with the varieties, even if they were only recent introductions to the region or country (such as peach and lemon). Demonstrating the importance of horticultural knowledge not only to the cultivators of gardens, but also to the owners of them, Gleason demonstrates the care taken by painters to accurately portray the plants and fruits, as well as distinct markings which reveal the techniques used to cultivate them both as decorative and useful objects.[444]



Figure 8: Frescoes from the House of the Fruit Orchard, showing a fig tree with a snake on the trunk (left, in the room off the peristyle) and a cherry tree and a perching bird (right, in the

yellow fruits, and a plum tree with blue fruits. Jashemski believes that the ceiling was painted to depict a grape arbour with ripe fruit, as one might find in a Pompeian garden around a triclinium. Other varieties depicted include ferns, oleander, and laurel, in addition to an abundance of birds of all kinds. Though the trees on display are clearly a work of fiction, given that many of these varieties would not bloom alongside one another, the frescoes in this house add to literary and archaeobotanical evidence in providing an important source of information about the fruit trees familiar to the Pompeians in the first century AD.

[444] Gleason 2019. This display, as in the Villa of Livia frescoes at Prima Porta, is an excellent example of pruning and *nemora tonsilia*; see note 180.

room off the atrium). Image: © *Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei*/OpenEdition Books.

Though an important source of fibre, sugar, and vitamins, the fruits listed above would have mainly acted as a dietary relief outside of the staples available to all. Few, apart from the olive, provide any significant amount of fat, though the regular consumption of a variety of the fruits available locally would have provided a good level of fibre (in addition to that already being provided by cereals and pulses). Dates stand out as exceptional sources of nutrition, particularly in terms of carbohydrates, though they were imported. As mentioned, the discovery of a price list in a *caupona* in Pompeii indicates that, by the mid-first century AD, a high enough quantity dates were being imported to the town to make them a widely accessible among the general population. Standing out among the fruit list, however, are the two non-grain Mediterranean staples: olive and grape.

3.5.3 Fruit in the 'Mediterranean Triad': Olives and grapes

Olives (*Olea europaea*) are one component of the Mediterranean triad and are well represented in the Campanian assemblages. Olives were cultivated in Campania from the Hellenistic age onwards and increased in volume in the Roman period. As we saw above, olives were also grown *en masse* on farm estates in the hinterland of Pompeii (Sarno River Plain), though several urban agricultural gardens in Pompeii exhibit evidence for the low-level cultivation of olive trees. Olives were enjoyed as table fruit, or pressed to make oil for cooking, perfume, lighting, medicine, athletics, and bathing,[445] and were an important source of fat for the Romans, with the tree hailed as 'first of all trees' (*prima omnium arborum est*) by Columella.[446] Olives are high in fat; there is around fifty grams of fat per Roman pound, or each olive is around twenty percent fat. Pressing olives into oil makes the fat content higher, thus acting as an excellent source of energy; olive oil is virtually one hundred percent fat. Around eighty to eighty-five percent of the calories in olives comes from the fat content.[447]

[445] Olives were commonly processed where they were cultivated, outside of the urban centre. See Donahue 2016, 85. For the process, see Stefani 2016, 51.
[446] Col. *Agr*. 5.8.
[447] Berardi and Heroux 2021.

The olive tree also held important mythical and cultural meaning, originating with Athena on the acropolis in Athens.[448] The garden at I.21.3 was suspected by Jashemski to have been an olive nursery due to the planting pattern and size of the cavities (congruent with young plants), the remains of carbonised olive stones, and the high count of olive pollen excavated in this garden.[449] Large quantities of olive pollen were discovered in the soil in the Large Orchard (I.22), alongside *Juglans regia* (walnut).[450]

Reasons for the low representation of olives in the archaeobotanical record in Campania, despite their universal importance in the Roman diet, must be considered. Olive pomace is the solid remains left after the pressing of olives for oil. Composed of olive flesh, skin, stones (endocarp), and seeds, the process of making pomace might explain its underrepresentation in the organic assemblages in Campania. Pomace was an important and sustainable source of fuel which, from the first century AD onwards, was sold on the market in the Mediterranean as an alternative fuel, playing an increasingly important role in manufacturing and production.[451] This was because 'Olive pomace burns at a high and constant temperature, making it an ideal fuel for heating and cooking as well as firing pottery and lime kilns.'[452] Olives presses (*trapeta*) have been discovered in villas in the hinterland of Pompeii (for example, Boscoreale), as well as in Pompeii. Several charred assemblages of olives may suggest that endocarps were burnt for fuel following their consumption, or else their dedication in home and road shrines, as for example in the House of the Vestals (VI.1.7). The processing of grapes to make wine may provide a similar reason as to why grapes are similarly underrepresented in the archaeobotanical record, despite their equal importance in the Roman diet.

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[448] Rosenzweig 2004, 48-9; Donahue 2016, 86.
[449] Pollen is a contentious source of information relating to the types of plants grown in ancient sites, as many types of pollen are wind-borne. As such, pollen is not always able to indicate which plants grew on site. Nonetheless, it is regularly used as a source of information in Campanian excavations, most recently being employed in assessments of the nasal cavities of eruption victims in support an October eruption date (Weber et al. 2020). See also Dimbleby and Grüger (2002) and Grüger (2002). Pollen analyses of the soil in the excavations of the Casa della Regina Carolina are also being taken to provide a more accurate image of the plants growing there at the time of the eruption (personal correspondence with Gleason 2021).
[450] This combination is also found in soil samples from the Terme del Sarno; Jashemski 1979, 257; Vignola et al. 2021.
[451] Olive pomace was not the only fuel alternative; dung, cereal chaff, coal, and animal fats were also used.
[452] Rowan 2015, 465-6.

Wine provided crucial calories to individuals throughout the Greco-Roman period. The migration of Greek colonists to Italy in the eighth century BC introduced new varieties and techniques in viticulture to Sicily and southern Italy. According to Pliny the Elder (*HN* 14.45-6), by 154 BC viticulture was widely present throughout the Mediterranean and Italy had become unsurpassed in terms of its volume and variety of vintages. Campania was especially praised for the quality and output of its wine, with certain vintages such as Falernian being celebrated.[453] Roman wine was most commonly red and could be 'softened' with lead, sweetened with honey, or diluted with water. One *sextarius* (546 millilitres) of wine would provide around 600 calories. Grapes were also consumed at the table and dried for storage. Dried grapes kept in a *dolium* and fermented with grape juice for six days made the popular wine known as '*passum'*. Polybius refers to *passum* as a wine for women, perhaps due to its sweet taste.[454] It was not, however, of a lower alcoholic content, with an above-average ABV to a typical red wine (around fifteen percent).[455] The comparatively low presence of two important fruits, grape and olive, in the urban archaeobotanical records may be due to the intensive cultivation and processing of each in the hinterland into oil and wine, before their transportation into the town in wine skins (Figure 9) and *amphorae*.

[453] Plin. *HN* 19.8.62.
[454] Polyb. *Hist. Frag.* 4.6.2.
[455] Nenova n.d., https://www.wondersofsicily.com/sicily-food-passito.htm

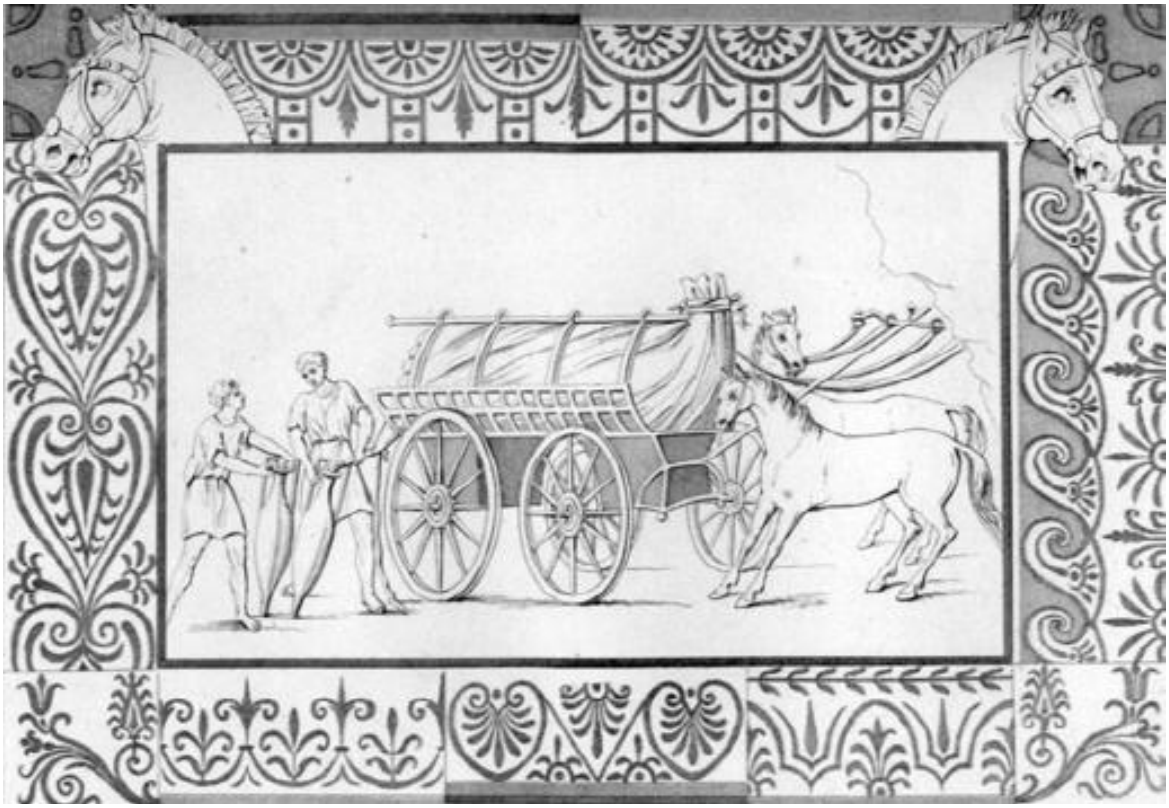


Figure 9: Fresco from Pompeii showing a large wineskin in a cart. Image: Erenow/*Soprintendenza Archeologica di Pompei*.

3.5.4 Vegetables and herbs

Vegetables, lacking in endocarps and exocarps, were more prone to destruction in the eruption. It is therefore unsurprising that no full carbonised remains of vegetables have yet been found in Campania, only seeds and partial remains (often charred prior to the eruption). However, despite the low number of finds, varieties of vegetable assemblages reflect those discussed in the literature (see Table 3). Various varieties known to have been eaten by the Romans, but as yet unrecovered in the above Campanian assemblages, are shaded in yellow (see Appendix A for supporting evidence). The most common find in this group was garlic; full cloves were discovered in various locations in Herculaneum, including the Casa del Alcova (IV.3-4). Onion was similarly well represented; at least forty-five carbonised bulbs

have been discovered in Herculaneum. In a *cubiculum* in the Villa dei Misteri, an imprint of a thick layer of onions was also discovered.[456]

Despite the similar vulnerability of herbs to destruction in the eruption, we find various taxa from this category represented in the archaeobotanical record. Spices such as peppercorn (*Piper nigrum*), imported from India, have also been found in mineralised form in the House of Hercules' Wedding (VII.9.47) and the House of the Vestals (VI.1.7), two wealthy properties in Pompeii.[457] Herbs were used for flavouring dishes and medicinal purposes and are easy to grow in most settings as they require little water and a minimal level of sunlight per day. In Campania, herbs were likely to have grown in window boxes, pots, lightwells, gardens, indoor and outdoor flowerbeds (for example, in the walls surrounding *impluvia*), and raised beds. However, most of the remains from Pompeii and Herculaneum (the majority again either from the House of Hercules' Wedding or the House of the Vestals) were in refuse deposits or cesspits, either as mineralised seeds or leaves. Jashemski suggested that eight herb plants were being grown along the east wall in the garden of I.12.8, known as the 'Garum Shop' in Pompeii.[458] Black nightshade, used as a poison in the Roman period, was also found carbonised in the House of the Surgeon (VI.1.10).[459]

Vegetable	**Latin name**	**Key nutritional information**
Asparagus	*Asparagus officinalis*	High in fibre and vitamins
Beetroot	*Beta vulgaris subsp. vulgaris Conditiva Group*	High in fibre, potassium, and vitamins
Broccoli	*Brassica oleracea var. italica*	High in fibre, protein, potassium, and vitamins
Cabbage	*Brassica oleracea*	High in fibre, antioxidants, and vitamins
Carob	*Ceratonia siliqua*	High in calcium, vitamin, and minerals
Carrot	*Daucus carota*	High in fibre, calcium, and vitamins
Cucumber	*Cucumis sativus*	High in protobiotic bacteria, vitamins, and antioxidants

[456] This is a good argument for rooms in the domus not being labelled in straightforward ways, for onions were unlikely to have been stored in a bedroom. For a discussion of the dangers of room labelling, see Allison 2008.
[457] Ciaraldi 2007.
[458] See Curtis 1979; Jashemski et al. 2002.
[459] Murphy 2015.

Fennel	*Foeniculum vulgare*	High in potassium, calcium, and essential fatty acids
Garlic	*Allium sativum*	Antibacterial and medicinal properties
Leek	*Allium ampeloprasum*	High in fibre, calcium, and vitamins
Lettuce	*Lactuca sativa*	High in vitamins and antioxidants
Onion	*Allium cepa*	High in potassium and vitamins
Parsnip	*Pastinaca sativa*	High in fibre, potassium, and vitamins
Radish	*Raphanus sativus*	High in calcium, potassium, and antioxidants
Turnip	*Brassica rapa*	High in fibre, antioxidants, and vitamins
Herb	**Latin name**	
Caper	*Capparis spinosa*	
Coriander	*Coriandrum sativum*	
Marjoram	*Origanum majorana*	
Mint family	*Mentha*	
Oregano	*Origanum vulgare*	
Parsley	*Pertoselinum crispum*	
Rosemary	*Salvia rosmarinus*	
Sesame	*Sesamum indicum*	
Thyme	*Thymus vulgaris*	

Table 3: List of vegetables known to have been grown in Campania in the first century AD, according to the archaeobotanical record. The yellow signifies the varieties known to have been grown in the area (based on literary and pictorial remains) but are not represented in the archaeobotanical remains.

3.5.5 Nuts

Nuts make up just under two percent of the non-grain assemblage in Campania, the varieties of which are listed in Table 4. Nuts are an excellent source of fat, protein, and carbohydrates, and their trees were widely used in architecture, for stakes in the garden, and as a fuel. In the Roman period, nuts were eaten raw, or used in sweet and savoury recipes. In some cases, nuts were also pulverised to thicken wine, or to make oil (for example, walnut

oil).[460] The almond (*Prunus dulcis*) is the most common nut found in this category, a frequency which is also reflected in wall art across Campania.[461] Chestnut (*Castanea sativa*) is a forest tree, used for both its edible nuts and valuable timber. Due to its size, it is very unlikely that it grew within the walls of Pompeii, and more likely grew on the Sarno River Plain for cultivation at scale.[462] While this nut did not provide a lot of calories per ounce, it provided the highest carbohydrates of all nuts grown in Campania. The stone pine (*Pinus pinea*), highest in calories of all the nuts growing in Campania, is an evergreen tree, the likeness of which was used by Pliny the Younger to describe the umbrella effect of the eruption of Vesuvius. The seeds from this tree were favoured for 'various sauces, fish, and meat fishes', as well as for eating.[463] A large quantity of pine pollen was discovered in the soil of the south-eastern peristyle garden in the Villa di Poppaea at Oplontis, as well as in the suburbs of Pompeii.[464] There is no archaeological evidence to suggest that walnut (*Juglans regia*) was being grown in the gardens of Pompeii, though there are small remains of pollen in several soil samples taken by Dimbleby.[465] Walnut, however likely grew in the suburbs of the town from the start of the Roman period, as suggested by consistent presence of walnut pollen; this is likely due to the space required for this tree to spread (their canopies reaching up to eighteen metres in width and thirty metres in height).[466] Despite also being wind-pollinated and a heavy pollen producer, no pollen remains for hazelnut (*Corylus avellana*) have been found in the urban centre of Pompeii. However, various instances of carbonised remains and root cavities have been found, as in examples from the House of the Ship Europa (I.15.1-3), the Large Orchard (I.22), and the *villa rustica* of L. Crassus Tertius at Oplontis.[467] Jashemski notes small fragments being discovered in fertiliser from various unspecified gardens in Pompeii, likely transported from the countryside.

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[460] Nuts were also sometimes used in games; see Lanciani 1892.
[461] Jashemski (2002, 149-50) lists at least eight examples from Pompeii and Herculaneum, though this is not exhaustive.
[462] Allevato et al. (2010) believe that chestnut woods were cultivated 'in a refugium area on Vesuvius' foothills', for the provision of wood for architecture and fuel.
[463] Lodwick 2015, 5.
[464] Dimbleby and Grüger 2002, 188; Vignola et al. 2021, 8-10.
[465] Dimbleby 2002, 188.
[466] Vignola et al. 2021, 8-10.
[467] For the House of the Ship Europa finds, see Jashemski 1979. This demonstrates the problematic reliance on pollen samples for determining which plants were grown where. Rowan (2016) relies on this heavily in her assessment of the Campanian diet. See above on pollen.

Nut	**Latin name**	**Nutrition by Roman *uncia* (ounce/27.4g)**
Almond	*Prunus dulcis*	162 calories; 14.3g fat; 5.7g carbohydrates; 2.9g fibre; 1.3g sugars
Chestnut	*Castanea sativa* Miller	62 calories; 0.5g fat; 13.2g carbohydrates; 1.3g fibre; 2.7g sugars; 0.8g protein
Hazelnut	*Corylus avellana*	183 calories; 18g fat; 5g carbohydrates; 2.7g fibre; 1.4g sugars; 4.3g protein
Stone pine	*Pinus pinea*	191 calories; 19g fat; 3.7g carbohydrates; 1g fibre; 1g sugars; 3.9g protein
Walnut	*Juglans regia*	182 calories; 18.2g fat; 3.9g carbohydrates; 2g fibre; 0.7g sugars; 4.3g protein

Table 4: List of nuts (left) and herbs (right) known to have been grown in Campania in the first century AD, according to the archaeobotanical and literary record.

3.5.6 Summary of the Campanian assemblages

From the archaeobotanical assemblages alone we gain an impression of a highly varied diet consisting primarily of grain, pulses, and fruit, the latter of both native and acclimatised varieties. We have also gained a better impression of the tree-heavy landscape used for grazing livestock (likely on a temporary basis) and vegetable gardens immediately outside of the city. Many of the varieties observed in the Campanian assemblages were known to have been grown in the urban gardens of Pompeii. However, as Heinrich emphasises, the high consumption levels of staple foods high in calories (grain, oil, and wine) makes the energy contribution of rustic produce (comparatively low in calories) moot. Instead, the high variety of vitamin- and nutrient-rich non-grain foods being consumed in Campania support the paleonutritional evidence for disease and physical trauma recovery, as well as long life spans. A closer look at the recovery locations of rustic garden produce in the city may tell us more about who may have been eating them and, by implication, the availability of different varieties. Following this, I undertake an overview of epigraphic records related to rustic garden produce to learn more about consumption habits, and its nutritional role, in Pompeii.

3.5 Archaeological contexts of hortus *produce in Pompeii*

The House of the Vestals (VI.1.7) in Pompeii is noteworthy for the high variety of food remains found in drains and cesspits (mineralised remains), and ritual and cooking deposits (charred remains) in the property, though it is important to remember that these deposits would have been formed by family members and slaves alike. This extensive house, expanded during the mid-first century BC, occupies a place in the top twenty largest properties excavated in Pompeii. The high quality fourth style decoration adorning the walls, a private connection to the local supply of water, and the creation of two peristyle gardens and outdoor areas in the space of other properties, indicate that this *domus* was occupied by a very wealthy household. The organic assemblages from this property thus primarily represent items available to upper-class individuals, as well as those of a lower status (slaves in the household). Among the fruit discovered here were apple, watermelon, fig, cherry, grape, citrus, strawberry, mulberry, peach, pear, bilberry, pomegranate, and rowan (Figure 10).[468] In terms of vegetables, cucumber (or melon), carrot, radish, and turnip (or rape), were discovered. Herbs were also well-represented, including oregano, coriander, fennel, mint, and what may have been thyme. Peppercorn was also present, an expensive product which could only be purchased at market following its importation from India.[469] Hazelnut, walnut, stone pine, and almond made up the nuts, while the pulses consisted of horse bean, lentil, and pea. Finally, olives were also present in abundance, though in almost all cases charred stones (the exception being one mineralised stone), meaning that they were likely used as a fuel source following consumption of the flesh.[470] Within this property, no evidence of home cultivation has been found, meaning that all the above foodstuffs were available locally on the market, and thus also to the general population of Pompeii.

[468] Murphy 2015.
[469] Murphy 2015.
[470] Olive pits are a highly efficient combustion fuel source producing, according to Sniderman (2011), more energy pound-for-pound that hardwood combustion.

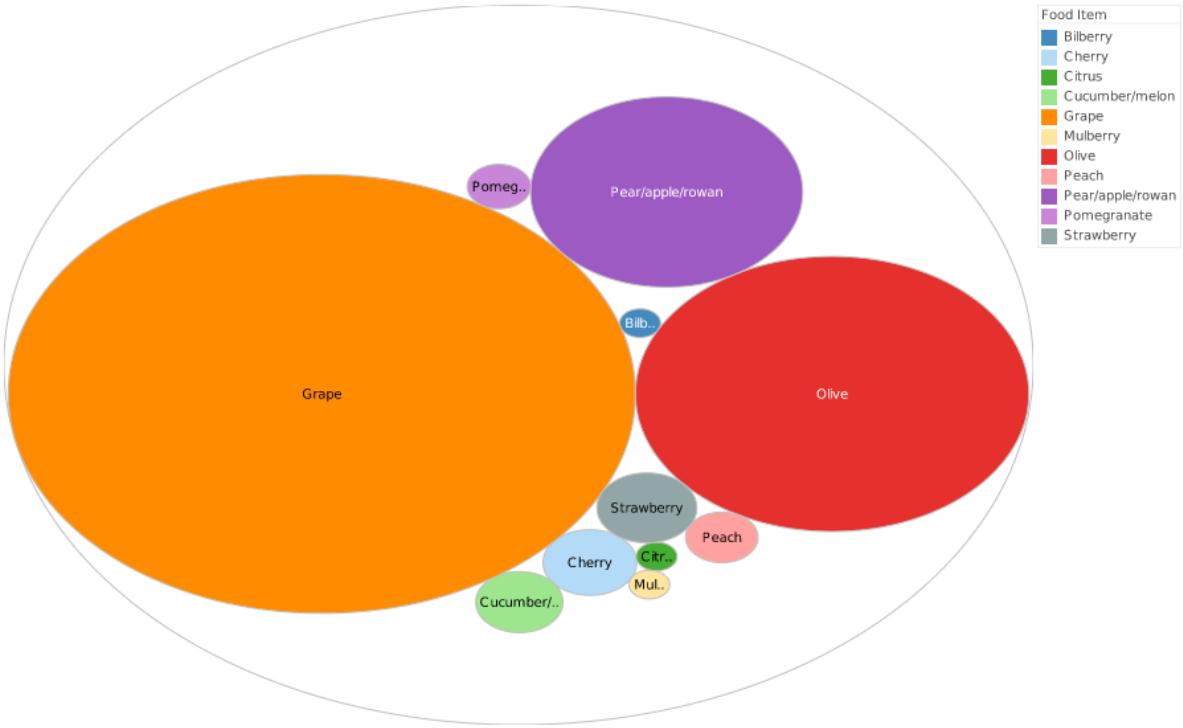


Figure 10: Share of food items from the House of the Vestals (VI.1.7) in Pompeii. Adapted from data obtained by Ciaraldi 2007.

The garden of a second large property, the House of Julius Polybius (IX.13.1-3), exhibited finds of fig, stone pine (including pollen), and almond, which unlike the House of the Vestals were all growing in the peristyle garden.[471] Citrus may also have been growing here in embedded pots along the rear wall (see *viridiarium* discussion in Chapter Two).[472] The imprint of a long fruit ladder, of the kind used in the area today, was discovered by excavators in the peristyle of this *domus.* This type of ladder was used to reach the fruit and nuts growing in the peristyle trees. As we saw above in Chapter Two, this garden can be described as a *viridiarium*, for it was an enclosed/bordered area which contained verdant plantings,

[471] Jashemski 1979, 1993.
[472] Jashemski (2002) provides a convincing case for the root cavities found in an *ollae perforatae* in one corner of the peristyle garden to be citrus though Mark Robinson, in a talk at the Ashmolean in December of 2018, strongly disputed the possibility of this. However, Lippi and Bellini (2006), Celant and Fiorentino (2017), Pagnoux et al. (2013), and Grasso et al. (2017) all provide compelling evidence for the cultivation of citrus in Campania. The most convincing of these is the discovery of citrus wood remains in the garden of the Villa di Poppaea in Oplontis, and the citrus pollen discovered at Cumae (Bui Thi Mai 2014, 174; Coubray et al. 2010; Pagnoux et al. 2013). For more on *ollae perforatae* and imported *exotica*, see Macaulay 2006; Macaulay-Lewis 2010.

including exotic varieties. Importantly, it is one example of a *viridiarium* which contained utilitarian plants; as established above, by the second to third centuries AD the *viridiarium* was associated purely with recreation and pleasure. In a bakery-cum-residential property the House of the Chaste Lovers (III. 4.2-3), where the skeletons of five working mules were discovered in a stable area, Ciaraldi identified various grasses, field weeds, and pulses, the last including broad beans, lentils, and pea. This supports the literary view that pulses were inferior goods, given their status as both a staple and a key ingredient for animal fodder.[473] This fodder was likely brought in from the fields surrounding Pompeii. It is interesting that the food materials found in residential properties were consistent with one another, despite the great variance in wealth between properties. This broad availability of different *hortus* produce regardless of income supports the conclusions deriving from Rowan's discoveries in the Cardo V sewer at Herculaneum.

One purely commercial property, the House of the Ship Europa (I.15.1-3), has been especially significant in advancing our understanding of the types of foods cultivated in the town. The large garden set at the back of a working property (once a residential home), was constructed over two man-made terraces and boasted sufficient irrigation for the extensive planting which occurred there. On the north wall of the peristyle, a rough graffito of a large trading ship, named EVROPA (giving the property its name) was found, raising the possibility of a link between this house and overseas trade. During excavations, Jashemski and her team uncovered the carbonised remains of hazelnut, fig, date palm, almond, broad bean, and grape, and once again identified one root cavity as that of citrus.[474] As the Romans were not able to acclimatise the date palm, despite various attempts, the carbonised date found here was likely the remains of a lunch. Despite their importation (and therefore their implied 'luxury' status), a graffito list on the north wall of an inn (IX.7.24-5) suggests that dates were widely available to the population of Pompeii.

The root cavities in this commercial garden reveal a regular planting of vines (older on the top terrace, and less than two years old on the lower terrace), in addition to a halo of trees of varying maturity on the outer edges.[475] Two plots on the bottom terrace were set aside for

[473] See Flint-Hamilton 1999; Wilkins and Hill 2006; Ciaraldi and Richardson 2000; Ciaraldi 2008.
[474] Jashemski 1974.
[475] The placement of the trees may have been an attempt at added security; see Chapter Five.

vegetables. The excavation of beans suggested to Jashemski the inter-cultivation of bean plants among the vines, a technique which would have introduced nitrate into the soil and improved vine growth (one of the reasons that pulses are so adaptable; see 'Pulses' above).[476] The lime found in a pit here may have also been used for a similar purpose. The extent of the finds found make this garden an excellent case study for producing yield estimations, which form the final portion of this chapter (3.7).

Thermopolia, or fast-food restaurants, were the main source of nutrition for the poorer members of society who may not have the facilities, space, or resources to cook at home on a regular basis.[477] Wealthier Romans preferred to eat in the comfort of their own home, with their own slaves preparing the food.[478] However, given the demands of an elite day, which required men to spend much of their day outside of the home, there is still the possibility of elite men eating 'fast food' (perhaps at *cauponae* or *thermopolia*) as a convenience model.[479] Whatever the scenario, hospitality venues provide valuable insight into the foods typically eaten by, and familiar to through *habitus* for, the general population.

Interestingly, we do not see a great variance in diet from the domestic properties in the inns and bars of Pompeii. For example, in the five hospitality properties studied by Murphy, fig and olive were the most prevalent. A total of 1,578 mineralised fig achenes were excavated from the first century BC level in just one of the Pompeian inns assessed in the study, along with 119 carbonised olive endocarps.[480] Elsewhere, in a 'Soap Factory' in Region VI (VI.1.14), 788 mineralised fig achenes were recovered from the first century BC sample.[481] The abundance of figs in the hospitality assemblages is unsurprising given the similarly high quantity of figs discovered in domestic properties. Stone pine was also present in each bar or inn studied by Murphy's team, commonly found in *lararia* as offerings. Bird

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[476] Venner 2015.
[477] Beard 2008; Wilkins and Hill 2006, 52.
[478] Hor. *Sat*. 2.2.160. See Ellis 2018, 36; Wilkins and Hill 2006, 52. See also Juvenal's *Satire* 5 in which he compares poor consumption habits to the rich.
[479] For example, during a heated debate in the senate, Claudius tells the senators there that he used to frequent city bars in his youth. In telling us this, Suetonius enters into the common trope of character defamation by placing the Emperor in the lowly bar. In this, he is making a commentary on Claudius' character by associating him with the Roman locus of gluttony, the haunt of the lowest individuals on the societal ladder. For a discussion, see Ellis 2004. Elite meals were also frequently taken at the houses of patrons and *amici*; see Donahue 2003.
[480] Murphy 2015, 108.
[481] Murphy 2015, 106.

has argued that stone pine was useful as an incense in Mithraic rituals due to its strong scent, suggesting one possible reason for their frequent dedication in Pompeii.[482] As each cone produces around 100 kernels, it is no surprise that this nut was prevalent in the Campanian assemblages.[483]

Given the likelihood of *puls* being served at 'fast-food' establishments such as these, its low cost, and the low financial status of the clientele frequenting them, lentil, broad bean, pea and bean were naturally well-represented among hospitality assemblages. Though lacking in residential assemblages, blackberry was found in both the Inn at VI.1.6 and the Vestals Bar (VI.1.5) in Pompeii,[484] as well as in one residential property in Insula 1, Region VI.[485] Similarly, the assemblages analysed at the Pompeian Bar of Acisculus (VI.1.17) were 'dominated by fruit', including melon, fig, olive, and grape.[486] In addition to the blackberry, the Inn at VI.1.6 also exhibited remains of peach and pomegranate, while the Vestals Bar assemblage also contained a species from the *Prunus* family. Unfortunately, the team undertaking the archaeobotanical analysis did not consistently record the number of remains found in the bars and inns, and so solid conclusions regarding their abundance cannot be made. However, their presence in each case can be taken as an indication that fruit of all kinds were commonly served in hospitality venues. This once again supports the view that fruit and nuts were not only limited to middle to high income families, and that the nutritional benefits derived from local produce (and a varied diet) was to the benefit of many, not few. Equally, a wealthy man stopping for lunch at one of these outlets may have found a similar offering to what he might have been served at home.[487] The Campanian diet, then, was plentiful in fruit, supported by pulse, and supplemented by nuts on a regular basis.

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[482] Bird 2004. Their ritual deposition was not limited to Mithras, however, but also to Bacchus, Cybele, and Silvanus. See also Crummy 2010, 63; Lodwick 2015, 5.
[483] See Lodwick (2015) for an in-depth look at stone pine ritual depositions in Roman Britain.
[484] Blackberry was also found at Oplontis in the carbonised hay. Pliny (*HN* 22.65; 28.214) mentions blackberry juice a couple of times for medicinal purposes.
[485] Murphy 2015.
[486] Murphy 2015, 106.
[487] Ellis has stressed the danger (as with most historical enquiries) of placing too heavy an emphasis on elite literature for reconstructing the role of bars in Roman (or Pompeian) society: 'To so faithfully follow the ancient moralists is to ignore not least the wealth of archaeological remains, but also the intrinsic civic value of retail food and drink outlets, as well as the forces of economic rationality that governed their operation and placement about the city' (Ellis 2004, 52). His most recent excavations with the PARRPS team in Pompeii (Ellis et al. 2011b) have served to support his hypotheses in earlier papers.

The above analysis has made clear that rustic produce played a central role in the nutrition of Campanian diets, most often regardless of societal ranking. The rustic produce enjoyed in the privacy of a personal or friend's *domus* were unlikely to differ greatly from the food available in fast food outlets in the city. Overall, the archaeobotanical record of Campania has shed light on the types of rustic foods being consumed in the first century AD, revealing a high variety of fruits, nuts, and vegetables in the diet of the general population. Inns and lower-income residential properties have provided crucial insight into the staple diet of Campanians, with figs, olives, berries, and pulses widely accessible and cheap to obtain. This not only paints a substantially different image to that originally provided by Jongman, but also supports the recent attestations of Flohr in arguing for a moderately high level of buying power among most of the population living in Pompeii in the first century AD. The impact of Imperial expansion is also apparent; items such as dates, citrus, and peaches were not only familiar but consumed by many. With this information, I now move on to a case study of one agricultural garden from the city to reconstruct the food being cultivated there, and its potential output. This may go some way to establishing how far urban agricultural gardens were able to contribute to the dietary patterns established above.

3.7 Shopping lists from Pompeii: The epigraphic record

The first section of this analysis assesses three shopping lists from Pompeii to establish possible monetary values of *hortus* produce in the first century AD. To interpret the values of the items on each list, it is important first to establish the portions that each entry was referring to. According to Bailey, consumers shopping at the *macellum* or *nundinae* likely judged the value of food according to portions of familiarity, values which may then be haggled down with shop and stall-keepers.[488] The low presence of weights and measures in Pompeian shops supports this view as familiarity would have reduced the need for the precise measurement of goods. Nonetheless, these portions are known to us by a set of measures standardised by the state in 20 BC to meet the requirements of Augustan tax reforms. This process of standardisation was carried out in Pompeii by local *duumvirs,* the act of which was recorded on an inscription accompanying the *mensa ponderaria*, or measuring table, on the west side of the Forum in Pompeii. Here, new standard measures were created by modifying

[488] Bailey 2013, 158. Portion familiarity continued in Italy today with the '*etto'*, measuring around 100 grams.

the original basins of Oscan standards, along with the addition of four new basins. The *mensa ponderaria* in Pompeii is useful for ascertaining portions which would have been most familiar to local traders and consumers in the city. These are summarised in Table 5.[489]

***Mensa ponderaria* basin**	**Measurement of basins (in litres)**	**Measurement inclusive of original bronze lining (in litres)**	**Dry measure inclusive of original bronze lining (in grams)**	**Equivalent Roman standard measure**	**Equivalent Greek standard measure**	**Equivalent *heminae***
A	0.49	0.274	273.6	*Hemina* (1 pint) or 1 *as* or 1 Oscan pound	*Kotylē* (*κοτύλη*)	x1
B	1.00	0.821	820.8	*Catīnus*?	*Trikotylon* (*κότυλον*)	x3
C	0.795	0.547	547.2	*Sextarius*	*Xestēs* (*ξέστης*)	x2
D	1.49	1.094	1,094.4	2 *sextarii*	*Choinix* (*χοῖνιξ*)	x4
E	4.62	3.293	3,293.2	*Congius*	*Konchē* *(κόγχη)*	x12

Table 5: *Mensa ponderaria* basin measurements representing Roman and Attic standards, as based on the *mensae* at Assos and Pompeii. Measurements were modified to allow for the original bronze linings which were inserted inside each basin. Source: Tarbell 1891, 440-1.

Basin A measures one *hemina*, equal to one Etruscan or Oscan pound, or the traditional Roman *as* (273 grams). This was also the equivalent to half a *sextarius* (or one pint). Interestingly, even following the alterations in 20 BC, this basin was not altered to the

[489]Tarbell (1891) provides estimations of the equivalent '*mensa*' at Assos which shared the measurements of the *mensae* at Pompeii (Mancini 1887, 144), Tivoli (Lanciani 1883, 513) and various other sites (see Tarbell 1891, 440). When inclusive of the bronze linings known to have been used by Tarbell in the Assos and Pompeian *mensae*, the measurements of these two *mensae* reduce to reflect the Oscan standard measurement of 0.2736 litres, equivalent to one Oscan pound, a Roman *as*, or 272.81 grams. This happens to be roughly equivalent to one *sextarius*, or half of a pint, in liquid or dry measures.

Roman pound (*libra*) of 328.9 grams, nor were any of the others.[490] The Etruscan, Oscan, and Greek historical contexts of the Bay of Naples explains why the traditional Oscan standards were maintained, as these would have been the measures most familiar to locals. It is also possible that some time passed before citizens became used to the new measures. These measures provide a foundation from which to interpret our three epigraphic lists from Pompeii. Cooley and Cooley (2004) interpret any numbers recorded on each shopping list as prices in *as*, except in the cases where the mark for a *denarius* was found. This provided a starting point for interpreting the monetary values of rustic produce in the first century AD.

Considering the nature of epigraphic remains, conclusions cannot be drawn about who wrote these lists, for what purpose, at what time (apart from in the final decades before the eruption, due to their preservation and location on the upper-most layer of wall remains), in what stage of the property's history or occupation and, most importantly, what measurement of the items each refers to. Nonetheless, they provide unique insight into the types of items being sold or purchased in the city's final years, and the associated costs. Given the argument for portion familiarity above, it is plausible that the portion size of one *as* or one Oscan pound (274 grams) correlated to the basic price of a small portion of fruit, nuts, or vegetables, much in the same manner as fruit is sold in standard portions at markets around the world today.

For example, Pliny the Elder references the price of a pound of turnips around the mid-first century AD as one *sestertius* (equivalent to two and a half *asses*), or two *sestertii* during a time of lower supply (he would have been referring to the Roman *libra*). Local familiarity with the standard Oscan pound (Basin A) likely also applies to the below lists due to this being the smallest measurement (as with *etto* in Italy today) and will be taken as such.[491] In the following section, I run a suite of scenarios regarding the context of these lists, and the produce quantities and costs they are referring to. I then use this to gauge the contribution of said lists to the average nutritional requirements, cross-referenced where possible with literary sources about income levels and outgoings on essentials, such as food

[490] The Etruscan or Oscan pound was divided into twelve measurements of 22.73 grams each, making 272.81 grams (or 4,210 grains), very close to the measurement of Basin A. The later standardised Roman pound (*libra*), introduced during the Augustan administration, measured 328.9 grams (or 5,076 grains). Six *denarii* (struck in 268 BCE at 4.57 grams each) made one ounce (*uncia*), and seventy-two *uncia* made the one *libra*. For the measurements of wheat, see Bagnall 2001.

[491] This approach is taken by Cooley and Cooley 2004.

and rent. This will allow me to discover a set of norms in relation to the cost of rustic produce, while further embellishing our impression of the nutritional contribution of rustic goods to the standards seen above.

I begin with the list found in the *domus* at IX.7.24-25 (Figure 11). This list of produce was found scratched into the atrium wall. Though connected to a shop, the doorway between the shop and the house was closed off by two battens in antiquity, suggesting that this was likely a shopping list for the inhabitants of an average-sized *domus*,[492] or rather a sale or purchase record for the *domus* (once an *hospitium* according to Della Corte).[493] The Region IX shopping list represents a simple diet, made up of bread, porridge (*puls*), onion, wine, and cheese, occasionally diversified with small portions of leek, meat, fish, fruit, and nuts. It was written over eight days, perhaps in the lead up to the *nundinae*, a market held every nine days (according to the Roman practice of inclusive counting). We do not know if the diet of the household living at IX.7.24-25 (if indeed it was a *domus*) was supplemented with supplies from the adjoining shop, or from produce on an urban or outer-town plot (since no garden has been found on the property). This also may not have been an exhaustive list for the week in question.

Taking the Basin A measurement as a standard portion or serving,[494] and assuming that a family was in residence at the time this list was written, the household at IX.7.24-25 was sustained by: six loaves of bread (including one half portion of 'plain bread'),[495] one shared serving of *puls*, one shared portion of cheese, and one half serving of soft cheese per day. This is in addition to three *sextarii* of wine and five and a half servings of oil,[496] and does not count the wheat kept in storage which may have been used for extra *puls.*[497] Just over one

[492] For sizing context, see Wallace-Hadrill's study on *domus* sizes in Pompeii. For an idea of the average household size, see Laurence (2010) and Flohr (2016), as well as Appendix B for a Pompeian case study.
[493] della Corte 1965, 197.
[494] Cooley and Cooley (2004) take the Roman standard measurement of 328 grams instead of the measurements reflected in the *mensa ponderaria* in Pompeii.
[495] Petronius states that the cost of one loaf of bread in the first half of the first century AD was 1 *as*. This would be enough for two persons per day, making the above serving enough for 12 persons.
[496] Presumably for cooking, eating, cleaning, and lighting. Oil quality, and therefore value, would have varied according to its intended purpose; see Rowan (2019) on olives, oil, and their use and consumption.
[497] The costs of a modius of grain vary greatly in the literary records. However, for the period within which this inscription was likely written (mid-first century AD), we have between 4 and 7.5 *asses* (Tacitus lists one modius at two *sestertii* in AD 19 and at three *sestertii* in AD 64 (Tac. Ann. 2.87), while Martial alludes to one *modius* at four *asses* in the second half of the first century AD, though says this is under-priced (as he would, by implying

as per day was spent on nuts or dried fruits and beans, though it is not clear what portion size this refers to (one *denarius* in total, equivalent to ten *asses*, may suggest that the nuts or fruits and the beans were each bought in bulk).[498] For slaves, just over one serving of low-quality bread was made available per day.

7 days before the Ides, cheese 1
bread 8
oil 3
wine 3
6 days before the Ides
bread 8
olive 5
onion 5
cooking pot 1
bread for slaves 2
wine 2
5 days before the Ides, bread 8
bread for slaves 4
porridge 3
4 days before the Ides,
wine [of animal tamer?] 1 denarius
bread 8, wine 2, cheese 2
3 days before the Ides
Dried fruits or nuts? 1 denarius
bread 2
female? 8
wheat 1 denarius
beef? 1, dates 1
incense 1, cheese 2
small sausage 1
soft cheese 4
oil 7

For Servatus
beans? 1 denarius
oil 1 denarius, 8
bread 4, cheese 4

leek 1, for a small plate 1
bucket? 8, lamp? 1

2 days before the Ides, bread 2
bread for slaves 2

1 day before the Ides, bread for slaves 2
plain bread 2
leek 1

On the Ides
plain bread 2
oil 5
porridge 3
whitebait 2



Figure 11: Shopping list from IX.7.24-25 (*CIL* IV 5380) showing items purchased or sold over eight days. The numbers likely refer to prices in *asses*, except in cases where the symbol for *denarius* (or 16 *asses*) appears. Translation: Cooley and Cooley 2004, 163 (following formatting of original graffiti). Inset image: Pearse 2019.

that Rome is generally becoming 'devalued' as a place) (Mart. *Sat*. 12.76.1)). As such, the portion in Figure 9 was likely anywhere between one and four *modii* of wheat, given the listed cost of one *denarius*.

[498] The writing one these portions are unclear; see Beard 2006. For an alternative translation to Cooley and Cooley (2004, 163) who mark nuts and beans as unintelligible.

The shopping list from IX.7.24-5 was of a variety and calorific content high enough to provide nutrition adequate to reproduce the nutritional standards of the skeletal remains analysed in Pompeii. Applying average nutritional values to the daily portions established above, in Appendix B I analyse the extent to which this list would have supported a family of six, including one 'moderately active' adult male, one 'moderately active' adult female, three children under the age of fourteen, and one 'vigorously active' slave.[499] Assuming the standard portions described above, this list would have provided the required calories for this one family (102,580 calories consumed out of the estimated requirement of 105,800 calories per eight days; see Table C in Appendix B). This is significant as the list does not include the essentials of wine or oil, both huge contributors to calories in the diet, while vegetables and fruit are only mentioned in small numbers; it is therefore likely that this list provided for more individuals than included in my hypothetical family unit. In terms of monetary outlay, and excluding the ten *asses* known to have been spent on slave diet(s), this list accounts for a budget of sixteen *asses* per day, equating to around three *asses* per person per day.[500] This is above Seneca's two *asses* (one *dupondius*) per day as the daily food expenditure of a frugal man, and thus congruent with the economic and dietary information that we have about Pompeii's general population in the mid-first century AD.[501]

According to Petronius, one *as* was enough to buy only a single loaf of bread, sufficient for two people.[502] This aligns with our list which sees an average of between one and two and a half *asses* per loaf of bread. The cost of bread would have varied according to the grain content, the quality, and the place of purchase. Of the three shopping lists available in Pompeii, the most expensive of the loaves was apparently purchased at a pop-up stall in the Palaestra (see Figure 13). Rustic goods of fruit, nuts, vegetables, and pulses occupy a large

[499] 'Vigorously Active' is defined as engaging 'regularly in strenuous work or in strenuous leisure activities for several hours' per day FAO 2004, 39. 'Moderately Active' individuals are engaged in 'occupations that are not strenuous in terms of energy demands but involve more energy expenditure than... sedentary lifestyles'; FAO 2001, 39. Sedentary lifestyles are defined by the FAO as follows: 'These people have occupations that do not demand much physical effort, are not required to walk long distances, generally use motor vehicles for transportation, do not exercise or participate in sports regularly, and spend most of their leisure time sitting or standing, with little body displacement.'

[500] The slave would have consumed the 'bread for slaves' (just over one loaf allowance per day, according to this list) and may have had an oil and wine allowance not referenced here. He or she may also have relied on household leftovers for nutrition.

[501] Sen. *Ep*. 18.7.

[502] Petr. *Sat*. 44.11. Loaves found in Pompeii were often rounded and divided into eight sections. Carbonised, these loaves weigh around 580 grams on average. This would have been around one and a half kilograms at its normal weight.

portion of the food on the list in the IX.7.24-25 list, making up one-fifth of the total 222 *asses* spent in one week (or taken, if it was indeed a list for the shopkeeper). If wine and oil are then added to the list of agricultural produce known to have been cultivated in gardens in the town and the hinterland, the dietary share of horticultural goods rises to one half of the total expenditure, even higher than the proportions suggested by archaeobotanical remains in the town.

This shopping list is highly reminiscent of the *tristi domicenio* ('gloomy dinner at home') and the *parva est cenula* ('modest little meal') described by Martial in his *Epigrams*.[503] Considering the satiric quality of the *Epigrams*, and Martial's aim to provide a candid overview of Roman life in the city, this 'gloomy dinner' is undoubtedly in reference to a simple meal at home, versus the more elaborate dinners to which Martial and his contemporaries hoped to be invited of an evening. However, given that it is satire, some element of irony on Martial's part must be assumed for this was likely not a 'gloomy' dinner at all. Perhaps Martial's invitation to Torianus is instead a commentary on the popular moralising trope of the period in which Martial was writing, in which elaborate displays of entertainment, and elaborate menus of exotic items, were placed before guests: 'you won't be faking or listening to pseudery… you will speak no falsehoods nor hear any and recline benignly wearing your own face.' A humble, but honest, brag on Martial's part, emphasised by the commonplace rustic produce he features on his menu.

The items which Martial lists for his 'modest' meal include 'cheap' lettuces from Cappadocia, 'smelly' leaks, chopped tuna in halves of eggs, green cabbage sprout from the 'chilly garden', sausage with *puls*, and pale beans with 'ruddy bacon'. The importation of basic fare such as lettuce may be a commentary on elite gluttony at the table, or else reference to a subspecies of lettuce. For dessert Martial suggests grapes, 'Syrian' pears, and slow-roasted chestnuts, the last a Neapolitan creation, and describes the finishing course as consisting of wine, good olives from Picenum, hot chickpeas, and warm lupins. Almost all Martial's ingredients appear on the shopping lists above (cabbage, lettuce, leek, chickpeas, chestnuts, grapes, pears, and pulses) and all could be sourced from the well-stocked garden in

[503] Mart. *Ep*. 5.78.

Pompeii.[504] It is significant that Martial is keen to make it known that his table is filled only with country produce (unless a special occasion called for diversity) and that he never drank as much as one *sextarius* of wine per day, clearly in reference to a perceived normal level of consumption for the general population.[505] Further lists reinforce the important role of rustic goods as key supplements to the Mediterranean triad of olives, grapes, and grain.

Firewood		--
Steward/land-agent?		4
Bread	6	
Cabbage	2	
Beetroot		1
Mustard		1
Mint	1	
Salt	1	

Figure 10: Graffiti produce list from a room in a small workshop at VII.2.30, Pompeii. Translations from Cooley and Cooley 2004, 164.

[504] Martial was likely writing in Rome before his return to Spain, and so foodstuffs such as these would be available in Rome to many at the time of his writing. They would, however, be more expensive than in Pompeii, where they were all most certainly widely available on the market (see below discussion).

[505] Tchernia (1986, 26) uses Cato's slave rations of wine to propose an annual male wine consumption of between 146 and 182 litres (or 0.4 – 0.5 litres per day). For females, he proposes between seventy-three and ninety-one litres (or 0.2 - 0.25 litres per day). Overall, Tchernia finally comes to an average of around 100 litres per year, equivalent to around 0.27 litres, or one Roman *hemina* (a cup), per person, not an unreasonable estimate. (It is worth noting discrepancies with these figures: taking a median point between the two male estimates (160 litres) and finding the median between this and the yearly female figure creates an estimate of around 125 litres per year). There is also nothing in the Roman literature to suggest that women 'drank half as much as men', as Tchernia assumes. Van Limbergen (2018, 1061) argues for the dilution of calories with cold or hot water (as the Roman were prone to do), though Jongman (2007, 602-4) estimates that around one quarter of Roman calories came from wine consumption.

Pompeii	
[…]	3 ½ asses
P(ound?) of lard	3 asses
Wine	1 as
Cheese	1 as
Oil	1 as
Bread	2 ½ asses
Pork	4 asses

Figure 11: Graffiti produce list from a wall in the Large Palaestra of II.7, Pompeii. Translations from Cooley and Cooley 2004, 164.

The shopping list found in the workshop at VII.2.30 closely correlates with the budget specified above by Martial. If this list equates to a full shop for a household for one week, a spend of just over two *asses* per day would have maintained two individuals at subsistence level for one week. Using the list from VII.2.30 as a base, this budget would also include rent of the workshop (in Figure 12 the 'steward/land-agent' entry is likely referring to rent, with the workshop perhaps doubling as a residence). The price of firewood is not legible in the inscription, though it may have been used on site for living, working, or both.[506] Aside from salt, the remainder of the items are rustic goods found in the Pompeian *hortus*. What is clear is that the amount of food listed would not have been sufficient to keep two people alive.[507] As such, this is either a top-up purchase between larger shops, or else it indicates that nutrition was sought elsewhere, perhaps in local *popinae* where the poorer members of Roman society tended to eat.

A similar list discovered in the Large Palaestra (II.7) is entitled 'POMPEII' (Figure 11). The Palaestra likely held pop-up stalls, of the kind seen in the open area around the Amphitheatre in the painting of the AD 59 riot (Figure 14).[508] In this painting, the Large Palaestra can be seen to the right. People fighting between the columns can be made out to the north of the Palaestra. Use of this area for stalls is confirmed by an inscription on the outer

[506] See Wallace-Hadrill 1994.
[507] Assuming a spread across three days (based on the cost of two *asses* per loaf used above), this list would have only provided 500 calories per day in total.
[508] This fresco was discovered in the House of Actius Anicetus and is now kept in the Naples Museum.

wall of the Amphitheatre which records the secured trading position of the stallholder Gnaeus.[509] Given its titling and find location, this shopping list may have been written by a visiting trader or customer at the *nundinae*, perhaps as a price list; it was hopefully not acting as a record of his or her sales for the day, given its small size. If this was indeed a price list, it would give more weight to Bailey's theory of portion familiarity as prices in as would correlate with standardised quantities of produce.

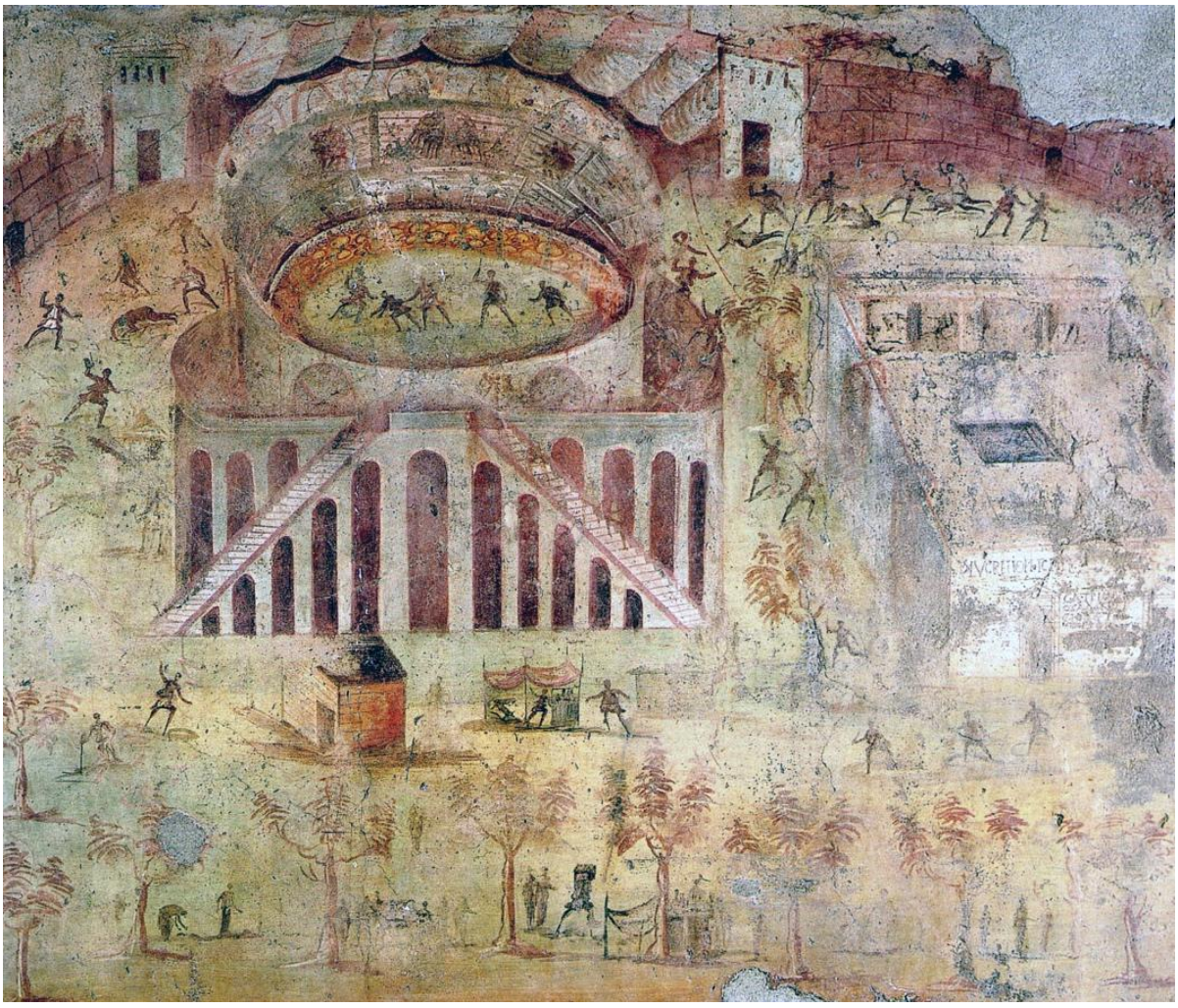


Figure 14: Fresco of the AD 59 riot between fans from Pompeii and Nola at Pompeii's Amphitheatre (found in the House of the Riot in the Amphitheatre (I.3.23). Image: Museo Archeologico Nazionale di Napoli (inv. nr. 112222)/Wikimedia Commons.

[509] *CIL* IV 1096.

Assuming instead that this is another record of items purchased in one day (the least likely of the possibilities), this individual purchased no rustic produce, but did buy three lots of animal-derived goods. As the wine is listed as 'one' (presumably one *as* for one *sextarius*), it is likely the wine purchased was of low quality. Although not a shopping list, a wine advertisement on the outside wall of a *taberna* on the Decumano Massimo in Herculaneum (Insula VI) values the wine for sale at between two *asses* and four and a half *asses* per *sextarius*, presumably rising in price according to quality (Figure 15). Martial quotes twenty *asses* for one *amphora* of wine in the late first century AD.[510] Using the average *amphora* capacity at Pompeii estimated by Vidal and Corredor of 16.38 litres (equivalent to thirty *sextarii*) and applying this to the wine advertisement from the shop in Herculaneum, the shopkeeper would have made between sixty and 135 *asses* profit per *amphora*.[511]

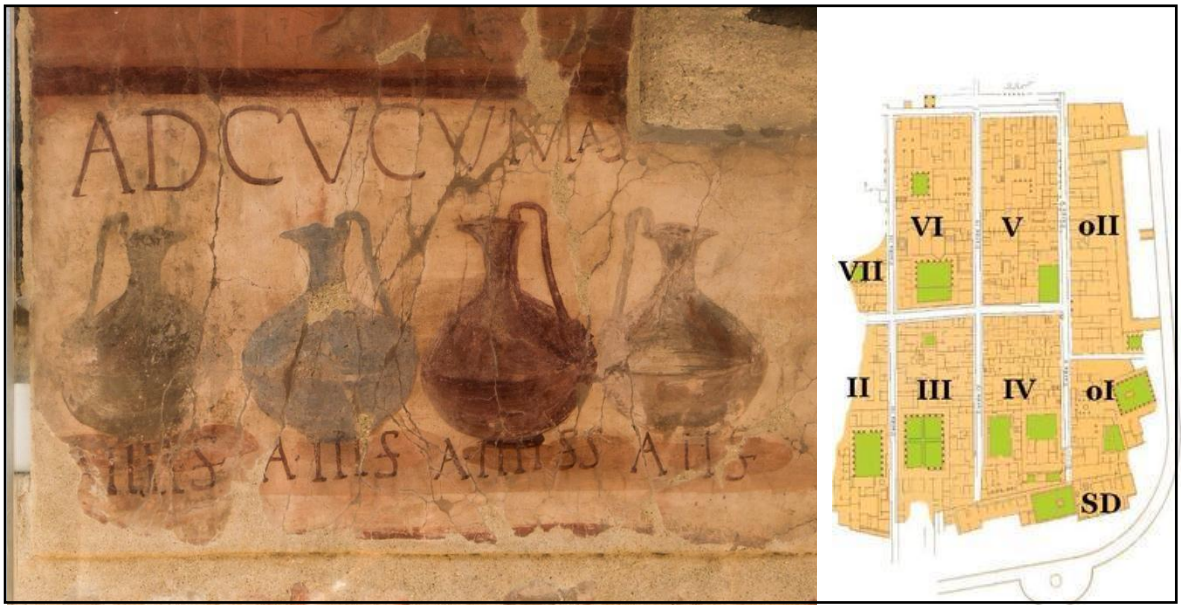


Figure 15: Advertisement from a *taberna* in Herculaneum (Insula VI) displaying different types of wine and their prices (according to quality). Image: (left) Wikimedia Commons (Jebulon)/*Soprintendenza Archeologica di Pompei* (right) Clements and Clements n.d.

[510] Mart. *Ep*. 12.76.1.
[511] Vidal and Corredor 2018.

The information gathered from archaeobotanical and epigraphical remains have revealed the central position of rustic garden produce in the Pompeian diet. In the most comprehensive shopping record, which listed the produce purchased per day over eight days, the importance of rustic produce to the Campanian diet is confirmed. While the vegetables, pulses, fruit, and nuts purchased could be grown in the *hortus* at home, they did not have to be, for they were widely available at the market, local pop-up stall, or *taberna*. These lists also importantly demonstrate that, while bread and *puls* acted as staples to the Pompeian diet, as we have come to expect from literary sources, goods which could be grown in the garden were important parts of the everyday diet, regardless of social class.

What remains to be established is how far the urban agricultural gardens being cultivated within Pompeii's city walls contributed to this high share of rustic garden produce consumption in the Pompeian diet. The hazards warned against throughout this chapter, in relation to the nature of available evidence, prevent estimating monetary and nutritional outputs of local gardens with any certainty, particularly on a city-wide scale. However, the unique opportunity to recreate the yield of real gardens from an ancient city is available to historians and archaeologists, even if the outcomes are tentative. This is due to the remarkable preservation of archaeobotanical remains from the city, available mainly because of the painstaking work of Jashemski in documenting garden remains from Pompeii. For this following case study, then, I return to one of the largest agricultural gardens excavated by Jashemski to reconstruct the yield of this garden from the archaeobotanical and archaeological remains.

3.8 Case study: Produce yield in the House of the Ship Europa

This case study focuses on the House of the Ship Europa in Region I of Pompeii (I.15.1-3) (see map in Figure 1) and takes the following structure: after setting out the archaeological context of the garden, I provide an overview of the major archaeobotanical and archaeological finds of the site which pertain to horticultural activities of a commercial nature. Informed by the information gleaned in the rest of the chapter, I will produce a model list of items likely to have been grown here. This list will also be influenced by the location and size of furrows and root cavities in the garden. Following this, I endeavour to produce

yield estimates for each cultivar to gauge the potential horticultural and commercial output of this garden at the time of the eruption, via an estimation of yields for the vines, trees, and vegetable plots grown here. For the first time this will provide an estimate related to the economic and nutritional impact of this garden locally, revealing a sustainable market garden engaged in polyculture (and potentially biodynamics), producing a high number of grapes, nuts, and vegetables for exportation or local sale.

The front entrance to the property faces on to the Via di Castricio, a street which runs directly to the Large Palaestra and Amphitheatre in the southeast corner of the city. The large garden located here (measuring just under 2,000 square metres) was created by demolishing several properties in the south of the *insula*. The two atrium *domus* at the front of the *insula* were converted to support the industrial activity of the garden. The garden measures around 1,800 square metres and has one direct access doorway from the west, and one doorway accessed via a rear garden room (perhaps a stable) to the east. The garden is split across two terraces; in the upper terrace, excavated by Jashemski (1974) and her team, the root cavities of mature vines and trees, as well as a complex irrigation system in the north-eastern corner, were uncovered. Terracotta *amphorae* were also found in the south-eastern corner, close to a large pile of lime, the latter suggesting either an attempt at internal or external renovations just prior to the eruption (lime was commonly used in wall paintings and construction in the Roman period), or treatment of the acidic soil for a better grape crop.

On the lower terrace, the root cavities of many young vines were discovered, along with two vegetable patches, one to the northeast, and one to the southeast. In these vegetable plots were the root cavities of small trees, thought by Jashemski to have been hazelnuts due to the remains of this nut found close by.[512] An L-shape path connected the two plots, while the root cavities show how trees formed a halo around the outer walls of the garden, likely a combined effort at security and preventing too much shade being cast by the trees for vines in the centre. This garden provides an excellent example of the specialised cultivation of fruit and nut trees, vines, and vegetables in a large urban plot in the city and exhibits evidence for both polyculture and biodynamics before its destruction in the AD 79 eruption. Polyculture, sometimes referred to as intercropping, is the practice of cultivating two or more crops

[512] Jashemski 1974, 401-2.

simultaneously or in rotation (for example, the cultivation of beans amongst vines, as we see in this garden).[513] Biodynamics is, like polyculture, another sustainable approach to agriculture which emphasises the use of animal waste and natural pesticides in crop cultivation. In some cases, this entails the maintenance of livestock among crops (which I will return to later).

The root cavities of vines, trees, and other plants in Campania continue to provide some of the most reliable and revealing sources of information about the plants growing, or being grown, in this region in the mid- to late-first century AD. During her many garden excavations of Pompeii, Jashemski became responsible for the application of the plaster of Paris method to garden space, an ingenious preservation technique first pioneered by Giuseppe Fiorelli for the recovery of human impressions in the volcanic material expelled during the eruption of Vesuvius.[514] The method for this is as follows. Following the eruption of AD 79, the dust which had settled over the surrounding cities hardened over time and any organic matter which was not carbonised during the pyroclastic flows decayed. This caused victims of the eruption (including humans and animals) to leave behind body impressions, including the outline of clothes and facial features, while plants left behind impressions of root cavities in the soil. Following their decay, pumice trickled into the cavities of decayed organic matter, thus preserving the hardened cavities. Following excavation, many of these cavities were filled with plaster of Paris to remove the casts of the roots for identification. The application of this method to root cavities made it possible for Jashemski to identify what plants were being cultivated in Pompeii and where, and is still in practice today.

Using this method, Jashemski was able to map and identify 176 vine root cavities and 240 trees in the garden of the House of the Ship Europa; thirty-one of the tree cavities were in the vegetable plots, perhaps for shading the crops. It is likely that more vine cavities would have been recovered had it not been for the damage caused by the movement of trucks and the digging of the Sarno Canal in certain areas (thus destroying cavities in sites of tunnelling).[515] The plan of root cavities reveals gaps in the even rows of vines on the lower terrace, perhaps as a result of the replacement of dying or dead vines with quicksets prior to the eruption, or

[513] See pages 102-3 and 146-7.
[514] Fiorelli invented this method in 1863; see Dwyer 2010.
[515] Jashemski 1974, 394-5.

their loss post-eruption.[516] The vineyard was planted in regular rows four and a half Roman feet apart. This is between the spacing advised by Columella, who suggests five Roman feet, and Pliny the Elder, who recommends four.[517] Using this spacing as a guide, I was able to identify around 226 vines on the lower terrace, including those which appeared to be missing between the preserved root cavities. Including the upper terrace, this brings this garden to a total of around 244 vines cultivated here at the time of the eruption. Judging by the root cavity size and the fact that many did not appear to be staked,[518] these vines were not yet two years old, and therefore only just approaching their full first harvest at the time of the eruption.[519] This information can be used to estimate a yield for this garden, in line with the methods applied by Jashemski to the Large Vineyard (II.5) in Pompeii for the same purpose.[520]

3.8.1 The yields and economic output of vines in the House of the Ship Europa

Using the standard methods applied by vintners today, it is possible to estimate a rough yield for the vines growing in this garden in antiquity. Though we do not know what variety was being grown here, it is safe to assume that it was likely a red grape variety, for this was the most common in the Roman period. Given the high fertility of the soil, it is also prudent to look at estimates on the upper end as production was likely much higher here than most other locations in Italy. Though they vary, the ancient sources provide a starting point for establishing potential vine yields in Pompeii. As is the case today, vine yield was estimated by area in the Roman period, though this would have been done in *iugera* (land measurement of 2,500 square metres) and *cullei* (equivalent to 115.3 gallons today).[521] With a good idea of vine numbers, estimating vine yield would typically be easier in a hindsight case such as this. However, it is not common to estimate yield by vine and so a different approach shall be taken.

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[516] Columella (*Agr*. 5.5.16-7) records the practice of replacing dead vines with quicksets. The root cavities of quicksets, due to their small size, were unlikely to have been preserved post-eruption.
[517] Col. *Agr*. 3.13.3; Plin. *HN* 17.171.
[518] In the Large Vineyard, stake holes were often found alongside the cavities of vines. This same pattern was not discovered on this terrace.
[519] Columella (*Agr*. 3.3.9) states that vines are 'delayed in bearing' for the first two years. See also Jashemski (1974) who says that the vines were too young to be staked.
[520] Jashemski 1973.
[521] Today it is common for European and North American vineyards to estimate yields in hectares.

The surface area of the vine cavities uncovered by Jashemski totals around 440 square metres in the lower terrace of the Europa garden. Rounding this up to 500 to ensure that any cavities excavated or lost in the upper terrace are included makes the space dedicated to vines around twenty percent of one *iugerum* (2,500 square metres). This likely accounts for the higher yield of the small number of mature vines in the upper terrace; for example, three mature vines cultivated by the Balkan Ecology Project in Bulgaria (2019) yielded 150 kilograms of grapes, around seven times the average. According to Varro, it is a worthwhile harvest if a vineyard produces ten *cullei* of wine per *iugerum* (approximately 1,153 gallons), a figure which can be otherwise expressed as an average of 250 square metres per *cullei* (see Figure 16). Using this as a base, the House of the Ship Europa would have been producing around two *cullei* per harvest (approximately 230.6 gallons). This is equivalent to around thirty-eight standard Roman amphorae (at 27.84 litres each), or sixty-four of the average sized Pompeian *amphorae*. Columella, guided by Varro and Cato, provides an alternative estimate of 600 *urnae* per *iugerum*, equivalent to 7,774 litres per 2,500 square metres (or 1,710 gallons). Applying this alternative estimate to the square metre coverage of vines in this garden instead gives three *cullei* per harvest, the equivalent to fifty-six Roman standard *amphorae* or ninety-five average-sized Pompeian *amphorae* (or approximately 343 gallons). Overall, these two estimates provide an estimated yield of between four and six litres of wine per vine, in line with the guide estimate of 4.66 litres per vine suggested by the Balkan Ecology Project.[522]

[522] Alfrey 2019.

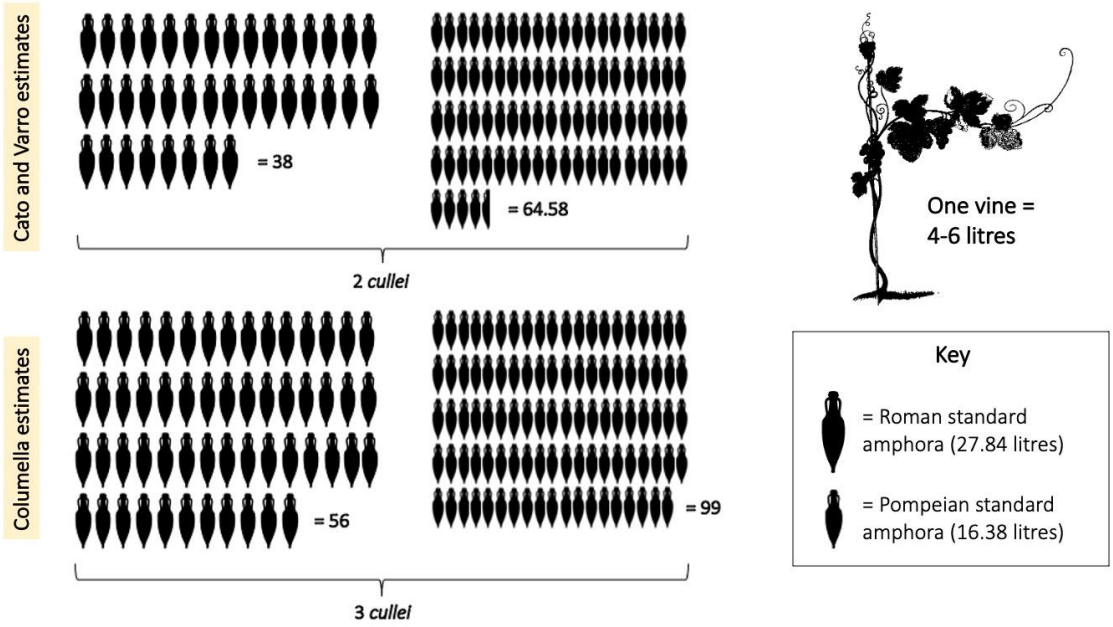


Figure 16: Estimated vineyard yield for the House of the Ship Europa (I.15.1-3).

To estimate the monetary value of this vine yield, I will apply the price of twenty asses per *amphorae* offered by Martial, assuming a wholesale cost for the lowest quality wine for the sake of simplicity. This assumes that the wholesale cost by the amphora is twenty *asses* for the lowest quality of wine; in the absence of other values from the literary or epigraphic sources, it is difficult to estimate the profit generated by *amphora* of different wine qualities.

Based on this estimated value per *amphora*, and assuming that Martial was referring to the standard size of 27.84 litres, the gardener or owner of this garden would have made around 304 to 448 *sestertii* per harvest.[523] To estimate the gross market value of the upper and lower yields of this garden, I also apply the market value of wine from the advertisement at Herculaneum (Figure 15) and the shopping lists at Pompeii.[524] For illustrative purposes only,

[523] This is the equivalent to 760 asses (lower estimate) and 1,120 asses (higher estimate). Though we do not know the size of the farm in question, a wax tablet from Pompeii records a farm owner named Herennia Tertia selling her produce 'via the agency of a slave' for 1,800 sestertii on the 16th October AD 40, which was to be paid by L. Annius Agathemerus by the following March. Cooley and Cooley (2004) believed that this delayed payment was due to the produce being grapes for processing into wine. *AE* (1999) 449 = *TH* 12.
[524] We cannot know what quality of wine Martial was referring to, though it is likely that he was referring to the standard amphorae measurement of 27.84 litres.

and not considering the cost of off-site processing, bottling, and transport, I use the imaginary example of the Herculaneum shopkeeper buying all of the *amphorae* produced by this garden in one harvest, this being between thirty-eight and fifty-six Roman standard *amphorae*. Following purchase at wholesale value (20 *asses*), if the shopkeeper were to sell this wine by the *sextarius* at the lowest cost of one *as* per *sextarius* at the point of sale (based on the lists in Figures 10 and 12), the shopkeeper would make between 211 and 313 *sestertii* gross profit (see Figure 17 for a summary of estimates).[525] If the wine produced in the Europa garden was of the highest quality, and therefore sold to customers at around four-and-a-half *asses* per *sextarius*, the shopkeeper's purchase would have generated between 3,252 and 4,825 *sestertii* for the Pompeian economy,[526] not including the profit made by the gardeners (between 301 and 447 *sestertii*). This is closest to the generated income estimate of 1,333 *sestertii* for an equivalent size vineyard by Pliny the Elder (in the 50s AD).[527]

Lowest quality wine (1 *as* per *sextarius*)					
Yield estimates (Roman standard amphora	Wholesale cost of *amphorae* in *sestertii*	Equivalent *sextarii* (48 per *amphora*)	Sale value in *asses*	Sale value in *sestertii*	Total profit for shopkeeper in *sestertii*
 x 38	304	1,824	1,834	734	430
 x 56	448	2,688	2,688	1,075	627

[525] This is assuming a wholesale cost of twenty asses per *amphora* for the lowest quality wine, with forty-eight *sextarii* per Roman standard *amphora*. This would make the gardener or owner 301 *sestertii* for the lowest yield at the lowest quality. So, to arrive at the value of the lowest yield estimate for the lowest quality wine: thirty-eight *amphorae* multiplied by forty-eight *sextarii* (the amount per *amphora*) comes to 1,807 *sextarii* or *asses* (at the lowest cost of one *as* per *sextarius*). There are 2.5 asses per *sestertius*, making 723 *sestertii* for the lowest yield of the lowest quality of wine.
[526] According to lower and upper yield estimates respectively.
[527] Pliny (*HN* 14.49) quotes one vineyard of sixty *iugera* in Italy as generating around 400,000 *sestertii*.

Highest quality wine (4.5 *asses* per *sextarius*)					
Yield estimates (Roman standard amphora	Wholesale cost of *amphorae* in *sestertii**	Equivalent *sextarii* (48 per *amphora*)	Sale value in *asses*	Sale value in *sestertii*	Total profit for shopkeeper in *sestertii*
 x 38	1,368	1,824	8,208	3,283	1,915
 x 56	2,016	2,688	12,096	4,838	2,822

* Assuming x 4.5 wholesale value versus lowest quality wine, based on cost per *sextarius*

Figure 17: Economic value of the estimated yield for the House of the Ship Europa vineyard.

In Appendix B, I provide an estimate for the living costs of one 'moderately active' family of six, including one 'vigorously active' slave. Their income I estimate at just under 2,000 *sestertii* per year (including rent and food). With this in mind, and assuming a higher rental rate for a garden than the average 520 *sesterces* per annum for a middle to low-income family apartment,[528] the income of this garden from the vines alone is more than enough to sustain a family comfortably. Similarly, if owned by a wealthy household, it undoubtedly provided a nice top-up to the profit made from agricultural estates owned in the countryside. However, in terms of the nutritional contribution of this garden and applying the standard consumption of one *sextarius* of wine per day (as implied by the Pompeian shopping lists and ancient sources), the upper yield from this garden would have supplied up to 383 people for seven days only. The monetary payoff for the owner is quite substantial, despite its contribution to local needs being low.

[528] Julius Caesar remitted the rent of all Italians who were paying 500 *sesterces* or less following the civil wars (which ended in 45 BC). For full calculations of this estimate, see Appendix B (figures based on Harl 1996).

It may well have been the case that this garden was in the business of producing high quality wine of a lower demand, perhaps a regional variety,[529] or else grapes for the table, given the absence of processing material on site (as was found in the processing rooms of the Large Vineyard at II.5).[530] We must also consider the fact that apartments located on this block pre-AD 62/3 (before their destruction in the earthquakes) would likely have been higher than the income generated from yield and garden rent.[531] The local value of real estate post-AD 62/3 is thus put into question. Are we possibly witnessing a collapse in the housing market, both economically and literally, in the archaeological record? Was horticulture a response to this, or an opportunity grasped with the sudden availability of open land for cultivation within the town? This will be discussed in more detail in Chapter Six, but for now the value of the other rustic produce cultivated here may better determine the relative nutritional and economic value of this garden for the local population.

3.8.2 Fruit and nut yields in the House of the Ship Europa

Jashemski does not pin down varieties of fruit and nut trees in this garden for more than a couple of cases. One of the trees growing in the garden was a very old olive tree, the largest cavity of all. The upper terrace also exhibited evidence for the cultivation of hazelnut and fig trees, along with the young hazelnut trees apparently being started in the vegetable plots.[532] The size and spacing of the remaining root cavities along the walls suggest that these may have been almond, cherry, plum, olive, peaches, and/or figs, as well as potentially citrus.[533] However, the only carbonised remains found here were hazelnut, fig, almond, and date, along with the root cavity of an olive. Twenty-eight root cavities were also found in *ollae perforatae* or broken pots throughout the garden. These were thought be Jashemski to be

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[529] Of the type discussed by literary writers (e.g., Falernia from the Falernian territory in Campania). For example, see Cic. *Agr*. 2.25.66; Cic. *Phil*. 13.5.11; Hor. *C.* 1.27.10, 1.20.10, 2.11.19, 3.1.43; Liv. 9.20.6; Mart. *Ep*. 3.77; Plin. *HN* 14.6.8; Tib. 2.1.27; Varr. *RR* 1.2.6, 1.8.2; Verg. *G*. 2.96.

[530] There is a possibility that gardens in the city hired the use of equipment at other garden sites, or that various gardens were owned by the same individuals and therefore had use of equipment on other garden sites. Another possibility is the destruction of transportable, organic equipment used for wine processing (e.g., treading barrels).

[531] For a summary, see Scheidel 2005.

[532] There is a possibility that vegetable gardens may have been cultivated here in lieu of mature trees for harvesting nuts.

[533] *Ollae perforatae* were said by Pliny to be used to acclimatise citrus in Italy. However, the citrus has long been a contentious subject when assessing the possibilities for their growth in Campania in the first century AD; see Pagnoux et al. 2013.

citrus trees.[534] A young citrus tree could be expected to yield around nine kilograms of fruit per year, equating to between eight and fifteen fruits per tree.[535] As these were still a recent introduction to the area, and attempts at acclimatisation were still being made, we can assume that they would be selling for a fairly high cost.[536] For the remaining 181 tree cavities in the garden, I will attempt to produce yield estimates based on the varieties known to have been growing here. For the sake of simplicity, I have divided this number by four varieties, assigning sixty trees each to hazelnut, fig, almond, and olive. Applying the average yield of fruit and nuts per annum to each tree (see Table 6) generates an estimate of around 150 *amphorae* of fruit and nuts yielded per year in this garden.

One of the entries on the shopping lists above quotes one *denarius* (or sixteen *asses*) for dried fruit or nuts. Using the shopping lists as a guide again, and assuming an average of around one *as* per Oscan pound (Basin A), the yield from this garden equates to an income of around 5,000 *sestertii*.[537] The wholesale value would have been far lower, but this does give some idea of the potential economic impact of this garden from fruit and nuts alone.

[534] Jashemski 1979.
[535] Though this must be taken as a very tentative guide, 14 citrus fruits are depicted on the young citrus tree in Livia's garden fresco at Prima Porta.
[536] We have no recorded values for the citrus fruit in Italy at this time. The peach was also a fairly recent introduction, though far more volatile in terms of shelf-life. Pliny the Elder (*HN* 15.40) quotes one *sestertius* for an Asiatic peach in the mid-first century AD, so this may tentatively be taken as an upper average for the citrus. Along these lines, then, this gardener may have made up to 420 *sestertii* from the citrus grown in their garden, though this is a very rough estimate which assumes that all potted trees (totalling 28) were citrus, that each was young, and that each was producing up to fifteen citrus fruits per year at the time of the eruption.
[537] The average yields for each tree (in British Imperial pounds, or 453.59 grams) are as follows: twenty-five pounds for hazelnut (Agrifarming 2020), fifty-five pounds for fig (Morton 1987, 47-50), sixty-five pounds for olive (a median between the lower and upper averages of thirty and 100, see Heber 2020), and fifty pounds for almond (a median between the lower and upper averages of fifty and sixty-five, see Foote 2019).

	Average Imperial pounds per annum	**Estimated Imperial pounds per annum**	**Equivalent measures of one Oscan pound/Basin A (272.81 grams)**	**Equivalent measure of one Roman *libra* (328.9 grams)**	**Equivalent *amphorae* (each being 27.84 litres)**
Hazelnut	25	1,131	1,881	1,560	18
Fig	55	2,489	4,137	3,432	41
Olive	65*	2,941	4,889	4,056	48
Almond	57.5*	2,602	4,325	3,588	42

Table 6: Estimated fruit and nuts yields for the garden in the House of the Ship Europa.

3.8.3 Vegetables in the House of the Ship Europa

Vegetables are cultivated in a standard fashion in terms of the spacing required between plants and rows, with many varieties growing as singular plants (for example, a cabbage is singular versus a pea, which has multiple pods per plant). This makes the job of estimating vegetable yield in Pompeian gardens easier than vines and fruit where the maturity of the tree, and even the variety of the fruit, can have an impact on yield (factors which are difficult to ascertain from the archaeobotanical remains available to us). In cases where a defined area of furrows for planting vegetables (and thus cultivated square footage) is available as it is here, the task of estimating yields is made simpler. However, a limited number of archaeobotanical remains (including carbonised material and root cavities) make estimates of the types of vegetables planted, and subsequently the yield produced by the garden, difficult without quite a substantial amount of conjecture. Nonetheless, the defined area used for growing vegetables in this garden allows an estimate of yields to be made. Once again, using the epigraphic sources from Pompeii, ancient literary sources, and the archaeobotanical record from the town, I have reconstructed the potential output of the two vegetable plots in the House of the Ship Europa. For this, I take cabbage, cucumber, garlic, leek, lettuce, onion, pea, and beetroot as example produce grown in this garden. Using typical yield outputs for these varieties, I have estimated the output potential of these two plots

should they have been cultivated in the usual way, and to full capacity (as they appear to have been).

	Plants per square footage	**Number of vegetables per square footage**	**Lower yield estimate (number of vegetables)**	**Upper yield estimate (number of vegetables)**	**Total estimate yield (number of vegetables)**
Cabbage	1 (summer and winter) – 4 (spring)	1-4	184	737	922
Cucumber	1	6-10	1,106	1,843	2,949
Garlic	4-9	4-9	737	1,659	2,396
Leek	4	4	737	737	1,475
Lettuce	4	4	596	737	1,333
Onion	4-9	4-9	737	1,659	2,396
Beetroot	9	9	1,662	1,662	3,324

Table 7: Case study of estimated yields for the two plots (A and B) in the House of the Ship Europa, based on vegetables known to have been grown in the area and sold and consumed in Pompeii.

The square footage requirements and the plant or weight yield for each vegetable is listed in Table 7. Plot A (in the north-eastern corner of the lower terrace) measures approximately 910 square feet in area, while Plot B (in the south-eastern corner of the lower terrace) is around 565 square feet. On square-footage alone, one may assume that thousands of vegetables were being grown in this garden. That only vegetables were grown here is implied by the furrows in the ground, in a style typical of vegetable gardens. As with the trees above, I have divided the square footage of each plot among the varieties of vegetables

equally, allowing an estimate of yield for each.[538] The figures in the table below give some idea of the scale of vegetable production that was possible in this garden. Seasonality would also affect what was grown when, and how much was yielded from each variety. For example, spring cabbages can produce up to four times the yield of summer and winter plantings.[539]

For illustration's sake, should the gardeners of this property have specialised only in cabbages, they would have been producing just under 6,000 cabbages in spring alone. Based on the epigraphic sources and 'familiar' portions seen above, this would have generated around 2,400 *sestertii* for a shopkeeper (though wholesale value cannot be estimated). This is a substantial output of food from one garden. In addition, the potential yield of beans in this garden, calculated by assigning at least one pole to every vine, culminates in just under 50,000 beans grown here per harvest.[540]

The yields calculated in the garden not only demonstrate the profitable use of urban plots for agriculture in Pompeii, but also illustrate why vines, olives, and in some cases fruit trees, were more suited to large plots of land outside of the city, as these would have produced far larger quantities. A growing trade in viticulture in Italy in the first century AD may have influenced the choice to grow a vineyard here, though a locally produced Pompeian wine may have carried a higher value (thus justifying its production inside the city). For *caupona* gardens cultivating on site (as in the *Caupona* of Euxinus), the appeal (and likely value) would undoubtedly have lain in its extra-local production.

The level of expertise in this garden is indicated in numerous ways, including the inter-cultivation of beans among the vines, of vines and vegetable furrows planted and spaced according to agricultural standards from some of the known 'handbooks', of organised irrigation methods, of attempts to acclimatise or improve the chances of survival for young

[538] This would allow seventy-one square feet for each variety in Plot A and 114 square feet for each variety in Plot B.
[539] GardenForumHorticulture 2009.
[540] Each broad bean plant has around 20 pods, and each pod produces between eight and ten beans; see Willis 2015. Counting one bean pole for every vine in the garden creates a maximum total of 48,800 broad beans.

plants by establishing them in pots,[541] and of potential attempts to improve the harvest by treating the vines with lime.[542] Significant, too, is the choice of the owner or gardener of the garden in the House of the Ship Europa to opt for polyculture when growing an orchard alongside vines, vegetables, and potentially small numbers of livestock. Though difficult to ascertain given the uncertainty surrounding with the osteological finds from this garden, the remains of dog, sheep, and cow bones in the lower terrace may be evidence for biodynamic farming in this garden.[543] As there were no cut marks found on any of the bones, it is a possibility that they were not the remains of meals in the garden, thus revealing more, perhaps unexpected, innovations in one working urban garden from first century AD Pompeii.

Today, the practice of keeping sheep in vineyards is increasing; unlike goats, sheep are not destructive and provide cost effective solutions to weed maintenance and soil manuring. For example, in Mendocino and Sonoma, California, it is common for people to lease herds of sheep to aid in the clearing of weeds and low bush from farms.[544] The dog remains in this garden likely belonged to a guard dog, as are commonly found in gardens of this kind,[545] while the cows may have been stored for the transportation of produce or for security at night before grazing in the hinterland by day. Such animals may have been responsible for the large numbers of coprophilous fungi in the immediate suburbs of the city seen above.[546]

Innovations in polyculture, and perhaps even biodynamics (as suggested by the presence of sheep bones), importantly improved the commercial opportunities of the owner or lessee of the garden by tapping into multiple revenue streams in response to local demand. Levels of profit would have undoubtedly been improved with the reduction or removal of transport costs via local sale at the market or in fixed outlets in the city. Overall, gardens such as that in the House of the Ship Europa were certainly living up to the expectations of

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[541] See Jashemski 1974. Many of the pots discovered in this garden were smashed in antiquity before or during planting. Upon excavation, the root cavities of trees were found growing around the pot sherds. Jashemski (1974) took this as an example of some remains of a seedling's pot falling into the planting hole after the pot had been smashed for planting. It may also have been an attempt at improving drainage for the young trees.
[542] Venner 2015.
[543] Jashemski 1974, 403.
[544] For example, see Wilkes 2015.
[545] Jashemski 1979, 247.
[546] Vignola et al. 2021.

Campania Felix and would have been a positive addition to the landscape of Pompeii in its final years, particularly during its time of crisis following the earthquake of AD 62.

3.9 Conclusions

Approaching the dietary status of the Campanian, and Pompeian, population from a novel, produce-first angle has allowed this chapter to reinforce the finds of former bioarchaeological and paleonutritional studies, of a well-nourished Pompeian population benefiting from the fertile and well-connected region in which it resided. In so doing, I have been able to provide direct examples of factors impacting local nutritional, and even economic, statuses, and have shown the agricultural gardens being cultivated in the centre as having a positive impact on the economy first, and local diets second.

Far from the *triste domicenium* described by Martial, many living in Pompeii and the surrounding towns enjoyed a varied, nutrient-rich diet, heavy in carbohydrates, protein, fats, fibre, and essential vitamins and minerals. Native and non-native varieties of rustic garden produce were cultivated and supplied locally in *tabernae, popinae,* at the *nundinae,* and the *macellum*, including recently grafted and acclimatised varieties, such as the peach.[547] The costs preserved from epigraphic and literary records support mass production of many goods locally and imply the broad availability and low cost of locally produced garden 'cash crops'.

Further findings demonstrated that the high level of dietary diversity among a broad social-economic range of the population was facilitated by a ready supply of pulses and fruit on sale at low cost, and the supply of many different types of fresh goods in local hospitality venues, such as blackberries, melons, and peaches. Findings from this interdisciplinary investigation thus support local dentition records, which attest to local diets rich in starchy, sugary foods, and are revealing of the robust immune systems, fast healing, and long-life seen in paleonutritional assemblages. This status can now in part be attributed to the local, growing, and thus increasingly affordable, supply of rustic garden cash crops in the region.

[547] Further discussions of the role of trading outlets in local agricultural *hortus* cultivation is discussed in Chapter Four.

If the figures above are to be taken at face value, high calorie foods were preferred in Campania over nutrient-rich vegetables, perhaps also due to the options for their preservation (for example, drying or acidulating). Nuts, along with pulses, provided variety in the diet and essential fats and protein where meat was not able to satisfy needs. Fruit, however, dominated the non-grain Campanian diet and provided the essential nutrients not available to average Roman inner-city populations (in Rome, for example), [548] hence the higher nutritional status of Pompeii's inhabitants.

The first collation of all recorded archaeobotanical remains in Campania thus allowed me to discover a consistent representation of rustic garden produce consumed in domestic and commercial contexts, in terms of both quantity and variety, regardless of related socio-economic status. This was found to be consistent with findings by Rowan in Herculaneum. In some cases, certain limitations were found to be revealing of food processing activities (for example, the underrepresentation of pulses, perhaps due to their processing for cooking and eating), thus illuminating further consumption habits within the region at this time.

The multidisciplinary approach taken in this chapter allowed a broad understanding of the nutritional and economic contributions of locally grown produce to local populations to be gained, especially when considered in light of transport and urban space use in the city of Pompeii. To support new important finds in the first part of the chapter, the final case study demonstrated the potential for urban agricultural gardens in Pompeii to make a positive contribution to the monetary and nutritional status of the local population in a tangible way, though regional specialities of fruit, vegetables, and wine were found to be a likely possibility for maximum economic gain. Finally, and most important for Pompeian and ancient garden study, the interdisciplinary approach of this chapter has allowed me to debunk the myth that urban agricultural gardens in the city were playing minor economic and nutritional roles, and therefore undeserving of academic attention. On the contrary, the economic and nutritional output of these gardens justified their cultivation on otherwise (seemingly) valuable urban real estate and has demonstrated the economic and dietary benefits of these spaces to local landowners, gardeners, and consumers in Campania at a time of great economic and social

[548] As discussed by De Angelis et al. 2020.

change and uncertainty. How these gardens and their produce fit into wider economic networks remains to be established in the next chapter.

CHAPTER FOUR: 'Buy fresh and support local businesses': Trading and gifting **hortus** *produce in Roman Campania*

In the previous chapters, I discovered an early Imperial growth in *hortus* produce consumption and cash crop cultivation and established the crucial role of agricultural *horti* and their produce in the production and preservation of Roman identity. I also outlined evidence for the above-subsistence wealth and nutrition levels of Campanians in the first century AD and illustrated the types of *hortus* goods grown in Campania which were contributing to this. The opportunities available for exchanging these goods in both monetary and non-monetary contexts, however, remains to be seen. Both shall be the focus of this chapter which aims to provide a generate a better understanding of the social and economic roles of rustic garden produce in Pompeian society.

This investigation will be carried out in two parts. The first utilises epigraphic and literary remains to understand the trading opportunities available to gardeners and rustic produce traders in Pompeii, with consideration for the relationship between the urban centre and the countryside (thus contributing to ongoing debates in this area). This is followed by an analysis of rustic produce gifting and display in the city via an assessment of still-life wall paintings, *xenia*, to understand how this produce was used as a social currency in patron-client relationships and as a form of social display in the home. As with other chapters, *rusticitas* and the memory of this sentiment will be shown as sitting at the centre of both the monetary and non-monetary movement of rustic garden goods in first century AD Pompeii. While Pompeii is once again the geographical focus of my investigation, it is essential that exchange networks outside of the town be considered to better understand the town's role within this, for the economic workings of a town cannot be understood without wider contexts.

4.1 Monetary exchange: Market and fixed trading of hortus *produce*

Before assessing the various opportunities for trading rustic garden produce in Pompeii, it is important to consider the economic status of the city of Pompeii and what this can tell us about the operation of urban agriculture as one part of the economic whole. The consumer-city model, devised by Weber to describe an urban centre providing only

administrative services in return for goods, taxes, and land rent from the countryside, was a term broadly applied to ancient cities by Finley, and Scheidel and Friesen, and more specifically to Pompeii by Jongman.[549] This model has been extensively debated in Roman scholarship, more recently culminating in conclusions which consider the model as not incompatible with a thriving market economy, for keeping consumers supplied was its main concern.[550] However, Finley's original principle aim of the consumer-city model being self-sufficiency, or autarky, should not be essential for an economic system which relies on the city as a centre of administration and supply.[551]

Scholars such as Finley have taken the perceived low-level reciprocal relationship between *urbs* and *rus* in ancient societies as the reason for ancient economies not extending beyond small-scale manufactory nor developing extensive market-networks, as are found in the Medieval period. As such, ancient cities such as Pompeii were considered to be unable to grow as they feverishly consumed goods from the countryside 'and yet still demanded more'.[552] A flourishing market economy cannot be found in the traditional description of a consumer-city for in this model the city is seen as a parasite thriving off the high production levels of the countryside with no reciprocation. However, contrary to the views of Scheidel and Friesen, we have extensive evidence for a thriving economy at Pompeii, inclusive of a market economy which positively impacted the economic status of Pompeii and its residents, allowing the two-way exchange of goods from urban centre to countryside and vice versa.

Aside from the robust diet and economic status of the population seen in Chapter Three, numerous rationales have been suggested in favour of a strong and stable economy in first century AD Pompeii. One relates to the town's geographical position. Located on the banks of the River Sarno (a key trading waterway),[553] and near to road links, such as the Via Appia, Pompeii was well placed to engage in regional, inter-regional, and national trade.[554]

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[549] Finley 1977; Jongman 1988 ('provided it does not imply a lack of ability to feed large numbers of people and support a heavily urbanised elite with its taste for sophisticated luxury goods and services'). See also Scheidel and Friesen 2009.
[550] von Reden and Scheidel 2002, 42.
[551] See Morley 2012 on autarky.
[552] Morley 1996, 6. See also Laurence 2007, 51 and Silver 2006.
[553] The River Sarno is thought by archaeologists to have been one kilometre southwest of the town today; see Vogel and Märker 2010.
[554] For example, bottles of *garum* (fish sauce) produced by the famous manufacturer Umbricius Scaurus in Pompeii have been discovered as far away as Britain.

Due to its advantageous position, Strabo tells us that Pompeii became the unofficial port for the export of goods from Southern Campania, most especially for the inland cities of Nola and Nuceria.[555] The city's proximity to Mount Vesuvius also meant that the soil was highly fertile and well-draining, making multiple harvests per year possible.

Another rationale in favour of Pompeii's economic stability is the apparent increase in specialised manufacture in the early Imperial period. Recent excavations at Pompeii have revealed an increasing commercialisation of southern regions in the town, as residential space was converted or adapted to incorporate more shopping and hospitality outlets.[556] This is further supported by archaeological remains from the town which reveal an infrastructure geared towards travelling trade, in the form of cart ramps into commercial properties, traffic controls, and numerable *cauponae* of varying size.[557] In particular, the sophisticated traffic system from Pompeii suggests a high level of goods and building materials being transported in and out of the town.[558]

The increasing commercialisation of the town in the first century AD enabled the elite in and around Pompeii to derive wealth from rent and taxes. Capital in the hands of local landowners would have subsequently incited a demand for manufactured goods, which we see growing in the archaeological record of the city from the first century BC (including new agricultural gardens in Pompeii's final years).[559] This led to an influx of tradesmen to the urban centre of Pompeii, many of whom would have worked in the workshops, hospitality venues, and agricultural gardens of the urban centre.[560] The income derived from the sale of small-scale manufactured goods among the non-elite population would have been spent on rent and other manufactured goods.[561] As such, elite wealth sourced from rent and taxes

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[555] Strab. 5.4.8. In antiquity, the port is thought to have been one kilometre further inland that it is today following its natural extension during the eruption. The coastal harbour would have been found just outside of the Marine Gate, where warehouses (*cellae*) large enough to store a mass of imported goods have been discovered; see Berry 2016, 224. *Garum* bottles made in the manufactory of Scaurus in Pompeii have been found as far away as Southern France, while 30 percent of *garum* bottles discovered in Campania to date have been traced back to his Pompeian shop. Wine from Pompeii has been discovered as far as Middlesex in the UK; Beard 2010, 161-2; Berry 2007, 224-7.
[556] Ellis 2018.
[557] Poehler 2016, 2017; Flohr 2016; Laurence 2007, 2011.
[558] Poehler 2016, 194-5.
[559] Ellis et al. 2011a; Tibbott et al. 2012; Poehler and Ellis 2014; Ellis and Pardini 2015.
[560] Dobbins 2007, 175.
[561] Mayer 2012, 61.

would have facilitated rather than stemmed production in Pompeii and incited the urban-rural and rural-urban exchange which allowed Pompeii to grow in the first century AD;[562] the cyclical movement of wealth allowed local commercial and market economies to grow and as such incited 'competitive local and regional market economies, in which there were incentives for organisational and technological innovation'.[563] As a result, towns such as Pompeii gave rise to a 'middling class' in the early Imperial period, in other words those living above subsistence level with a moderate to high income and disposable income enough for non-essential goods.[564] This goes some way to explaining why a 'linear development from periodic to permanent markets [can be] linked to economic progress' in Pompeii,[565] and why a local increase in supply and demand for *hortus* produce (a form of specialised manufacturing, see Chapter Three) expanded in the first century AD.

Up until recently, the consensus among scholars has been to wholly reject the consumer city model in relation to Pompeii due to the evidence for a thriving market and manufacturing economy. In disagreement, Erdkamp and Zuiderhoek chose to accept and build upon the model, seeing it as compatible, rather than conflicting with, a prosperous market economy at Pompeii. Zuiderhoek, along the same lines as Flohr, argued that this level of wealth was not incompatible with Weber and Finley's consumer-city model, as a high level of inner-city specialised manufacture still began with agrarian-derived wealth among the elite. The apparent strong economic basis of Pompeii has been attributed to, and at the same time an outcome of, a local growth in specialised manufacture, hospitality, and services in the first century AD, as observed in the archaeological records of Pompeii. Commercial agricultural gardens are not often considered as contributing factors to the economic stability of the town, nor is the reliance and contribution of urban *horti* on fixed and unfixed trading points in the urban centre appreciated. Understanding where *hortus* produce fits into nundinal and market networks will shed light on the opportunities available to *hortulani* (market garden sellers) in the town and reveal more about the importance of *hortus* produce to the people of Pompeii.

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[562] Eighmy 1972; SEG 38-1953.
[563] Zuiderhoek 2018, 47. See also Erdkamp (2001, 2012).
[564] Mayer 2012; Wallace-Hadrill 2013. For applications to the economy, see Foxhall 2007; Garnsey 2009; Flohr 2016, esp. 80, 2019.
[565] SEG 38-1953.

Archaeological, epigraphic, and literary evidence relating to Pompeii paints a picture of a thriving market town engaged in national, inter-regional, and intra-regional trade by the mid-first century AD, the output of which was a high level of specialised manufacture, agriculture, and animal husbandry from the urban centre and hinterland. As a result, the town boasted a population with (for the most part) above-subsistence wealth and high levels of nutrition, the cause and effect of which we saw in Chapter Three. An increase in workshops and hospitality venues from the mid-first century BC in the Region I and II (southeast corner of the town) demonstrate the effect of Roman colonisation upon the commercial character of the town. Prior to this time, it is likely that Pompeii was an agro-town, from which many commuted to their fields and worked their own land for income. Numerous wells found below some of the oldest houses in Regions I and II, but not belonging to them, suggested to Nappo that the Region I and II district was itself farmland prior to its development sometime between 300 and 180 BC.[566] More recent excavations aiming to understand earlier histories of Pompeii have demonstrated that, after the earthquakes of AD 62/3, the south-eastern portion was beginning to return to its former identity as the agricultural district of the city, leading to one of the questions posed at the beginning of this thesis: was rustic garden produce growing in demand commercially at this time?[567]

An agro-town is similar to the consumer-city model, though it differs in that the majority are engaged in agriculture as their main occupation and derive most of their income this way, rather from rent. Pompeii's transformation from an agro-town to one which was 'economically and socially diverse… created economic opportunities outside agriculture' and allowed a 'middling class' with access to goods from elite culture to grow.[568] In Chapter Three, I referenced the estimated twenty-five to thirty percent of households in Pompeii who had regular access to 'consumer goods commonly associated with elite culture', and the 'middling class' (a further twenty-five percent) below this who had some level of access to the same goods in the first century AD. This model of a broad distribution of wealth is in contention with the views of Scheidel and Friesen, who considered the non-elite middling group of Pompeii to be small.[569] Their estimate of only ten percent would mean that the

[566] Nappo 2007, 348-9.
[567] Such finds form the basis of Chapter Six.
[568] Mayer 2012, 61.
[569] Scheidel and Friesen 2009.

majority of the population would have been living at or below subsistence level.[570] Instead Flohr, via an assessment and quantification of architectural features in Pompeii associated with 'elite culture' (such as peristyles) found evidence to suggest that sixty percent were living above subsistence level in Pompeii which, when combined with archaeobotanical evidence for a well-nourished population seen in Chapter Three, importantly points to a broader distribution of capital flow than previously thought.[571] Flohr's estimate means that the 'few rich/many poor' dichotomy cannot be applied to the city of Pompeii in this period.[572] By implication of a growing manufacturing economy, including specialised agriculture, owning land in Pompeii appears not to have been a requirement for making a modest income in Pompeii. One key element in Pompeii's economy was contributing to this in the first century AD: the *nundinae.*

4.2 The market economy of Pompeii

Laurence and Berry separately view the small-scale workshop as central to Pompeii's robust economy, though several difficulties, namely the inadequacy of archaeological records and preservation conditions, prevent an accurate quantification of this economy at this time.[573] Small-scale manufacturers would, as a standard, have worked full-time and would have been producing goods intended primarily for local distribution.[574] This differs from part-time household production which was often carried out seasonally or during non-working hours (for example, alongside agricultural work) to supplement household needs and income, as we saw with the fictional Simulus in Chapter Three.[575] Notably, gardens are considered one example of part-time work by elite writers of late Republican period, before horticultural discussions turn to *otium*.[576]

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[570] Scheidel and Friesen 2009, 83-4.
[571] Flohr 2016; Rowan 2016; Ciaraldi 2007; Murphy 2015.
[572] Flohr 2016, esp. 80.
[573] Berry 2013, 227; Laurence 2007, 66. See Monteix 2016 for the issues and methods involved in quantifying the manufacturing economy at Pompeii.
[574] Berry 2013, 227; Laurence 2007, 66; Zuiderhoek 2018.
[575] E.g., see Hollander 2018.
[576] See Chapter Three.

The rise in *tabernae* in urban centres from the late Republican period onwards meant that many items once created at home were now being made on the market.[577] In an economic sense, Mayer refers to this as the creation of a new commercial class who were actively marketing goods in response to moving demand. Flohr refers to this group as the 'middling class' who were, most importantly, in possession of a disposable income.[578] The elite anxieties highlighted in Chapter Two, which were dominated by a perceived movement away from self-sufficiency and a growing reliance on the market as the downfall of Roman morality and identity, are recalled here. Commercial demands driven by a broader distribution of capital flow expanded needs outside of the periodic *nundinae*'s capacity to bring a wider variety of goods and trading opportunities to more people and cities, though their original need for supplying essentials remained. This demand was likely further encouraged by the (mostly) stable supply of grain to Italy from Egypt, North Africa, Sardinia, and Sicily by the early Imperial period, the lower cost of which would have increased demand for other goods.[579]

There is also evidence to suggest that the forum in Pompeii functioned as the town's central market before a fixed *macellum* was constructed there in the first century AD, some time prior to the earthquake of AD 62/3. The construction of a fixed market building and other public building projects (such as the Sarno baths, still under construction at the time of the eruption) indicates the priorities of the city and its inclination to align the town with Augustan and post-Augustan developments in Rome.[580] Further, the mass importation and exportation of goods to and from Pompeii appears to have only begun in the first century AD, including staples which piggy-backed on the cabotage of luxury items;[581] the transportation of valuable and expensive items with cheaper goods by merchant ship allowed the costs of the latter to be absorbed by the former.[582]

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[577] Mayer 2012, 61. Mayer (2012, 66) also states that a rise in *tabernae* would have contributed significantly to a rise in Rome's overall GDP, due to the changes it initiated in the 'socioeconomic underpinnings of urban life'.
[578] Flohr 2016, 80-88.
[579] The *annona* (grain dole) would have removed the cost of grain altogether for citizens living in Rome (and some other cities); see Erdkamp 2005; Geraci 2018.
[580] Holleran 2012, 161, 168-9, 174-5; Fagan 2002, 66-7.
[581] Exports from Pompeii appear to have only begun in the mid-first century AD. Amphorae of wine from across Greece, Turkey, Sicily, Palestine, and other parts of Central Italy have been found in Pompeii, alongside amphorae of olive oil from Libya and Spain, and garum from Spain. See De Sena and Ikäheimo 2003; Laurence 2007, 80.
[582] The organised nature of goods movement implies contacts and knowledge; Rice 2016, 104.

While the cabotage of cheaper items with more expensive goods would have increased competition for staples such as rustic produce in the Pompeian market (an effect which was commented on by Pliny the Elder), the perishability of rustic goods would have made local production preferable in most cases.[583] As such, 'high prices in the urban market and relatively low costs of transport served to promote intensive, market-oriented, specialised production of expensive perishables: fruit, certain vegetables, dairy products', in both the urban centre and the immediate suburban areas outside of the city.[584] As seen in Figure 5 above, the location of agricultural or pastoral activities was often determined by the cost of transportation to a market centre and the perishability of items. In the light of the challenges posed by perishability and maintenance, Frayn states that the market should be reached 'comfortably in a day's trip', which MacMullen takes as roughly four hours walk each way, equivalent to 'a fifteen-mile radius around a market centre'.[585] A network of cities which facilitated the easy, regular, and short-distance movement and exchange of goods were required by ancient economies. In Italy, this was known as the *nundinae.*

4.2.1 Nundinae *and roaming traders*

This section will explore the potential impact of small-scale agriculture on the local economy of Pompeii via an exploration of opportunities for the monetary exchange of rustic produce in the city and region. Throughout history, periodic markets have continued to serve as crucial points of sale for producers, traders, and consumers in urban and rural systems. By the mid-Republic, every town under Roman rule was part of a regional or intra-regional *nundinae*.[586] In Campania, there were at least four *nundinae* (held every eight days, hence *nundinae*, due to the Roman's inclusive counting) covering twenty-five urban centres, including Pompeii.[587] Nundinal networks, often exclusively made up of cities within one region (due to travelling distance between centres), facilitated the exchange of goods and have

[583] Von Thünen 1921; Wilson et al. 2012.
[584] Morley 1996, 107. This is in consideration of von Thünen's (1921) model of agricultural location; see Zuiderhoek (2018, 50-1) for a summary of this model.
[585] Frayn 1993, 22-34; MacMullen 1970, 337.
[586] Macrob. *Sat*. I.16.34.
[587] MacMullen 1970, 339-40. The word *nundina* is thought to derive from *novem* (nine) and *dies* (day). Due to the Roman habit of inclusive counting, the market would have lasted eight days and be held on every ninth in a new location.

been described as a multifunctional 'institution' and 'the temporal equivalent of the forum'.[588] They were also a key source of perishables, farm surplus, and essential items such as salt, and minor luxuries such as spices.[589] The smallest cities in a nundinal network would have specialised only in locally produced goods at a small scale. Given that Pompeii was part of a network including the larger cities Capua and Nola, and even Rome in one calendar, it may well have acted as one of these 'smaller' cities.

At the *nundinae*, traders were provided with the opportunity to reach a wider customer base, while consumers could access goods not available locally,[590] stay up-to-date with, or participate in, political matters,[591] and purchase religious artefacts for festivals at certain times of the year.[592] The *nundinae* also served the important purpose of circulating wholesale goods, as suggested by their association with auctions, most commonly held on the busiest days in the nundinal calendar.[593] Many transactions could be carried out on the *nundinae*, meaning that the livelihoods of many were impacted by its presence. For example, Apuleius tells of a market gardener transporting his goods to market on a donkey and selling them to a *venditore* (middleman) before immediately returning to his garden.[594] Likewise Simulus, as we saw in Chapter Two, walks to market with his produce and returns on the same day with his shoulders light and his pockets heavy with money. Even large purchases were made on the *nundinae*, one example being Cicero purchasing a large property at auction.[595]

Four Campanian *nundinae* schedules have been discovered on marble (*indices nundinarii*) to date. The writer of the calendar in Figure 18 appears to have worked in a seven-day week (see the left-hand column listing *dies*, or days) when noting the location and date of local markets. Cooley and Cooley and MacMullen separately take this calendar as an indication that Campanian markets worked on a seven-day cycle by the mid-first century AD,

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[588] Macrob. *Sat*. 1.16.34; Dionys. *Ant. Rom.* II.28, VII.58; Festus, s.v. *Nundinalem Cocum*.
[589] Ker 2010, 363; Holleran 2019, 188; De Ligt 1993, 9, 106-7, 112; Morley 1996, 166; Shaw 1981, 39. Though *nundinae* became less essential in Rome as the infrastructure became increasingly commercialised, they nonetheless continued to act as an important supply of perishables. See MacMullen 1970, 188, 333; Holleran 2019.
[590] De Ligt 1993, 92; de Ligt and de Neeve 1988, 387-9.
[591] Col. *Rust*. 1. Praef. 18; Macrob. *Sat*. 1.16.28-35.
[592] Religious rites were often carried out on days of the *nundinae* due to the higher crowds in attendance, often alongside games (Macrob. *Sat*. 1.16.29-32).
[593] Caecilius notes this link. See Andreau 2000, 69-70, 76; Morcillo 2000, 173-84; Fentress 2005; Ker 2010, 182.
[594] Apul. *Met*. 9.32.
[595] Cic. *Quint*. 3.1.3.

rather than the usual eight-days of official Roman calendars.[596] This may be a result of increasing surplus in the region, in which case the claims of Morley, Finley, and Jongman regarding low demand and output in the region would once again be proven false.[597]

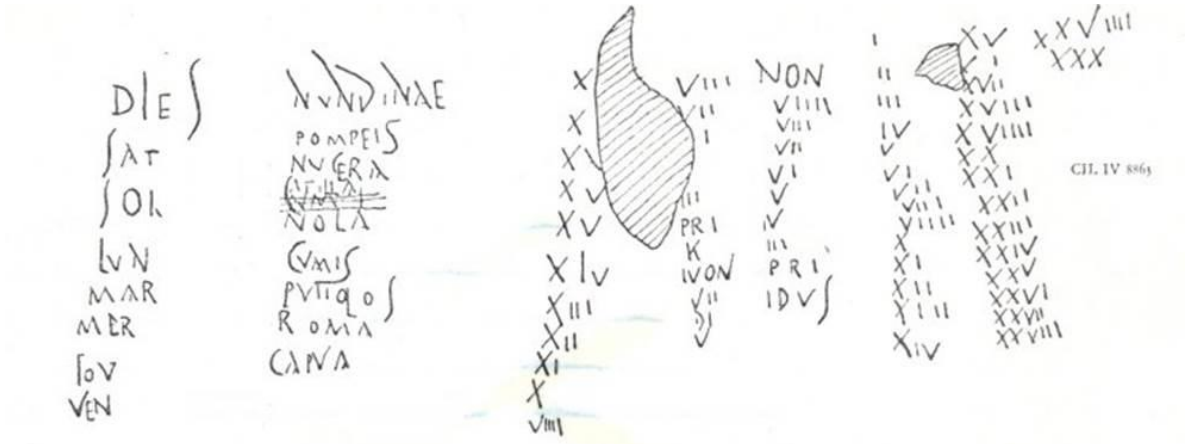


Figure 18: *Indices nundinarii* graffiti found in the *Taberna Vasaria* of Zosimus (III.4.1) in Pompeii, referencing Pompeii, Nuceria, Atilla, Nola, Cumae, Puteoli, Rome, and Capua (CIL IV 8863). Image: Pompeiiinpictures 2022.

Importantly, *nundinae* are thought to have followed the pattern of religious festivals, games, and the agricultural calendar and were frequently organised so as not to interfere with the schedule at Rome.[598] Tuck's assessment of *edicta munerum* (game advertisements) showed that the agricultural calendar at Pompeii played a significant role in the scheduling of games and markets in the town; the harvest dates given by Columella (13 April, 23-24 June, 1-26 July, late August, 1-13 September, early October) line up with gaps in the spectacle calendar for the city, 'suggesting a connection with the annual agricultural cycle'.[599] In other words, the regular participation of Pompeii and other Campanian cities in nundinal, festal, and spectacle schedules, now held more frequently in the first century AD, denies the claim that Pompeii was an 'autarkic town-country [unit]…. Only occasionally intruded upon by outside

[596] Cooley and Cooley 2004, 159; Holleran 2019, 181-2.
[597] This is supported by Flohr and Wilson (2016) who demonstrated the capacity of Pompeii's hinterland to support the town's nutritional requirements above subsistence level.
[598] Ker 2010, 363-4; SEG 38-193; Tuck 2008/2009, 137-9.
[599] Tuck 2008/2009, 130-1.

influences' but does further support the town's partial status as an agro-town at this time (for enough individuals would have been engaged in agriculture to warrant organising other events around key agricultural occasions).[600]

Though archaeological records do not indicate where *nundinae* would have been held in the city, we can assume that they were held in large open areas. One possible location for this in Pompeii was the arcade between the Large Palaestra and the Amphitheatre, as suggested by a notice securing the trading post of a stallholder on the wall of the amphitheatre and the pop-up stalls which can be seen in the fresco of the AD 59 riot adjacent to Pompeii's Amphitheatre (see Figure 14).[601] The Forum and the Basilica were also well-established locations for pop-up stalls; a fresco from the Estate of Julia Felix (II.4.3-12) (Figure 19) depicts stands between the columns of what is often assumed to be the Pompeian Forum, but could just as well be the Basilica.[602] Various funerary reliefs from the port town of Ostia show numerous occupations in the port town. One example (Figure 20) shows a female vegetable vendor standing in an alcove and selling bunches of leeks, cucumbers, and other vegetables from her trestle-table stall. This seller likely transported her goods to market in the basket below the table.



Figure 19: Fresco from the Estate of Julia Felix showing the sale of clothing, pots, and other objects among columns of (potentially) the Forum in Pompeii. Image: Wikimedia Commons/*Soprintendenza Archeologica di Pompei*.

[600] Morley 1997, 46.
[601] *CIL* IV 1096 ('By permission of the aediles Gnaeus Annius Fortunatus occupies [this space]'). Pop-up stalls can be seen in the arcade adjacent to the Amphitheatre and in the columns of the Large Palaestra in the fresco of the Pompeian riot of AD 59 (NM inv. 112222), found in the House of Actius Anicetus (I.3.23).
[602] See Holleran 2019, 193.

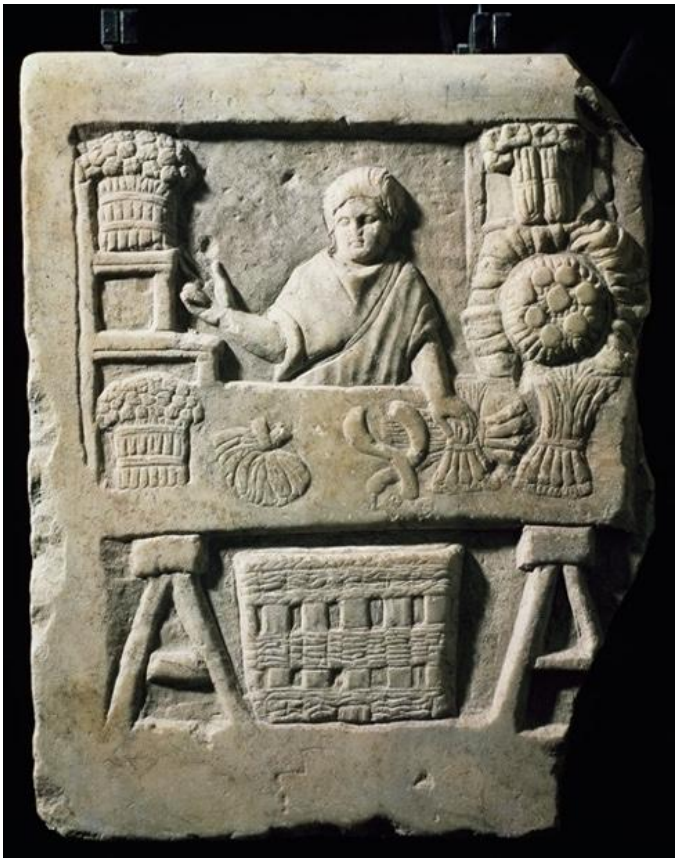


Figure 20: Bas relief of a tombstone from Ostia showing a female vegetable seller, 3rd century. Image: *Museo Ostiense.*

Alongside *nundinae* and wholesale to *venditores*, rustic produce sellers had the option to forego kiosk charges and fixed outlet rental altogether and sell produce as a hawker. Roaming traders were a key feature of market and non-market days in the city. In Rome, there are records of various types of hawkers congregating around amphitheatres and circuses during the *fasti*, games, and *nundinae*. For example, in front of the *pulvinar* near the Circus Maximus in Rome, a *pomarius* sold fruit to those attending the games.[603] Elsewhere, Martial speaks of the vendor selling cooked chickpeas to an idle crowd.[604] Similarly, Cicero speaks of the fig seller's shout of '*Cauneas!*' (Caunean dried figs) in Brundisium, while the characteristic cries of '*Mala! Mulieres, mulieres meae!*' are proudly recorded on an apple

[603] *CIL* VI 9822.
[604] Alongside fish, snacking sausages, and even slaves; see Mart. *Ep*. 1.41.5-10.

seller's funerary monument in Narbonne.[605] Next to his calls, he is depicted with a basket of apples around his neck.

4.2.2 The macellum

This local, rising demand for manufactured and locally cultivated goods, occurs around the same time that new fixed trading outlets, such as the 'Northwest Building' (thought to be the *holitorium*, or 'vegetable market') (Building D on Figure 21) and the *macellum* were built in the Pompeian Forum in the mid-first century AD (Building O in Figure 21).[606] Given the orientation and high ceilings of the Northwest Building, it has been assumed that this building was purpose-built for hosting vegetable and fruit sellers (given its cool interior), as an equivalent to Rome's *Forum Holitorium*. Excavation of *hortus* produce in the shops adjoining the *macellum* attest to this further.[607] In addition, numerous trading outlets appear to have been constructed in the final century of the city's existence to meet local demand, particularly in the southern regions of the city.[608] Various literary sources pinpoint the Pompeian *Macellum* as the main sale point for fish and meat or livestock.[609] In support of this, Pliny stated that the *hortus* was once the poor man's market ('*horto plebei macellum*'), hinting at the sale of fruit and vegetables in this type of building. Pliny's claim is supported by frescoes found in the colonnade of the *Macellum* which show live and dead birds, fish, and vessels for wine and other produce, in addition to sheep skeletons in a pen and fish scales in the central basin. In shops adjoining the *Macellum* (Buildings P in Figure 21), 'charred figs, chestnuts, plums, grapes, fruit in glass vessels, [and] lentils' were discovered, alongside grain, loaves of bread, and cakes.[610] The northern exposure of these shops would have served to protect stock from the sun, perhaps indicating their purpose-built nature.[611] Further changes to the commercial landscape of Pompeii following the AD 62/3 earthquakes is viewed by

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[605] Holleran 2019, 212.
[606] For the growing demand of luxury and modified goods, see Chapter Three. Mau (1899, 93) felt that the long room in the northwest corner of the Forum in Pompeii was used for vegetables and farm products, in part due to the proximity of the *mensa ponderaria* located in a recess close-by. The Macellum appears to have been built post-AD 62. See also Holleran 2012, 2019.
[607] See note 605.
[608] Pirson 2007, 468.
[609] Plaut. 971-80; Mart. *Ep*. 10.37.19; Apul. *Met*. 1.24-5, 2.2. Inscriptions from Rome also support the sale of fish and meat in the macellum; Holleran 2019, 172.
[610] Mau 1899, 97. The absence of vegetables in the Forum archaeological record does not negate the possibility of them being sold here; for the destruction of vegetable remains in the eruption, see Chapter Three.
[611] Mau 1899, 97.

Dobbins as the city seizing an opportunity to 'lend a new grandeur to their corporate, civic existence' by mimicking building progress in Rome, where similar fixed trading outlets were being constructed close to the Forum.[612]

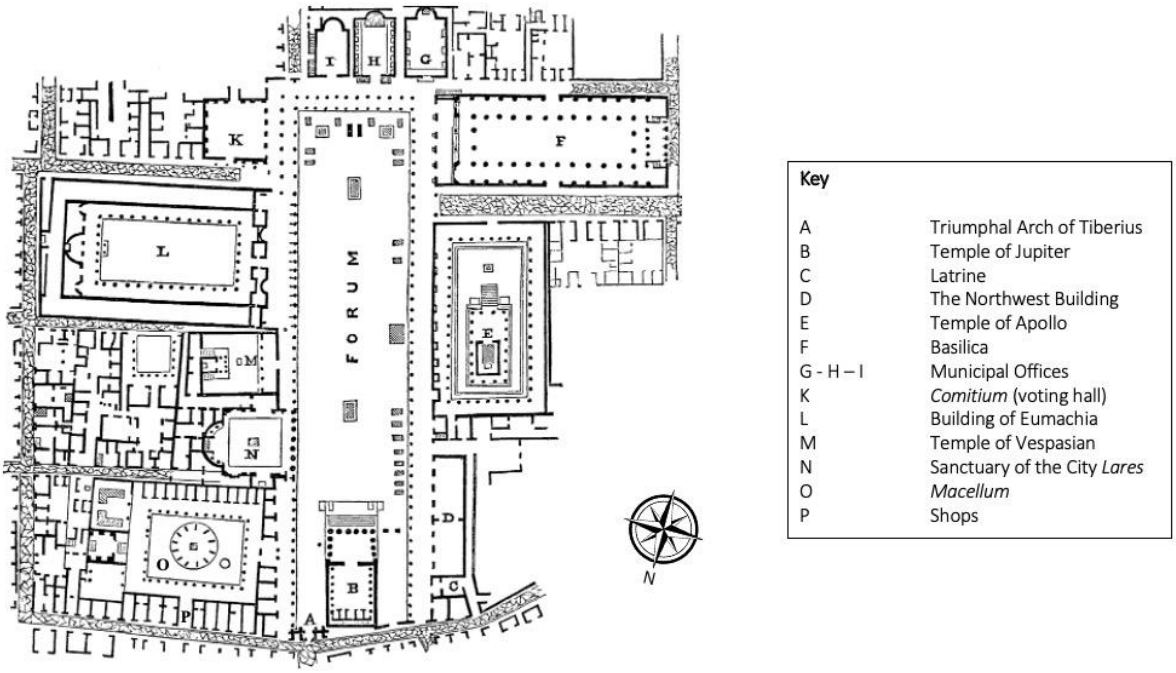


Figure 21: Map of the forum at Pompeii. Image: Anthony Rich (1849)/Wikimedia Commons.

Holleran believes that the *Macellum* would have provided a secure environment for the wealthy to shop for essentials and also luxury items, though individuals of this standing likely tasked slaves with this job.[613] Considering the higher costs that were undoubtedly associated with produce sales in and around the Forum, it is a possibility that 'modified' fruit and vegetables (as seen in Chapter Two), cultivated for the tables of the rich, were sold here. Varro tells us of a specialised building for this purpose in Rome, named the *Forum*

[612] The Forum Boarium was located in front of the temple of Fortuna and Mater Matuta (Liv. *Hist*. 33.27.3-4), the Forum Suarium (mentioned in inscriptions around AD 200) was located near the barracks of the *cohortes urbanae* in the north portion of the Campus Martius (*CIL* VI.3728=31046, 9631), the Forum Piscarium was along the Tiber near the Temple of Portunus, and the Forum Holitorium was "between the Capitoline and the Tiber just downstream of the Theater of Marcellus" (Aicher 2004, 268; see also Var. *Ling*. 5.146, 106.1). See Holleran 2012, xiv for a map of Rome, including the locations of the Forum Boarium and Forum Holitorium. See also Dobbins 2007, 175; Holleran 2012; Mau 1899, 79, 92-3.
[613] Holleran 2019, 179.

Cuppedinis, derived from *cuppedium* ('delicacy'), notably named by many as the *Forum Cupidinis*, or the 'Greed Market'. The equivalent space in Pompeii likely offered for sale exotic products such as black pepper, expensive cloth, songbirds for consumption, and imported fruits not produced or cultivated locally, though such goods could just have easily been sold across from the *Macellum* in the Northwest Building.[614]

Taking all of this into account, the recent building and restoration of dedicated marketing outlets in the Pompeian Forum are testament to a thriving economy actively responding to consumer demands. Rustic garden produce appears to have been one important part of the growing commercialisation of Pompeii's infrastructure. However, rustic produce was not only growing in importance in the monetary economies of the town. Gifting, a subject of great interest in Roman scholarship, presents another opportunity for understanding the role of rustic garden produce in Pompeian society in the first century AD.

4.3 Non-monetary exchange: Gifting hortus *produce in Pompeii*

I have already established that most of the population of Pompeii had regular access to *hortus* produce via periodic markets and fixed trading outlets. However, aside from growing your own, purchasing rustic produce was not the only means of attaining it in Pompeii.[615] An assessment of literary, pictorial, and epigraphic records related to food in the region reveals a separate economy for its exchange: gifting. In this section, I investigate the means for gifting rustic produce and its possible contribution to the local 'social economy' of Pompeii. In so doing, I demonstrate the *generositas*, *rusticitas*, and *simplicitas* implied by the act of gifting rustic produce and the display of this traditional deed in domestic art. Through the important social game of gifting, we may come closer to the symbolic implications and semantic charge of rustic produce in action.

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[614] Roaming hawkers may also have sold delicacies; Gnatho, through the mouth of Terence, talks of a trip to the market where, upon arrival, *cuppedinarii* ('sellers of fancy foods'), including 'fishmongers, butchers, cooks, sausage-makers, and fishermen', rushed up to greet him with their wares; see Ter. *Eun*. 256-7. A high quantity of partridge remains were discovered in the Insula VIII.7 assemblages, with the eggs showing signs of being hatched and kept as breeding animals (Taivalkoski et al. 2022, 2, 6); it is possible that partridge meat was sold to elites as a delicacy (for bones were not well represented) while eggs were likely consumed by individuals in lower socio-economic levels (due to the high representation of partridge egg shells).

[615] As established, self-sufficiency was not attainable for most of the urban population living in Pompeii at this time, due to the unavailability of space and the growth of a manufacturing class.

4.3.1 The gift of friendship

To understand the social function of the gift of rustic produce in Roman society, we must first gain an appreciation of the various tensions behind the concepts of *amicitia* (friendship), *kharis* (joy), and *gratia* (a mark of favour). This will allow me to understand why and how rustic produce was gifted and where the practice came from. Most importantly, I will be able to establish why this practice come to be immortalised in wall paintings in *domus* throughout Campania, relating this to the outcomes of the former two chapters.

A tension existed between gifting and commerce in the Roman period, with different forms of gift exchange leading to varying 'repercussions on social capital and social visibility'.[616] Today, a gift is understood as something which is voluntarily given to another as an expression of affection, appreciation, gratitude, or friendship. Reciprocation or payment is not (formally) expected in return. This definition is standard in contemporary society, though the same cannot always be said for antiquity. In Roman society, the gift was grounded in the concept of *amicitia*, or friendship. However, despite its etymological root in the Latin term *amare* ('to love'), *amicitia* was often considered one of the core components of elite and political life in Roman society, most especially when forming ties with others to gain advancement in the *cursus honorum* ('course of honours' in public office). Due to the maintenance of relationship ties wrapped up in *amicitia*, the notion of reciprocity was often implied.

Though Konstan views *amicitia* as founded in mutual affection, which cannot always be said to be true, his statement that 'friendship among the Romans was a voluntary bond of mutual devotion' can be agreed upon.[617] The associated notions of obligation, mutuality, and voluntary participation between two parties can be traced back to Greek philosophical debates on the tension between morality and obligation in *philia* (the equivalent of *amicitia*) and *kharis* (grace or kindness) in the act of gifting.[618] While Seneca viewed *kharis* as the

[616] Carlà and Gori 2014, 10.
[617] Konstan 2014.
[618] This is not to say that individuals could not have affection for one another in a 'friendship' capacity. As observed by Aristotle, humans are inherently political and social animals, meaning that friendship is practiced 'in every community' Arist. *Eth. Nic.* 1159b26-27. See Burton 2011, 28. That affection is implied by friendship

benefaction of joy (perhaps rather too innocently considering the social and political contexts of self-advancement and preservation in the first century AD) Konstan instead reads *kharis* as the gratitude expected following a favour (or gift), and the owing of something in return.[619]

Given the contentious nature of *amicitia*, the concept of obligation in gifting is perhaps best encapsulated in the term *gratia*.[620] Though Cicero relates *kharis* directly to *gratia*, the two differ; unlike *kharis*, which has joy at the centre, *gratia* is congruent with expected reciprocity and a debt of gratitude (or some other gift) which was compulsory on the behalf of the beneficiary. Cicero says: 'Even if one cannot return *gratia*, one can certainly have it.'[621] As such, expected reciprocation in gifting is not so much indicative of friendship as it is a form of exchange, thus transforming the act into an opportunity to exert one's power over another and to reinforce inequality and social hierarchies. Importantly, Seneca was writing during the Augustan gift reforms which sought to preserve true generosity over reciprocal transactions. Unsurprisingly these failed and only served to give rise to more lawsuits relating to unpaid favours, setting a precedent in the reigns of later emperors for 'reciprocal' non-monetary gifting as a regular form of exchange in Imperial society. These included the gifting of food.

In Juvenal's *Satire* 5, the *cena* of Virro is used as a setting for highlighting non-reciprocal gifting and the various hypocrisies of patron hosts which negate their status as *amicus* of their invitees and the recipients of their food gifts. Virro has invited his peasant client Trebius to a *cena*. With disdain, the narrator tells us that only under the fictional circumstance of Trebius being raised to an equestrian rank would Virro treat him as an *amicus* or *frater,* a beneficial status which would be confirmed by the gifting of items and food relative to his status as Virro's equal.[622] Food gifting was therefore only useful to Virro when he expected equal or greater reciprocation in return. However, in reality Trebius is treated to the opposite of generosity with measly gifts which do not benefit him, but rather insult him by their

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is supported by *amicitia's* close relationship with *familiaritas* (intimate acquaintance) and *necessitudo* (a close connection; intimacy); see Brunt 1988; Konstan 1997.
[619] Konstan 2014.
[620] E.g., see Plaut. *Capt*. 3.5.63; Cic. *Verr*. 2.3.82, 189 (mark of favour); Cic. *Inv*. 2.22.66, Plin. *Ep*. 9.31.21 (gratitude); Plaut. *Men*. 2.3.36 (obligation).
[621] Cic. *De Off.* 2.20.69 (transl. Konstan 2010).
[622] Juv. *Sat*. 5.135-6: *da Trebio, pone ad Trebium. vis, frater, ab ipsis ilibus.*

uselessness. As such, the items he gifts at the table go against the concept of *kharis* and *beneficium*; for Seneca the Younger, the physical object being gifted tended to manifest joy if it was both useful and needed (*beneficium*) and given without any intentions of self-interest or feelings of obligation. For example, he says:[623]

> Whoever called a morsel of bread a benefit, or tossing anyone a copper, or enabling him to get a light? And sometimes these are more helpful than very large gifts; yet, for all that, their cheapness detracts from their value even when the necessity of the moment has made them necessities.

The unamicable and unvirtuous character of Virro is further emphasised by his ranking of food quality and type according to guest status. While Virro treats himself to mushrooms of a quality enjoyed by Claudius,[624] Trebius is forced to do with rotten apples which are not only useless in their quality, but not needed (being commonplace goods in Italy). But the narrator of this scene mocks the fool who endures such unfriendly treatment more than once, for he who is drawn in by the promises of false friendship will endure only disappointment and embarrassment: 'This banquet you deserve, and this kind of friend'.[625]

Food gifts given in the right (or wrong) circumstances were thus able to communicate the qualities of the benefactor, as well as his or her relationship to his guests and dependents. This is highlighted by Graeber who states that gifting was one of the central means for maintaining social connections due to the obligations attached to the act of gifting and the gift itself.[626] This is best described by the term 'fictive gift', so named by Crook to describe a gift 'cloaked in the language of equality and generosity, but it is in reality intended to exercise power over another.'[627] The semantics of *amicitia* are often cloaks for such behaviour, as we saw at Virro's *cena,* with friendship acting more as a mask of dependence or obligation than mutual affection. In other words, gifts which expect reciprocation are 'fictive', for they are

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[623] Sen. *Ben*. 4.28.6: *Quis beneficium dixit quadram panis aut stipem aeris abiecti aut ignis accendendi factam potestatem? Et interdum ista plus prosunt, quam maxima; sed tamen vilitas sua illis, etiam ubi temporis necessitate facta sunt necessaria, detrahit pretium.*
[624] This is a tongue-in-cheek reference to the rumours that Claudius was murdered by his wife when she poisoned his mushrooms.
[625] *his epulis et tali dignus amico*; Juv. *Sat*. 5.173.
[626] Graeber 2001, esp. 220.
[627] Crook 2013, 67.

not given with *kharis* or the giver's needs in mind, but are rather aimed and the social, political, or even financial advancement of the benefactor.[628]

To demonstrate the role that rustic garden produce played in the reinforcement of inequality and hierarchies through gifting, and to reveal alternative ways that these consumables were being moved around and exchanged in Pompeian society, I turn to *sportula* and *xenia*, two common food gifts in the Roman period. Though public gifts of food were a common occurrence in Roman (and Pompeian) society, we do not have any specific evidence for the 'gifting' of rustic garden produce to the people via this route (instead bread and grain dominate). Therefore, the following will focus on small-scale rustic produce gifting which commonly occurred within the space of the *domus*.

4.3.2 Sportula

Duncan-Jones suggests that there were three distinctive types of food parcels, or *sportula*, though all references are derived from the satiric genre: 'A morning payment at the *salutatio*',[629] 'A payment at the baths, made in the afternoon at about the tenth hour, when bathing took place',[630] and 'A payment at dinner'.[631] The evolution of the term *sportula* (σπυρίς) runs parallel with historical contexts of the periods in which it is referenced, beginning as an essential farming tool in the Greek and Roman Republican periods, before a food gift basket during the late Republican and early Imperial eras, and a gift of money by the mid-first century AD.[632] The Greek term σπυρίς first appears in reference to large baskets or creels.[633] The first known Latin reference is from the second century BC when Plautus puts the term '*sportam'* into the mouth of Ero, who tells the character Cyl to take a basket to the market to buy food for the *cena*.[634] The literal meaning of 'basket' is also echoed by Cato between the third and second centuries BC, as essential tools of practical use on the farm, as

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[628] *Magnitudo* is referenced in relation to '*vis amoris'* (Cic. *Fam*. 2.7.2), '*beneficii'*, (Cic. *Fam*. 1.7.2). See also Sen. *De Ben.* 1.5.2, 3.19.1 (on benefits being freely conferred), 4.29.2, 5.11.5.
[629] Mart. *Ep*. 3.36, 6.88, 14.1; Juv. *Sat*. 1.120.
[630] Mart. *Ep*. 1.59, 3.7, 10.70.
[631] Mart. *Ep*. 3.30, 3.60.1-2, 9-10; 3.7, 14, 4.68, 9.10, 9.85, 10.27, 12.29, 13.123.
[632] This change in meaning occurred during the mid-Principate; see Duncan-Jones 2008, 139. The *sportula* was also known to have been dedicated by magistrates, and even emperors; e.g. see Suet. *Nero* 16.2. See also Juv. *Sat*. 1.95; Mart. *Ep*. 14.125.
[633] Ath. 8.365; Hdt. 5.16; Arr. *Epict. diss*. 4.10.21; Aristoph. *Pax* 1005.
[634] Plaut. *Men*. 218-23.

well as by Columella in the first century AD.[635] However, Suetonius tells us that the meaning of this term changes around the time of Claudius when the Emperor invites the *populus* 'to an extempore meal, hastily prepared' on the occasion of many gladiatorial games provided by himself.[636] At this meal, Claudius gifts '*sportula'* (literally little baskets) full of food rations to the people.[637] By the time of Pliny the Younger writing in the mid-first century AD, the term *sporta* had become fixed as the Latin term for a gift basket of food, namely given by a patron to his client.[638]

Dinner gifts were thus introduced to Roman society around the middle Republic as one means of obtaining food in a 'less monetised' economy, though in reality these appear to have been a replacement for the more formal *cena recta* to which clients were originally invited.[639] This food parcel came to commonly be handed out to clients in little baskets at the morning *salutatio* in lieu of a dinner invitation, though as time moved on, *sportula* came to be associated with gifts of money, and more specifically of 100 *quadrantes,* equivalent to twenty-five *as*.[640] This was the standard amount gifted by patrons to clients and was the same amount gifted to the *populus* (by family unit) on a specified 'handout' day in Rome.[641]

As we have seen, and despite Martial sharing the views of Juvenal in decrying the money-basket gift as a 'shabby pittance' (which he nonetheless subsequently accepts),[642] this amount was sufficient for a sustaining a small family for a couple of days (see Chapter Three and Appendix B), and thus likely replaced the essential food items gifted in previous years. Considering the conditions of *beneficium* seen above, we must assume that this amount was

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[635] Cato *Agr*. 11.4; Col. *Rust*. 8.7.1, 12.6.1.
[636] Suet. *Claud*. 21.4-5. Martial (*Ep*. 8.49.10) refers to the basket meal, while Suetonius refers to this at three different points (*Claud*. 21.4; *Nero* 16.2; *Dom*. 7.1).
[637] *Sportellae* is used by Petronius (writing in the 60s AD) to refer to 'little baskets' at Trimalchio's feast; Petr. *Sat*. 40. See Hurschmann 2006 for a working definition.
[638] Epictetus (4.10.21) states that meals in baskets are one of the four duties of a consul (the others being the employment of twelve lictors, judging a number of law cases, and proving games). Pliny the Younger (*Ep*. 2.14.5) does not specify whether the baskets contain food as other writers do when he says: 'take the gifts offered on the floor of the court as openly as they would at a dinner-party'.
[639] Duncan-Jones 2008, 143. See also D'Arms 1990, 309.
[640] Juv. *Sat*. 1.120; Mart. *Ep*. 10.70, 75. Martial (8.42) mentions the '*sportula maior*' at rich men's houses, which provides enough for 100 baths (each costing one *quandrans*). Harrison (2015, 369) wrongly states that this was a reference by Martial to a food basket which includes one *quandrans*, for use at the public baths. Quintilian (*Inst*. 11.3.131) instructs the trainee orator to 'look as if you were giving instructions for a gratuity (*sportulam*) to be handed out [to the crowd]' at any pause for applause.
[641] Juv. *Sat*. 1.95, I.127-40.
[642] Mart. *Ep*. 10.74-5.

'useful' for its acceptance as a standard gifting amount. Juvenal tells us that at the end of the handout day, the poor buy their cabbage and firewood, while the rich return to their homes to lay on luxurious *convivia*, mocking the system for its role in further separating society by rank, as opposed to lessening any gaps there may be.[643]

Monetary *sportula*, however, had not entirely replaced the food parcel, for in Juvenal we are treated to the scene of clients and their slaves crowded into the vestibule of an important patron, each waiting for gifts of still-hot food to carry home:[644] 'Do you see the smoke billowing around the handout? There are one hundred diners, and each comes with his own kitchen. Corbulo would have difficulty taking up the enormous pots on his head and other implements which his wretched slave transports…' This is of course intended to be a humorous scene, but the message of Juvenal (like Seneca above) is clear: the act of gifting has moved far from its original joyful and valuable purpose as a transaction of essential items. Thus, when Juvenal and Martial choose to parody the gifting of food parcels at key Roman social events, they are challenging the social implications of *khara* on the surface, and social advancement and hierarchies held under the surface. Furthermore, it is significant that most literary references to food parcels are satiric, for what patrons were gifting was not *khara* but obligation, the very thing the Augustan reforms failed to prevent.[645] As various works in recent years have demonstrated, Roman satire is not 'a simple window into Roman social life', but rather a challenge to the darker realities of Roman existence, with 'aggressive criticism' often central to this genre.[646] This is especially true in Roman satire on food. As Freudenburg argues: 'Every Roman knows that food isn't just stuff you eat to stay alive. It's elaborate showmanship, outlandishly produced to please and seduce and gratify and move ahead in the world.'[647]

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[643] Notably, *sportula* have only been identified as associated with regions to the south of Rome up to the mid-second century AD, while no mention of the contents of food *sportula* is made anywhere in the literature, thereby supporting the argument that the term *sportula* cannot be used as a universal term for food gifts in Roman society in the Imperial period.
[644] Juv. *Sat*. 3.249.
[645] Bowditch 2001, 40. Martial's friend (*Ep*. 5.75), despite being gifted very high amounts of money from the satirist, still wants his puny *sportula* of 100 *quadrantes*. Harrison (2001, 295) counts twenty-three out of fifty-two poems by Martial that mention *sportulae*.
[646] Fitzgerald 2007, esp. 5-10. See also 2.6 in this thesis.
[647] *Per litteras*, as in Fitzgerald 2007, 10.

Martial provides the largest number of surviving references to *sportulae* in ancient Roman literature, frequently referring to the 'basket meal'. As seen above, a client would be gifted a *sportula* in the *domus* in exchange for political and private support, while *sportula* could also be gifted on a large scale, often in commemoration of an event or public works.[648] These various references to *sportula* highlight the development away from the practice of providing provisions to the less fortunate, to a social obligation utilised to earn 'symbolic capital'. In other words, through the gifting of food or money, status is accrued, and a debt or obligation is imposed on another through gifting. On this, Martial says to Sextus: 'Hospitality is not a business deal. You feed presents, Sextus, not friends',[649] elsewhere stating that those who are not gifted *sportula* at the *convivium* may dine for free (*gratis conviva recumbis*).[650] Of course, this development may also be a reflection of Martial's own ascendency through the social ranks, from a *cliens* to a *patronus*, yet his own awareness of reciprocity in gifting now that he is the beneficiary, is significant.[651] He, like many others at the time, would have understood the symbols inherent within the gifting of food. These symbols we may assess in real archaeological examples thanks to the prominent display of rustic garden produce as art in the *domus* in and around Pompeii. These we now know as *xenia*.

4.3.3 Xenia

Xenia are common subjects of analysis in Roman art history and are an important source of information about rustic food gifting and display. Rooted in a 'long-esteemed ethical principle permeating Athenian culture and Homeric legend', *xenia* contain themes akin to those from Roman culture seen above, including *rusticitas*, *frugalitas*, *simplicitas*, and *virtus*.[652] In its earliest forms in Greek literature, the term *xenia* refers to the relationship

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[648] See Donahue 2015, 176; Vössing 2004, 94. Slater (2000, 107-9) misunderstands Pliny the Younger's statement that *sportula* was handed out *in triclinio* ('They parley with the contractor, take the gifts offered on the floor of the court as openly as they would at a dinner-party, and move on from case to case for the same sort of pay') as an act for which 'there was no parallel for an allegedly common habit of disbursing money, let alone picnic baskets (*sportula*), at private dinner parties to guests.' This is wrong, as we know that the Romans did hand out both *xenia* and *sportula*; see Duncan-Jones 2016 for the most in-depth and recent discussion of *sportula*.
[649] Mart. *Ep*. 7.86.
[650] Mart. *Ep*. 3.30.
[651] For further from this viewpoint, see Harrison 2001, 295.
[652] Weir 2015, 868.

between adults 'of different social groups performing filial obligations'.[653] Originating in the context of the ritual of *theoxénia*, at which gods and heroes were hosted as divine guests and provided with food and gifts, *philiká xenia*, or 'hospitable gifts', came to encapsulate the special relationship between a host and his guest as fostered by the gifts offered to, and accepted by, the guest. On the first day of their stay, 'distant friends' or strangers (*xenoi*) were invited to dinner and stayed in the self-contained guests apartments of the host (*hospitalia*). As one portion of the act of good hospitality (and friendship), the guest was supplied with guest-gifts (*xenia*) for 'self-catering' on the other days and meals. These items were of the kind that would fill their storerooms at home.[654] The acceptance of this symbol of *xenia* is also the acceptance of indebtedness to the other, 'from which state the beneficiary could only redeem himself by a display of submission and loyalty', or in other words a 'fictive gift'.[655]

The hospitable food gift had been transformed from a 'ritualised ethical principle regarding foreigners to a painting of a platter of fruit that was given to friends' by the late Hellenistic era 'as the Greeks became more luxurious'.[656] Vitruvius refers to these gifts as 'country produce' (*res agrestes*) and 'guest-gifts' (*xenia*). By linking the gifting of rustic produce to the wall art of the same subject, Vitruvius highlights an important act of social display and a household's conformity to the societal game of exchange, implied generosity, friendship, and wealth. He also sanctions the display of realistic art or real items related in places related to their subject: 'thus guest rooms decorated with images of gifts for guests would be appropriate'.[657] In Greek society, this would also crucially link the household to the important Greek (and later Roman) concept of *autarkeia*, or self-sufficiency. Nonetheless, the *khara* and associated virtues behind the act of gifting rustic produce arguably lost their moral force upon their transformation to a display of virtues in artistic forms. This is not lost on

[653] For example, Homer uses the term around one hundred and eighty times, most often in relation to circumstances of hospitality; Weir 2015, 869 referencing Herman 1987.
[654] As mentioned, this may have also been identified by some as *sportula*, though the terms *xenia* and *sportula* appear to be fairly interchangeable, despite their historical introductions to Roman society, these spaced out by centuries. As stated by Duncan-Jones (2018, 142): "The *sportula* was essentially a mark of the patron's grandeur, which sustained his social relations", much as *xenia* were, though as we see in the above analysis, the former were only introduced during the reign of Claudius.
[655] This was formalised either via a handshake or gift exchange (though not of consumables); Herman 1987, 48-9.
[656] Weir 2015, 875, 880-1.
[657] Weir 2015, 880, quoting Vitr. *Arc*. 7.5.1-5.

Vitruvius, who comments on the link between this and the luxurious ways of the Greeks (later adopted by Romans).

One of the key sources of information about *xenia* in the Roman period are Philostratus' *Imagines*. Within these, Philostratus describes detailed paintings of food in a Neapolitan picture gallery (*pinax*), as well as a hunting scene with food in Xenia I and Xenia II respectively. Both texts reveal a genre of food 'still-life' intended to be contemplated for the artist's skill and detail,[658] as well as the symbolic meaning of food items. In all cases, the semantic value of rustic garden produce displayed in the home is clear. In Philostratus' ekphrases the loss of ancestral virtue and *rusticitas* are considered. Bryson says: "For Philostratus, *xenia* brings to mind the whole narrative of culture's progression from primitive conditions, creatural satisfaction, and simple equality before nature's abundance, on to the complexities of affluence and leisure, social difference and estrangement."[659]

In Xenia I Philostratus, a guest to another person's *oikos*, describes the paintings of food guest-gifts depicted as paintings on the wall, all of which feature raw and rustic items. Providing his listeners with *ekphrases* of food (also known as *xenia*), Philostratus thus represents the art of *ekphrases* as 'a "portable" *obsonia'*.[660] Philostratus' choice to focus on the natural and raw state of the items in the country scenes would fall into the category of *autarkeia*, or self-sufficiency, by affluence for, not only is he listing many types of rustic produce, from fruit to honey to meat, he is also influenced by the context of the artistic form when making his descriptions, these being rooted in the act of provisioning for others.

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[658] This is more in line with the modern construct of still-life, associated with contemplation. Squire (2017, 196) notes the various studies as useful for still-life study, though many are heavily focused on Dutch still-life paintings which, if relied on too heavily, may pose issues for our reception of ancient *xenia* (due to different historical contexts, use, placement, and so on).

[659] Bryson 1990, 46.

[660] Given the original meaning of this term, and Philostratus' nod to virtue through raw nature, Bryson's characterisation of Philostratus' ekphrases as 'portable obsonia' is tenuous. As we have seen, *obsonia* is yet another term for food items (viands, 'that which is eaten with bread') and, according to Pliny (*HN* 35.112), the 'sordid' subject choice of the Greek painter Piraeicus. Could Piraceicus be one of the originators of *xenia* paintings? Offering poetry, ekphrases, or writing at a feast was a common form of gifting. For example, the poet Simonides is summoned to a feast where, after he recites a poem and receives no payment (a bad show of *amicitia* from the host), all the guests are killed by a collapsing ceiling. His ability to remember who was sat where, and thereby recover their bodies to the family's, brought attention to the practice of artificial memory (Quint. *Inst*. II.2.11: '*Artem autem memoriae primus ostendisse dicitur Simonides Cius*'; Cic. *Orat*. 2.86.352-353. See also Scarth 2004, 43-4.

This description by Philostratus *'Xenia I'* recalls the rustic scene conjured by Martial. In this, all the town folk provide sustenance for other town members, from the farmer's wife feeding the pigs, to the townspeople tending the kitchen gardens, and from the 'country caller' bringing honey and milk from the woods to the peasant daughters bearing gifts of rustic produce in wicker baskets. All play their part in the image of abundance and surplus is not kept. Notably, shares are not established according to rank or status (unlike at Virro's *cena* above). Martial starkly contrasts this image with the lazy existence of the wealthy in their 'painted' country villas, which he describes as 'all elegance and starvation', who ironically order their food in from the countryside (from the likes of Simulus) for all they have are useless laurel bushes: 'Should this be called a place in the country or a townhouse out of town?'[661]

Martial is, like many others at the time, making a commentary on the preference of *otium* over *utilitas* by the elite. The individuals Martial speaks of, who sourced essential rustic goods from individuals such as Simulus, are posed as having villas are more suited to *pinocothecae* (picture galleries), the epitome of Hellenistic luxury, not the utilitarian equivalent of *oporothecae*, or rooms for storing fruit. Varro importantly refers to *oporothecae* as formerly rooms of utility and now a feature of 'Hellenised' country villas. Considering the satiric nature of his agricultural texts, and the problematic 'expertise' of Stolo and Scrofa seen earlier, Nelsestuen takes Varro's praise of Scrofa's *oporothecae*, abundant with fruit sourced from his own estates and used as intended for (utilitarian) purpose, as light mockery. For, despite the utilitarian nature of the *oporothecae* 'fruit-galleries',[662] Stolo tells us they were also used as dining rooms: 'after all, if such a practice is acceptable in the case of a picture-gallery (*pinacotheca*), why not in a gallery of fruit, where the decor is surely more appropriate for the meal's foodstuffs and atmosphere?'[663] The issue here is one of display; rather than testifying to Scrofa's 'agronomic authority and moral-ethical standing', Varro implies that Scrofa's *oporotheca* was, like many displays in the *domus*, vulnerable to human manipulation and interference. The *oporotheca*, like *xenia*, is thus unlikely an innocent display of agronomic virtue, but rather another form of (staged) art, much as the space of the rustic

[661] Mart. *Ep*. 3.58 ('*rus hoc vocari debet, an domus longe?*')
[662] These rooms were frequently ventilated (to keep produce cool and fresh), and the walls were lined with dusted marble (for a similar purpose); see Nelsestuen (2016) for a discussion of the utilitarian use of *oporothecae*. See Spencer (2010) for reference to this in Varro.
[663] Nelsestuen 2016, 33.

hortus was found to be in Chapter Two.[664] For the utilisation of rustic food in art, unlikely to have been sourced autonomously, may be seen as yet another contribution to the 'declined state of Roman agriculture… [leading to] a corresponding degeneration in ancestral *mores'*.[665]

The persistent use of food as a form of both gifting and display is therefore undeniably significant for understanding moral codes and semantics in real settings. Bryson, Nichols, and Weir have arguably made the most significant headway in relation to the placement and interpretation of *xenia* in literature and art, the former two choosing to take Philostratus' *Xenia* series as points of focus, and the latter focusing on the historical associations of the term up to the first Latin reference to *xenia* by Vitruvius.[666] Little focus, however, has been given to the social power of rustic connotations of rustic food gifts, or to the historical contexts of their display as art considering the movement from rustic food to monetary gifts in the first century AD.

In his assessment of *xenia* as art, Bryson places too large an emphasis on the subjects contained within the frame of the *xenia*, rather than the historical connotations behind the subjects themselves.[667] Nichols rightfully argues that this view 'misconstrues the image by an anachronistic imposition of cultural values [and]… seriously impoverishes the *xenia*'s imaging power'.[668] This view also excludes the significance of the contexts in which the paintings were originally placed, as well as the symbolism inherent within Roman food systems and eating habits. These contexts are very often lost to contemporary audiences because of preservation and conservation processes yet keeping in mind the significance these artworks once held in their original architectural (and historical) surroundings will help to understand them better.

Along this line of thought, Weir emphasises the importance of the context in which Vitruvius uses the term *xenia* in Book 6 of *De Architectura*. Following his description of

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[664] I discussed the applicability of this same theme to Pliny the Younger's rustic *hortus*, displayed in full view of arriving guests at his Laurentine villa; see Chapter Three.
[665] Nelsestuen (2016, 22) reflects on the views of Varro.
[666] Ling (1991) dedicates time to 'still-life' paintings though, as other scholars such as Jones point out, this label is not useful as it does not contain the same connotations as the 'still-life' art category, established in the seventeenth century by the French Academy (Tate 2021).
[667] Bryson 2013.
[668] Nichols 1991, 833.

xenia, Vitruvius provides a chronology of the term *androns* (a passage between two walls or rooms in a Roman *domus*) which in his time was synonymous with *mesauloe* (passageways):[669]

> …when the Greeks became more luxurious, and their circumstances more opulent, they began to provide dining rooms (*triclinia*), chambers (*cubicula*), and storerooms (*cellas*) of provisions for their guests from abroad, and on the first day they would invite them to dinner, sending them on the next chickens, eggs, vegetables, fruits, and other country produce (*res agrestes)*. This is why artists called pictures representing the things which were sent to guests '*xenia'*.

Similarly, *androns* (a term of Greek origin) is typically associated with the room used for *symposia*.[670] The use of the term in dining and hospitality contexts by both Plato and Vitruvius is significant. As Vitruvius was keen on placing realistic depictions of items in places related to their use or consumption, it is fitting that guest rooms, or passageways reading to them, should be decorated with images of guest-gifts. Associations of *xenia, amicitial, beneficium, and kharis* are associations which *domus* owners hoped to recall in their placement of *xenia* in the *androns* before the guest rooms, to recall the personal virtues held within the rustic produce itself, as well as in the act of gifting it.[671] How this was played out in reality, and in 'ordinary' homes in towns such as Pompeii, remains to be seen. An exploration of this using archaeological remains forms the final part of this chapter.

4.4 Displaying rustic garden produce in Campanian xenia

We are fortunate that a large number of *xenia*, or 'still-life' paintings, from Campania were preserved in the eruption of AD 79, though their study is not without its problems. This is most especially the case with regard to the under-recorded find locations of *xenia* during their original excavation.[672] Ling views the use of food in Roman wall painting (referring to

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[669] Vitr. *De Arc.* 6.7.4; Weir 2015, 879-90.
[670] Lynch 2007, 243.
[671] Vitr. *De Arc.* 6.7.4. See Jones 2019 (esp. 117-28) for a discussion of art and semantic codes.
[672] This issue is slightly mitigated by the highly important publications cataloguing the "still-life" discovered in Roman excavations, though even in these some errors regarding find locations of artwork can be found: Croisille 1965, 2015; De Caro 1999, 2001.

xenia, but using the modern term 'still-life') as a 'trivialisation of art in Hellenistic times'.[673] In this he relies heavily on contemporary views of still-life, largely characterised from the late sixteenth century onwards as realistic food scenes enclosed by a frame, when stating that they reach their 'heyday' upon conforming with this characterisation in the Fourth Style.[674] My reasons for disagreeing with this view requires further explanation and illustration. To achieve this I will outline the development of *xenia* within the wider Roman art-historical context, before examining case studies of *xenia* in hospitality-contexts from Pompeii and Herculaneum in order to demonstrate their encapsulation of the semantics of virtue, hospitality, tradition, and obligation (assessed above), and their use as social currency.

4.4.1 Second Style xenia

Figures 20, 21, and 22 compares examples of Second, Third, and Fourth Style *xenia* from three different properties in Campania.[675] The Second Style example is from the Villa di Poppaea in Oplontis, and the Third and Fourth Style examples are from two properties in Pompeii.[676] The Second Style example (Figure 22) is in Room 23, located off a portico in the south of the property and to the right of the atrium, along an open portico (Figure 23).[677] The rooms adjacent to Room 23 have been classified as *cubicula* (broadly defined as bedrooms), likely due to their small size. This area may well have been the *hospitalia* of the villa, in which case the decoration of rustic foods fits well. The extent of this villa has led scholars to believe that this was the villa of the Emperor Nero's wife, Poppaea Sabina. As one would expect of such a high-status home, the paintings in this villa are of an exceptional quality and adorn the walls throughout.[678] *Xenia* are found in different forms throughout the villa, but in all cases are highly mimetic of real-life.[679]

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[673] Ling 1991, 154.
[674] Ling 1991, 156-7. Ling also perhaps too obviously states that the first "still-life" paintings appeared in Second Style painting, which is to be expected given the limited marble imitation subject of the First Style.
[675] First Style is not included as this is a style which mimics marble wall panels and does not include figures or landscapes.
[676] Though problematic in their own way, the four Pompeian Styles of wall-painting, originally established by Mau (1899), are useful as a framework in which to track the development of the rendering of "still-life" in wall paintings. For a discussion of realism in each of the four 'Pompeian Styles', see Bryson 1990, 36-45.
[677] Room 23; see Pompeiiinpictures (2021) for a plan.
[678] The slave quarters are characteristically painted in 'zebra stripes'; see Clarke and Muntasser 2019.
[679] Birds perched walking on room skirtings or perched on ledges are a common feature, helping to add to the overall artistic illusion of the wall paintings. This is a common recurring theme throughout all painting styles, with fruit often being pecked at by various garden birds and poultry (and sometimes the odd rabbit).



Figure 22: Second Style fresco with bowls and a basket of fruit in Room 23 of the Villa di Poppaea, Oplontis. Image: Author's own.

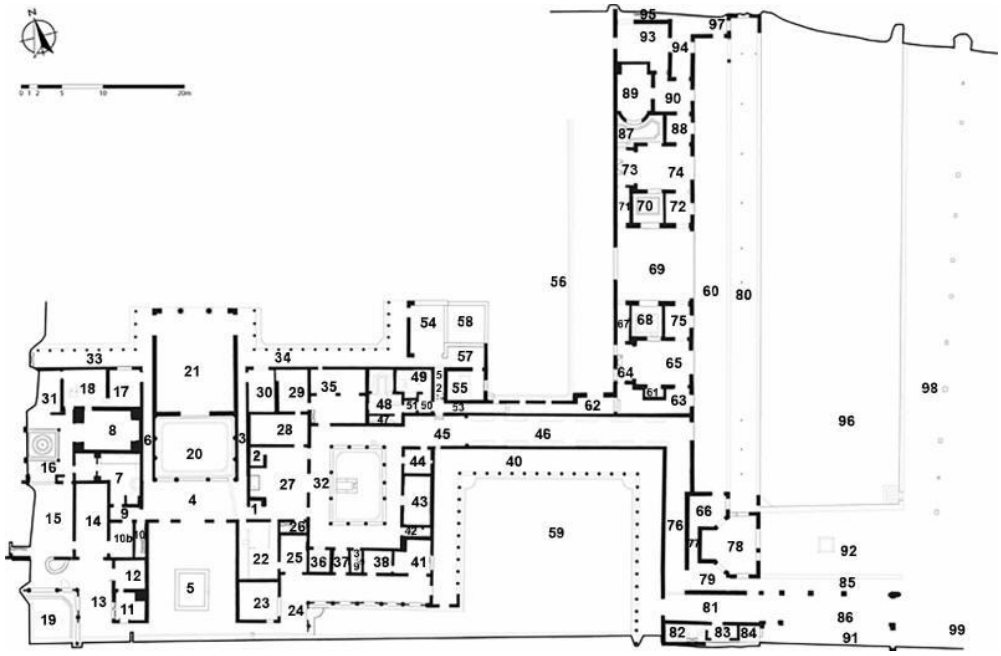


Figure 23: Plan of the Villa di Poppaea, Oplontis. Image: Pompeiiinpictures (2021), after Oplontis Project plan.

In the example provided in Figure 22, the *xenia* lends extra realism to the global scheme in creating the illusion of real bowls and baskets of food. The sheer cloth placed over the basket and the glass for the bowls are painted with such skill as to appear true-to-life and may very well have reflected the produce awaiting guests on their departure.[680]

4.4.2 Third Style xenia

Third Style (Figure 24) is a more muted development of Second Style, in which individual motifs replace the illusionistic pretences of the former style. Rather than emulating real space, Third Style is concerned with 'fully immersive environments' that encourage viewers to produce their own experiences in space. *Xenia* in the Third Style are frequently and abruptly contained within floating frames and on floating shelves. Religious paraphernalia are now added to the usual subjects of food; small panthers and fish floating in water reduce the illusion of Third Style. *Xenia* motifs and subjects are often framed in the central *aediculae* with no immediate relation to the rest of the scene or room. This encourages the viewer to engage with the paintings, now 'tasked with combining the diverse servings into an experiential whole, gaining both insight into entertaining stories and the opportunity to relate to the norms and values that they represent.'[681]

[680] The realism applied by the artist to this Second Style example must not, however, be taken as representative due to the context of the highly wealthy villa in which these examples reside. For a discussion of realism in *xenia*, see Bryson 1990, esp. 46-8.
[681] Lorenz 2015.



Figure 24: Third Style wall-painting, with framed food and sacrificial scenes from the House of the Ephebe (I.7.11) in Pompeii. Image: Author's own.

The introduction of Third Style designs around the time of Vitruvius writing about *xenia* is perhaps significant, for he would have been writing for an audience likely gaining familiarity with this style. As in Vitruvius' descriptions, Third Style *xenia* are removed from their illusionistic roles of the Second Style, where they played important scene-setting functions as part of the room. Now they are instead 'framed' to intentionally encourage viewers to apply their own knowledge of cultural semantics associated with *xenia,* food display, and associated *rusticitas*. This style therefore lends itself much more usefully to social display and advancement via rustic food exhibition and alongside contemporary gifting practices.

An example of Third Style *xenia* can be seen in Figure 24, taken from the House of the Ephebe (I.7.11), in Room T of the property (Figure 31). This room is adjacent to a kitchen

and latrine and was accessed via the *fauces* (entrance corridor). Here, benches for the morning *salutatio* were located. Clients likely waited on these benches in the *fauces* before being invited into Room T, decorated with *xenia*, perhaps advertising the food to be gifted. On the walls were framed images of victuals, such as fish and birds with cherries, as well as religious paraphernalia, such as Hercules' panther. Another example, this time from Herculaneum, captures Vitruvius' reference to the *andron* perfectly, acting as a model example of the use of *xenia* in the *domus*. Finding its analytical roots in guest movement in the *domus* (a key feature of spatial syntax analysis, to be tackled in Chapter Five), this final discussion sets up the succeeding chapter in this thesis which makes spatial enquiries into *hortus* placement in the Pompeian *domus*.

The House of the Stags (IV.21) (Figure 25) is a large property, originally located on the coastal front overlooking the beach and the sea (and the 'Terrace of M. Nonius Balbus' one level down).[682] In the centre of this property is a garden, around which a shaded cryptoporticus runs. Here, framed *xenia* in the Third Style run at head-height in intervals around the entirety of the cryptoporticus. To understand how these images of 'guest-gifts' may have impacted upon a guest's impression of the household, I will view the movement of individuals in the property from the point of view of 'strangers', with the aid of spatial syntax analysis.

[682] This was prior to the eruption when the coast was extended, causing Herculaneum to be further inland than prior to AD 79.

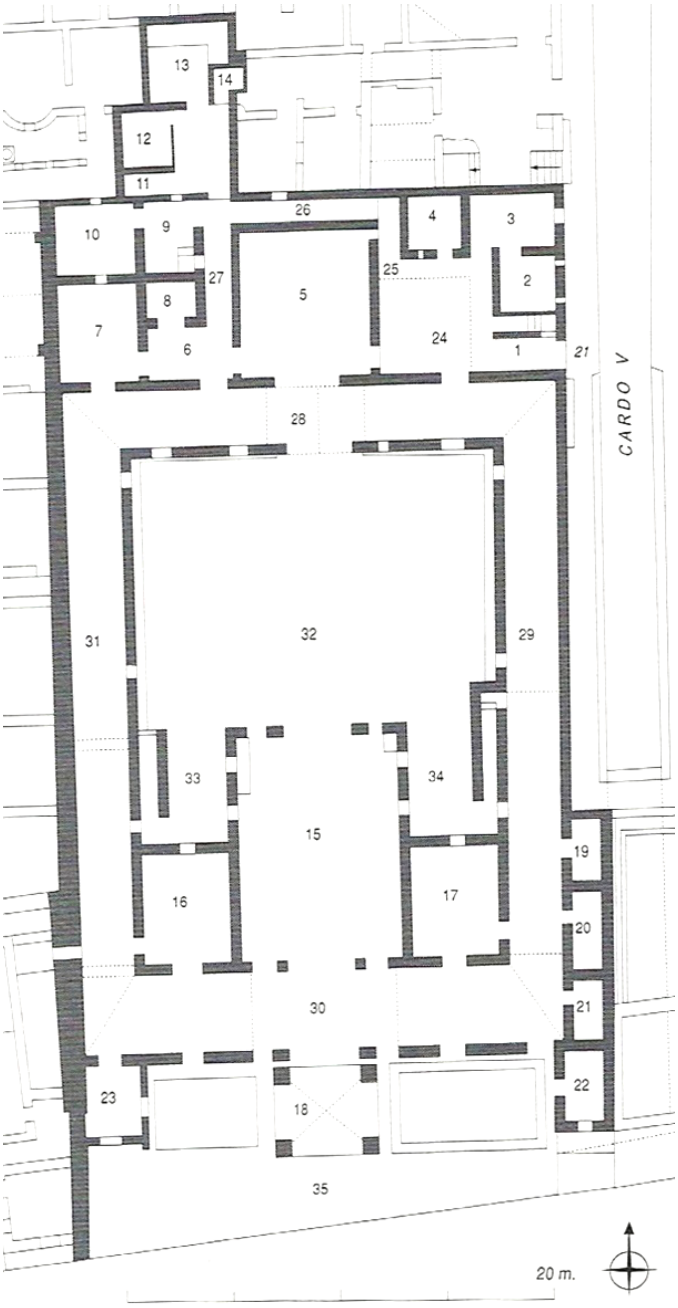


Figure 25: Plan of the House of the Stags (IV.21), Herculaneum. Image: Pesando F. and Guidobaldi M. P., 2006. *Pompeii, Oplontis Ercolano et Stabiae.* Roma: Laterzi.

Guests or visiting clients to the property would enter via the *fauces* and the *atrium* (Rooms 1 and 24), perhaps waiting on the bench outside of the property on Cardo V. For those staying over, they would likely stay in guest apartments, perhaps Rooms 22 and 23 with direct views of the sea at the southern end of the property. This placement would, as per

Vitruvius' advice, require guests to walk through the passageways (*androne*s) decorated with *xenia,* in advertisement of the hospitality they will receive while staying in the host's home. Figure 26 shows a view from the north-eastern corner of corridor 28, looking south. The *xenia* depicted on the walls include peaches ready for grafting, beans, and plates of nuts and fruit, with interstitial views of the lush garden in the centre, as well as the expansive sea view available at the south-eastern end of the property. Having walked full-circle, or via the garden, guests would end up at the *triclinium* (Room 5, the largest indoor room in the property).

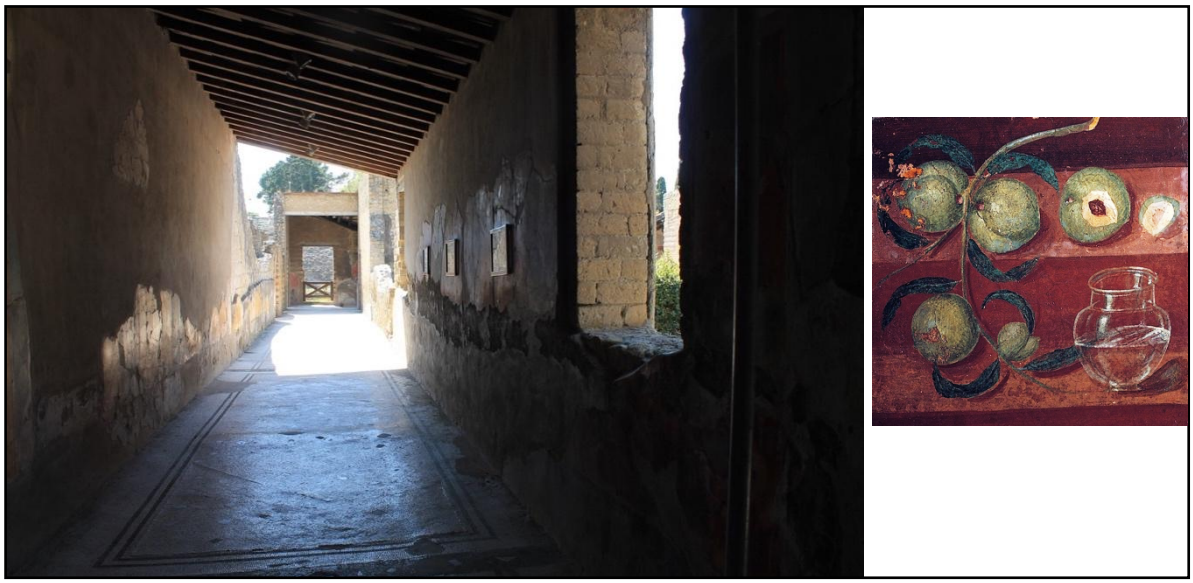


Figure 26: View of eastern cryptoporticus corridor, with *xenia* on the western wall (frames are modern). Inset shows a close-up of a *xenia* with a glass jug and fresh peaches on the branch displayed on the cryptoporticus wall (this one is no longer in-situ). Image: (Left) Author's own, (Right) Museo Archeologico Nazionale di Napoli.

This property provides a good example of a *domus* displaying *xenia* paintings in a space with moderate to high stranger accessibility.[683] In other words, the *xenia* paintings in this property were deliberately placed where guests would see them, not only as an advertisement of character (related to *rusticitas*), but also of culture. Commenting on Varro's

[683] See section 5.2 for a discussion of spatial syntax and its application to this study.

aforementioned deliberate and interchangeable use of the terms *oporotheca* and *pinocotheca* to make a point about *luxuria*, Spencer states that understanding the 'code-switching' comes down to understanding the roots of the terms: 'the Roman command of agriculture can be compromised so that spectacle (*spectaculum*, 1.2.10) rather than favour or quality of produce is what defines (even) the well-run and profitable farm.'[684]

The same can be said, to some degree, about *xenia*, for the depiction of a 'still-life', rather than the content, is intended to incite specific codes in the minds of the viewers. The overlaying of this with rustic produce, however, would have added meaning. However, if we are to discount these views entirely, we may simply view the display of rustic produce in *xenia* as exhibitions of *rusticitas*. However, the frequent inclusion of other paraphernalia, as well as seafood, alongside religious items, negates this simple view as a possibility. It is unlikely, then, that the gallery in the House of the Stags intended to reflect Scrofa's *oporotheca* in Varro's *De Re Rustica*, as testification to the *paterfamilias'* 'moral-ethical standing'. This is more likely given that the displays fit the bill of Vitruvius' *xenia* placed in *androne*s. The cryptoporticus was also certainly not a room of a utilitarian nature (just as Varro's descriptions of *oporothecae* were not) but importantly nodded to this type of space.

Fruit displays from the *Villa di Poppaea* may provide an example of allusions to the rustic *oporotheca* gallery, of the kind found on the fictional Scrofa's estate. Various types of trees and other edible plants were known to have been grown in the gardens of *Villa di Poppaea* (located in the countryside). While this villa likely matched the opulence of the elite Lucullus' villa, which was more suited to *pinocothecae* than the 'produce-filled fruit-galleries' of Scrofa's (utilitarian) estate, it nonetheless had claims to on-site self-sufficiency and agricultural abundance. As we know, through a man's *cultura* and *utilitas*, he may gain *fructus* (profit), and through this the *virtus* of a true Roman. The glass bowls of fresh produce painted on the walls of the rooms in the villa at Oplontis, then, are a deliberate *spectaculum* of virtue-signalling justified by on-site production of the same, or similar, goods. However, though well-ventilated, rooms with illusionistic country produce in the Villa di Poppaea do not fit the description of Varro's *oporotheca* (as in Figure 22), they nonetheless act as a false display. As Nelsestuen puts it: 'In this respect, the *oporotheca* may also be emblematic of a

[684] On *oporotheca,* see p.164.

villa's inversion… from the locus of agricultural production to the façade thereof: luxurious, unproductive, and, in this case, adorned by fruit purchased in and imported from one of the city's many marketplaces.'[685] The same link can be made in the decidedly 'sterile' xenia displays in the House of the Stags, even more so with no evidence of on-site food production. The intention in this wealthy *domus* was once again to incite the *imago* (image) of hospitality in the minds of guests.

In Vitruvius' system, the model for the construction of a house was to be arranged so as to suit the social status and requirements of the master of the household.[686] Of the *xenia* remaining in situ, or for which we have recorded locations from archaeological reports, all are found within properties of one or more atria.[687] Wallace-Hadrill records that there were only forty-one percent of properties that had an atrium in Pompeii and Herculaneum, meaning that just under half of the population were in need of spaces to host guests. A spacious house with an atrium for welcoming guests was suited to those from the higher echelons of society who would invite patrons or other guests into their *domus*; this would not be needed in the houses of lower status individuals, and so it follows that a display of food gifts, whether *xenia* or *sportula*, would not be a requirement. That *xenia* only appear in houses geared towards public display in the *domus* is therefore unsurprising.[688] Furthermore, due to the fact that 'a house must be of a certain minimum size to enable construction of an impluviate atrium',[689] the display of *xenia* can be linked directly to wealth and subsequently to individuals of the middling or upper class.[690]

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[685] Nelsestuen 2016, 33. Stolo is potentially implying this of Scrofa when he makes this very critique, given the praise of Stolo's self-sufficiency just previous.
[686] Vitr. *De Arc*. 3.9.
[687] From data collected by Croisille 1965 and De Caro 1999 and site visits. Wallace-Hadrill (1994, 86) records forty-one percent of properties in his study of Pompeian and Herculanean housing as incorporating at least one atrium.
[688] A suggestion for further study, a study quantifying the presence of *xenia* wall paintings by house type, including atria, would be useful for establishing a closer link between housing types and display, and by extension perhaps wealth.
[689] Wallace-Hadrill 1994, 83.
[690] Statements of class in relation to ancient societies are imbued with problems, namely contemporary conceptions of societal classing originating in the Industrial Revolution of the 18th century, which cannot simply be applied to Greek and Roman notions of societal ranking. Despite this, Mayer (2012) makes a good case for at least tentatively using the term 'middling' classes as a means for gaining further insight into ancient societal practice. For alternative views to this 'provocative' thesis, see Wallace-Hadrill 2013; Flohr 2013; Noreña 2013; Harland 2014.

4.4.3 Fourth Style xenia

Moving on to Fourth Style paintings, this group is commonly attributed to the period after the earthquakes of AD 62/3 in Campania, while their initial development is now agreed to have occurred during the Claudian period.[691] This dating is significant. Given the emperor's recent re-ignition of food gifting to 'clients' (or his people) as '*sportula'*, and the development of *xenia* as motifs in the Second Style (between 100 BC and the first quarter of the first century BC), it is not surprising that the general Roman population should begin emulating the act of food gifting and displaying representations of this more centrally in the home. This development can be seen best in an example from the Estate of Julia Felix (II.4.3).

Built around 30 BC, this vast property complex in Pompeii incorporated apartments, baths, shops, green spaces, including a large and productive vegetable garden, and Fourth-Style *xenia*. The example of Fourth Style painting seen in Figure 27 is in a room located just off the atrium in the southern part of the complex. This room has previously been labelled as a *tablinum.* Given that the *tablinum* was traditionally the domain of the head of the household, in this case likely an important patron (given the size and wealth of the property, including an adjoining upstairs), it is fitting that *xenia* and book-keeping paraphernalia, such as money and writing tablets, are pictured alongside rustic food items from the traditional *sportula*.

[691] Strocka 2007, 317. This style was originally attributed to the Neronian period (due to its theatrical and gregarious influences) by Schefold 1952, 171. See Lorenz for a discussion of the Four Styles.



Figure 27: Fourth Style framed food, money, and book-keeping paraphernalia (the latter potentially recording first-century AD forms of monetary *sportula*) from the Estate of Julia Felix (II.4.3) in Pompeii. Image: *Museo Archeologico Nazionale di Napoli.*

The first panel is a display of various breads, as well as what appears to be a bowl of *puls* (Figure 28). The next panel shows a display of seafood which, according to paleonutritional finds in the town, was not a category of food limited only to the wealthy.[692] In the third panel four or five trussed up songbirds, a bowl of eggs, a jug, and a vessel with a spoon resting on the top are depicted. On the floor of this display rests another vessel with engravings on the front, typical of those used to store dried foods or olive oil, while on the wall hangs a cloth.[693] The final panel shows the piles and bags of bronze, silver, and gold coins, writing tablets, an inkwell and a stylus, a scroll of papyrus with a seal, and what appears to be a sign nailed to the wall. While the food *xenia* are a nod to the generosity and

[692] Among the types of fish are moray eel, white bream, cuttlefish, a snail, two '*mullus barbatus*', and a mullet, all native to the Mediterranean.
[693] The inscription on the jar is not completely legible, though it may read 'NATIS' in handwritten script, meaning buttocks. Could this be a hidden joke on the painters part (unlikely to be seen by viewers below)?

hospitality of the patron resident in this property, the book-keeping paraphernalia may hint at his or her business dealings, perhaps including moneylending and handouts (the aforementioned *sportula* of the mid-first century AD). According to spatial syntax analyses undertaken in this property (see Chapter Five), this room was only moderately accessible to house guests. This means that, if *xenia* handouts had been conducted here, visitors likely entered the atrium and waited to be invited in to collect their packages in such a room, as appears to have also been the case in the House of the Ephebe above.



Figure 28: (from top left anti-clockwise) *Xenia* of bread and *puls*, *xenia* of sea creatures, *xenia* of birds, eggs, and vessels, and panel of bookkeeping paraphernalia (potentially *sportula*) from the Estate of Julia Felix (II.4). Images: Carlo Raso/*Museo Archeologico Nazionale di Napoli*.

The style of *xenia* and/or *sportula* depicted in the Estate of Julia Felix is of the sort described by Philostratus in his *Imagines*, for example *Xenia* I. Philostratus' descriptions, spoken (and written) over one hundred years after the eruption of Vesuvius, demonstrate the

development of the term *xenia* from illusionistic images of food guest-gifts to scenes in which food is intentionally mimetic of life, and symbolic of societal issues of the time. The paintings he describes, and the examples from the Estate of Julia Felix, both achieve the aims of Fourth Style painting, namely that the objects depicted were intended to incite codes of cultural or social significance in the mind of the viewer.

It is also important that, despite the time that had passed between the Campanian examples and the food in Philostratus' *Xenia* descriptions, country produce persisted as the key theme of *xenia*. This not only demonstrates the powerful ideation of country produce as an iconographic trope throughout much of the Imperial period but also how, through the concretisation of traditions associated with their consumption and gifting in *domus* wall painting (concretised as a style in itself), the memory of the symbols inherent within the produce remained. The meanings attached to rustic produce discovered in Chapter Two were crucially not lost to time or artistic trend development by the mid-first century AD in Campania. Much as Cook and Foulk state of Roman landscape wall paintings, emerging in the mid-first century AD as a way of 'harnessing' the *external environment* by the householder,[694] *xenia* were clearly a persevering means for householders to harness their own strong Roman values and manipulate the *internal environment* of his *domus* to his or her social advantage.[695] Contents was not the be all and end all, however. Where *xenia* were placed clearly had equal impact on implied meaning.

4.5 Conclusions

In the above assessment of the monetary and non-monetary economies operating around rustic produce in first century AD Pompeii, the tension between *rus* and *urbs* is clear throughout. In particular, we have witnessed the town's evolution from an agro-town in the Republican era, to a consumer-producer city still with agriculture at its core in the early

[694] Cook and Foulk 2013, 185.
[695] Context, though not always possible to consider in Roman art, has been highly useful thus far in assessing the symbolic importance of *xenia* display in the home. However, in contention to the advice of Vitruvius, and due to the problematic business of 'labelling' rooms by use in the Roman period, we cannot be certain that any of the *xenia* so far assessed were placed in 'dining rooms'. All three of the examples given are also from contained rooms, rather than corridors or passageways. However, several instances from Campania exist where *xenia* are placed in rooms adjoining other rooms. Most often these feature birds perching on floating shelves, accompanied by a piece of fruit, such as figs, cherries, or pears.

Imperial period. Yet as the town grew commercially, elite anxieties related to the growing gap between the Romans and their agricultural heritage were being played out in real time, with mitigating measures taken to preserve the semantics of *rusticitas* inherent within the consumption, gifting, and display of rustic garden produce in the home.

The self-sufficient capabilities of Pompeii that we saw in Chapter Three likely made the display of 'Hellenistic' *xenia* more palatable in Pompeian *domus*, particularly given their Roman adaptation by local painters into three of the four painting styles, right up to the destruction of the town in AD 79. In particular, the culmination of *xenia* paintings in the Fourth Style *tablinum* of the Estate of Julia Felix, akin to the descriptions of Philostratus' Neapolitan *xenia* over one hundred years later, demonstrates the embrasure of the agronomic and hospitality symbolism inherent within *xenia* paintings and their fixed role as an iconographic trope of Roman *generositas*, as a host, and *rusticitas,* as a good *paterfamilias*.

Furthermore, the *spectaculum* of *xenia,* placed appropriately in locations frequented by visiting guests (such as in *androne*s) and locations where clients were most likely received at the *salutatio* (for example, the *tablinium* or another anteroom off the atrium) supports the Vitruvian practice of paintings as suited to context. It also demonstrates that a lot of individuals were fluent in the semantics of *hospitalia*, with many more possessing a good command of agricultural codes and their operation in Roman society. This not only has far wider implications for how we read the subjects in Roman art for the future, particularly around the subject of consumables, but it also alters how we view room use and rituals at the *salutatio.* Such findings also support previous conclusions around the use of civic areas in the *domus* (for example, the atrium) and their adjoining rooms, the effects of which shall be further explored in the next chapter in the context of the *hortus*.

Overall, the discovery that rustic produce was at the centre of many new infrastructural and economic changes in the town's final years, as well as in social rituals, speaks volumes about the impetus placed on this category of food in the town and the growing supply and demand for this produce locally. In this chapter I have directly linked rustic garden produce to economic progress and social tradition in the town's final years and shown that these consumables were embedded both social and economically within the

identity and functioning of Pompeian society. Via a persistent set of semantics associated with *rusticitas*, the people of Pompeii were empowered to flourish economically and live up to their reputation as 'a class of men of most excellent character' (or so they would have strangers believe).[696]

[696] Cic. *Agr*. 2.31.84.

CHAPTER FIVE: The Spatiality of the Utilitarian **hortus** *in Domestic and Commercial Properties in Regions I and II of Pompeii*

The previous chapters have shown that autochthonous sentimentalities of *rusticitas*, *frugalitas*, and *autarkeia* were firmly rooted in the *lieu de memoire* of the utilitarian agricultural *hortus* and its produce by the mid-first century AD*,* allowing both to be used as signifiers of virtuous identity in different contexts. As I have demonstrated, the *hortus* not only played an important social role in Pompeian society but also a key nutritional and economic one. Several case studies over the course of this thesis thus far have explored the economic, social, and nutritional roles of the *hortus* and its output, though special attention has not been paid to the spatiality of archaeological *hortus* sites from Pompeii. Such an exploration will allow me to approach the motivations of the people developing, constructing, designing, cultivating, and frequenting these spaces in daily life and will demonstrate the fundamental nature of urban utilitarian *horti* to the population of Pompeii.

The epistemological lessons and economic contexts established in previous chapters will be applied to two established methodologies in Roman scholarship, spatial syntax analysis and isovist analysis, to investigate the placement and orientation of agricultural *horti* in the city. The outcomes of the chosen case studies will uniquely highlight the different roles that utilitarian gardens fulfilled in Pompeian society in both domestic and commercial contexts and provide the important context within which to assess the rise of market gardens in Regions I and II in the first century AD in Chapter Six. Within the space of three categories, domestic, commercial, and commercial-dining, this chapter engages with contemporary spatial theory in Pompeii, an area still gaining traction in Roman scholarship, and investigates the social and economic roles of utilitarian *horti* through human movement and architectural placement.

The three categories of Pompeian *hortus* provide the structure for the following investigation. The first category, domestic, can be found in the space of the *domus.* This type of garden is traditionally referred to as the kitchen garden and is generally used for

subsistence or as an alternative income stream via the surplus cultivated there.[697] The second category, commercial, refers to garden spaces used for cash crops. Commercial *horti* are almost always attached to a property primarily used for commercial activities, such as processing, production, and/or trading (which in some cases have been converted from domestic properties). The third category, commercial-dining, describes properties with a utilitarian *hortus* used for cash crop production with evidence for outdoor dining in antiquity. For ease of identification in this chapter, I limit this final category to properties where there is significant evidence for outdoor dining due to the archaeological remains found there, such as masonry outdoor *triclinia*. No spatial studies have yet been applied to agricultural gardens in the Roman world, much less to commercial properties; von Stackelberg stopped at one utilitarian *hortus* in the elaborate House of Menander (I.10.4) and provided limited discussion regarding its social, economic, or nutritional role in the *domus*. This chapter hopes to provide the first holistic overview of the spatiality of agricultural *hortus* space in first century AD Pompeii.

5.1 Spatial studies in Pompeii

Studies of urbanism and the ancient city are numerous. This is especially the case in Pompeii where the preservation of archaeological remains has aided in-depth analyses of architectural space, and the individuals who inhabited them. The 'spatial' and 'movement' turns of the 2000s and 2010s set the conceptual groundwork for the 'sensory turn' which has followed in recent years. The 'Movement Turn' analysed architectural space as 'lived', taking inherently Foucauldian approaches: 'Roman urbanism [was] no longer debated solely in terms of orthogonal planning and symbolic model, but by the specificity of practice.'[698] Scholarly impressions of Roman cities thus shifted over time from a preoccupation with micro space (individual buildings and public spaces), into attempts to understand macro space, or 'complex networks of interconnected spaces, both reflecting and shaping everyday urban interaction.'[699] Outside of Pompeii, spatial syntax analysis has contributed to varied findings, from the centrality of public space in Rome through the lens of Lefebvrian theory, to the

[697] See Chapter Two.
[698] Foucault 1986. For an overview of the sensory and movement turns, see Flohr 2020. Quote from Newsome 2009, 25.
[699] Flohr 2020, 23-4.

reconstruction of social interactions in street networks and the impact of this upon building spaces in Ostia.[700] All have coloured our understanding of how space shaped, and was shaped by, Roman society.

At Pompeii, Grahame contributed an in-depth spatial syntax study of all properties in Region VI of Pompeii, demonstrating that domestic properties were shaped by social motivations and, in turn, moulded human movement in space. Other studies at Pompeii sought to better understand street cart movement, foot traffic, 'public' and 'private' space in the *domus*, and recreational garden space, with each contributing to a clearer picture of the relationship between 'the physical layout of the built environment… [and how they] both shaped and reflected the everyday social, political, cultural and economic processes that made up urban life'.[701] In particular, the approaches of Laurence, Newsome, Flohr and Wilson, Poehler, and von Stackelberg have illuminated complex networks of spatial relationships, urban interactions, and social processes in Pompeii.[702] The many contributors to Flohr's latest edited volume made great headway in revealing the responsiveness of ancient urban communities to social and historical contexts, and subsequently the power of space for shaping societal cultures. However, a spatial approach to agricultural 'market' and 'kitchen' garden space has not yet been attempted at Pompeii, due to its overlooked centrality to Campanian economies and society (demonstrated in previous chapters). However, one author did come close and provides an excellent starting point from which to undertake the present analysis.

In her work on Roman landscape and its relation to Roman identity, Spencer provides a stable framework within which to understand the epistemological significance of the natural landscape, and the encapsulation of this in the garden, with an appraisal of both elite discourses and their wider social impact.[703] Von Stackelberg, however, was the first to apply

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[700] Newsome 2009, 2010; Jansen .
[701] Quote from Flohr 2020, 23. See also Laurence 2011; Laurence and Newsome 2011; Newsome 2009, 2011; Stöger 2011; Kaiser 2011; Ostenberg et al. 2015; Flohr and Wilson 2016; Haug and Kreuz 2016; Betts 2017; Poehler 2017; Jansen 2018; Flohr 2020.
[702] Jansen 2018; Laurence 2011; Newsome 2011; Laurence and Newsome 2011; Poehler 2011, 2016; von Stackelberg 2009.
[703] Spencer 2010. See also Pagán 2006, Gleason 2013, Myers 2018. In other cases, the garden is left out all together; see, for example, the edited volume *The Production of Space in Latin Literature* (Fitzgerald and Spentzou (eds.) 2018).

spatial syntax analysis to the empirical space of the garden, applying literary ideals to archaeological garden space.[704] In so doing she highlighted the 'dual spatiality' of the garden, as both a public and private space, and as a locus of encounter where social identity could be formed and promoted. Nevertheless, von Stackelberg stopped at any in-depth analysis of utilitarian space and used limited 'real' archaeological sites as case studies. This chapter takes as the point of departure the advances made by von Stackelberg but, instead of revising the progress made by her in an experiential sense,[705] I will instead assess the economic and social contribution of the three categories of utilitarian *horti* to the population of Pompeii. I will also expand her very limited focus on one rustic garden from an elite property to several case studies from both domestic and commercial contexts in Regions I and II of Pompeii, focusing on this district due to the high volume of gardens and data related to agricultural activities found here. To frame the spatial lens through which these gardens will be viewed, I will first provide an overview of relevant theoretical concepts.

5.2 Semantics and codes in the agricultural hortus*: A spatial syntax approach*

Space is a product of the society which creates it. Without the individuals that inhabit and create it, space ceases to exist as anything more than simply a place.[706] To take the views of Lefebvre, to read space is to decipher the 'spatial competence and performance of every society member', as wrapped up in 'spatial practice' (First Space) and 'representations of space' (Second Space).[707] It was Soja who advanced this conceptualisation of societal experience in space with the identification of 'representational spaces', or 'Thirdspace'.[708] To directly quote Soja, Thirdspace is 'a fully lived space, a simultaneously real-and-imagined, actual-and-virtual locus of structured individuality and collective experience and agency.'[709] As such, the *hortus* as a general category can be understood as a space which at once marries empirical and epistemological notions of Roman identity, and is crucially constructed as a result of human agency. In other words, the production of space occurs as a result of social

[704] von Stackelberg 2009.
[705] A key concern of von Stackelberg (2009) is to reproduce the experience of the garden, through the combination of material and literary sources, as well as spatial theory. For a review, see McIntosh 2010.
[706] It is a moveable and fluid entity, described by Michel de Certeau (1984, 117) as 'a practiced place'. See also Foucault 1986.
[707] Lefebvre 1974, 38.
[708] Soja 1987.
[709] Soja 2000, 11.

conformity. This conformity is expressed in relations of production, in addition to the order imposed by these relations and the complex symbolisms that they tend to represent. To put this simply, patterns of production are reproduced in an effort to maintain or improve one's own social position in society.

In the case of the Roman *hortus*, the cohesion of agricultural output and land ownership created the 'First Space' of the *hortus* (or *heredium*) as a result of societal needs. Over time, this space evolved with society and came to be manifested as a 'Second Space', most commonly communicated through the literary works of elite members of society and public *Horti* (as seen in Chapter Two).[710] As a result, the ideologies held and communicated by this dominant group were deployed to preserve their desires for a continuance of 'Romanness', in part through the traditional and physical space of the *hortus*. Epistemes of autochthony, *virtus*, and *rusticitas* were communicated to the wider population through figures of memory and *lieux de memoires*, both physical and epistemological. Newsome takes as an example the restorations of the *Lupercal* in Rome by Augustus, a space embodying 'religious, magical and political symbolism.'[711] In the case of the Roman *hortus*, once the *heredium* gifted by Romulus upon which *maiores nostri* relied for survival, the perpetuation of 'relations of production and… the 'order' they impose' through signs, codes, and 'frontal' relations (Thirdspace)', caused it to become a symbolic pillar of Roman identity.[712] Through the combination of First Space and Second Space, then, the *hortus* became an embodiment of complex symbolisms, 'directly lived through its associated images and symbols.'[713]

As I have stated, an investigation into the signs and codes of the agricultural *hortus* forms the central purpose of this chapter. In identifying spatial patterns between structures, the epistemes of Romanness established in the previous chapters will be tested by garden type to demonstrate that the *hortus* of the first century AD was an evolved 'social' form of the rustic 'economic' vegetable patch of *maiores nostri*, or, in other contexts, a practical space utilised for maximising economic profit. Through this investigation we may better appreciate the relationship between what it meant to be Roman in Pompeii, and the manifestation of this

[710] See Zarmakoupi (2014) for a discussion of Roman villa culture and its impact in Campania.
[711] Newsome 2009, 26.
[712] Lefebvre 1974, esp. 33-8.
[713] Lefebvre 1974, 38. See also Laurence 1997, 9 and Grahame 2000.

in Roman garden space, leading not only to a translation of the 'language of allusion, activated by shared cultural associations'[714] in the utilitarian *hortus*, but also a picture of the extent of their economic use. Spatial syntax analysis provides the tools for reading utilitarian garden space.

5.2.1 Spatial syntax analysis

Spatial syntax analysis is defined as the quantification of movement in space. Its aim is to establish the accessibility of individual spaces within the 'global' area of a property (or public space), and the relations between each. In other words, this approach looks to quantify the ''syntaxes' that underlie spatial order' as a 'language' communicated and understood by 'competent' members of Roman society.[715] Fluent individuals are perceived as 'performing' at a level appropriate to their status and identity as a Roman citizen.[716] As Hillier and Hanson, the creators of this methodology, argue, 'The ordering of space in buildings is really about the ordering of relations between people.'[717] The works of Bourdeau, Giddens, Lefebvre, and Foucault, in addition to the large swathe of twentieth and twenty-first century scholars following in their footsteps, are founded in the capability of the human mind to read social systems in architecture and decoration, and in the general ordering of space. Yet mathematical approaches, such as spatial syntax analysis, are required due to the human race's inability to *talk* about relational systems in space, conceiving of them only at a subconscious level. 'Relations, it seems, are what we think with, rather than what we think of.'[718] This is made even more difficult by the distance in time and place between the researcher and ancient societies under study. Through the gamma analysis developed by Hillier and Hanson, then, we are able to delve deeper into the social orders shaping Pompeian society and the space of the utilitarian *hortus* as one important component of it.

Wallace-Hadrill describes the Roman *domus* as 'coded in a language foreign to ourselves.'[719] Spencer similarly describes this phenomenon as 'interpretation rooted in a

[714] von Stackelberg 2006, 81.
[715] Grahame 2000.
[716] Grahame 2000, 25.
[717] Hillier and Hanson 1984, 2.
[718] Hillier and Hanson 1984, 2.
[719] Wallace-Hadrill 1994, 3.

shared semiotic system.'[720] Spatial syntax allows us to *read* such semiotic systems shaping built space in Pompeii.[721] In identifying patterns of production, we may more broadly identify the social and economic systems shaping Pompeian space in the first century AD. The question of which individuals were intended to view and enter utilitarian garden spaces, and in what capacity, is an important question to answer in all three categories of domestic, commercial, and commercial-dining properties. Due to this, isovist analysis will enrich spatial findings to reconstruct the visual experiences of individuals in space.

As summarised by Jansen, 'An isovist is the area in a spatial environment directly visible from a specific point within the space.'[722] In the commercial-dining property, for example, a visible dining-garden space might invite guests in, while in a *domus*, the visibility of a utilitarian patch would have fulfilled its role as a social symbol for the *paterfamilias* and his household. Cooper's important study on the visibility and private power in the Roman *domus* emphasises the importance of considering lines of sight:[723]

> Sight-lines into [domestic] houses — both from the street and as the visitor progressed deeper into the *domus* — were carefully judged... As a matter of course, the doors of an aristocratic *domus* stood open…

Visibility in any property could be controlled by architecture or other moveable objects, daylight (or lack thereof), and the activities occurring within.[724] The same goes for accessibility, though it is important to remember that accessibility and visibility were not the same. Visibility can be established using isovist analysis, which, for the current primitive aims, will be conducted in a simplified version using floorplans.[725] The outcomes of this analysis provides an alternative understanding of space not provided by spatial syntax analysis, representing the 'description of the space 'from inside', from the point of view of

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[720] Spencer 2010, 8.
[721] Lefebvre (1974, 9) refers to this as 'social relations of production'.
[722] Jansen 2018, 57.
[723] Cooper 2007, 15.
[724] Taylor and Vlassopoulos 2015, 32-3.
[725] The use of isovist software is increasingly being employed to analyse visibility in archaeological properties. However, due to the rudimentary aims of this chapter with regards to visibility (i.e., to see whether a triclinium was visible from the street or not), I will use floorplans to judge this. Where possible from the archaeological remains, I consider any obstacles that may have been in the way (for example, root cavities or floor level).

individuals, as they perceive it, interact with it, and move through it'.[726] In taking this approach, I ask: Were utilitarian *hortus* spaces in properties positioned so as to provide a view of the produce being grown and served to visitors? Or were these spaces kept separate and private from non-household members and customers?

5.2.2 The methodology of spatial syntax analysis

The outcomes of spatial syntax analysis are threefold, providing solutions regarding how a space was used, by whom, and to what end. The mathematical outputs of this methodology are: Global Integration (GI), Local Interaction Potential (LIP), and Stranger Interaction Potential (SIP). These factors quantify the 'encounter-generating potential of a given space' within the 'global space' of a property by charting the potential movement of an individual within it, irrespective of gender, age, or class.[727] SIP differs from GI and LIP which calculate which rooms were most likely to encourage social interaction and room integration and are generally focused on the movement of household members. SIP, on the other hand, focuses on the movement and accessibility of rooms for guests (or 'strangers') to the property, and as such provides valuable insight into what the host intended to display about the character of the master and his *familia*.

There are several limitations to this method which are also acknowledged by Grahame in his own study of Pompeii. The first is the assumption that every doorway was 'unlocked' and equally inviting to household members and strangers alike; social customs are not considered in this scientific method. Furthermore, the destruction of many upper floors in the eruption causes an unavoidable bias in data, though stairs can indicate when these were present. It is up to each individual analyst to decide whether these are included, though the floorplans of many upper floors cannot often be reconstructed for inclusion in the data. Moveable barriers, such as curtains or even slaves, are also untraceable in many cases.

To begin the analysis, I first create a justified access map for each property representing the relationship between each. Each discrete space, or node, is signified on an

[726] Turner et al. 2001, 103.
[727] von Stackelberg 2006, 56.

access map by a white circle, each corridor by a black circle, each barrier or door by a line, and each staircase by a dashed line. The exterior of the property is counted as one space only and marked by a circle with a cross. Once drawn, an access map can then be justified by aligning all nodes according to their depth from the exterior to display social access more clearly within each given property.[728]

The layout of a property provides important insights into how it was intended to be accessed and used, and by whom. Maps exhibiting a symmetrical layout, also known as 'distributed' (due to being spread out), are those which facilitate social encounters through the integration of social categories (Figure 29). This can be observed when 'no one space controls more than any other does',[729] and is technically indicated in the data by *low* Relative Asymmetry (RA) values. RA values relate to the number of boundaries that need to be crossed to access a space; the fewer the boundaries, the more accessible the space, and the less complex the social and economic relations within it.[730] As such, distributed properties generally tend to be openly accessible.

Alternatively, those which are asymmetrical can be described as 'non-distributed'. Non-distributed properties tend towards the segregation of social categories and the reinforcement of social hierarchies, represented in data as *high* RA values.[731] Non-distributed configurations can be identified when 'control is invested preferentially in one space'.[732] These properties often only have one point of entry, while distributed properties often boast more than one access point.[733] Once the distributed or non-distributed status of each property has been established, a mathematical approach can be applied to determine Control Values (CV) and Mean Depth (MD). This data is then used to generate heat-map visualisations (stippled maps) representing the accessibility of each room within a property. For context, I will now provide a short overview of the different outputs of spatial syntax analysis before

[728] The justification of a property does not always have to be carried out in respect to the exterior but can illuminate the 'penetrative gaze of exterior to interior' (von Stackelberg 2006, 58).
[729] Grahame 2000, 44.
[730] von Stackelberg 2006, 55. See also Grahame 1997, 146 and Davis 1990, 231. For an in-depth discussion of spatial syntax methodologies, see Grahame 2000.
[731] Social hierarchies are discussed in Chapter 2. See also Wallace-Hadrill 1988, 1994; Garnsey 1998; Gardner and Wiedemann 1991; Cooper 2007; Nichols 2017.
[732] Grahame 2000, 44.
[733] For a discussion of the effect of this upon local and global integration and interaction potentials, see Grahame 2000, 44-5.

moving onto the case studies from Pompeii. Appendix C provides an in-depth overview of the methodology used in this chapter.

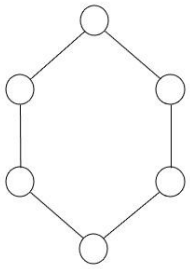
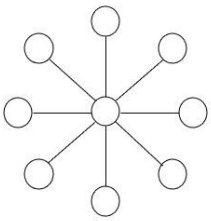
Configuration	Global	Local	Relative Asymmetry (RA)
Distributed			Low
Non-Distributed			High

Figure 29: Spatial order and Relative Asymmetry (RA) at global and local levels, as per Grahame 2000, 44.

5.2.3 Global Integration (GI)

Global Integration aims to establish the integration of any given node within the 'global space' of a property. In this chapter, this is achieved by calculating the Mean Depth of each node in relation to the total number of nodes in the property (generally labelled in spatial syntax analysis as 'K'). As mentioned, the fewer the boundaries that need to be crossed from the exterior to each given space, the more accessible that space is deemed. For the current study, this is useful for establishing the physical position of a utilitarian garden space in relation to all other spaces,[734] and by inference its *intended* accessibility (by the inhabitants) for both household members and guests (or strangers) to a property. The final visualisation of

[734] This approach does not consider temporary barriers, the evidence for which in many cases did not survive the eruption. Examples include wooden doors, curtains, and 'living barriers' (slaves). See Wallace-Hadrill 1994, 39.

GI in a stippled maps allows conclusions to be drawn about overall levels of access in relation to garden space. For the methodology, see Appendix C.

5.2.4 Local Interaction Potential (LIP)

Local Interaction Potential assesses the control each space has over those around it. This helps to reveal the rooms in a property where the most interactions were likely to take place. Spaces with high LIP are most likely to be reception spaces, such as atriums or dining-garden spaces, referred to by Vitruvius as *communia* (see below). For this study, LIP is useful for establishing the varied uses of utilitarian garden space by property type (domestic, commercial, and commercial-dining) and the varying levels of controlled access to each garden space. While spatial syntax analysis does not differentiate between individuals, LIP can be useful for making assumptions about the use of a garden space; high LIP values for an outdoor triclinium area may contrast with low LIP values for a utilitarian space, not intended to be accessed frequently by many people.[735] In contrast commercial properties, which instead encouraged customer footfall, would be expected to have a high LIP and be highly visible from external points of sight. For the methodology, see Appendix C.

5.2.5 Stranger Interaction Potential (SIP) and visibility

Unlike GI and LIP, Stranger Interaction Potential seeks to quantify the accessibility levels of each node in a property for non-household members (strangers). Vitruvius states that a domestic space should be reflective of the *dominus* (master or owner) while also reinforcing the social status of visitors. This can be observed in SIP.[736] The more trusted or honoured one is by a patron, the deeper into a property that guest was able to traverse.[737] In this way, SIP feeds into the theories established by Wallace-Hadrill and Thébert with regards to 'private' and 'public' spaces in the Roman *domus* (Figure 30 in 5.2).[738]

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[735] Slaves were likely entrusted with garden maintenance in domestic properties, though this is not recorded anywhere. Nichols (2019) contributes a useful overview to our understanding of the link between the male and his *domus*.
[736] Vitr. *De Arc.* 6.5.2.
[737] See Grahame 1997, 145 (citing Foucault1984) and Cooper 2007, 15.
[738] Wallace-Hadrill 1988, 1994; Thébert 1987.

There was not a strict notion of 'public' and 'private' in Roman society, only varying levels of access, the meditation of which 'was important to the accountability of the *dominus*.'[739] Thébert's discussion of private life in the domestic environment remains one of the most substantial contributions to our appreciation of the centrality of 'public' display in the *domus*, particularly in relation to decorations and feasting. All architectural and design choices in the *domus* were made with an external audience in mind. Though this has not been studied, this can also be applied to commercial property.

Cooper similarly highlights the role of 'public spaces' in the *domus* as minimising the distinction 'between public authority and private power',[740] while Wallace-Hadrill, Ling, Zanker, and Thébert helpfully promote the theory that domestic art was a crucial communicator of room accessibility to visitors, and a 'medium of social communication'.[741] This is significant to remember when establishing whether utilitarian *hortus* space was 'public' and subsequently their social or economic role in domestic and commercial properties via SIP analysis. As such, I test the theory that the deeper a garden was from the exterior of a commercial or domestic property, the more likely it was to be a 'controlled' space of limited access for house guests. In the *domus*, this would likely have been reserved for close *amici* or important guests.

While SIP might not immediately seem to work for commercial properties, I hypothesise that, depending on their economic model, the owners of these properties would either control access (for security reasons) or invite access (for profit derived from dining and sales) to utilitarian garden space. In each of the three spatial syntax outputs outlined above, it is clear that the outcome will differ by property type. Therefore, prior to the case study analysis, I will provide an overview of three utilitarian *hortus* categories in Pompeii.

5.2.6 Hypotheses and categories

While the classification of a *domus* garden is straightforward, the many possible sub-categories of a commercial garden (for example, cash-crops only, cash-crops and residential

[739] Cooper 2007, 12.
[740] Cooper 2007, 13.
[741] Zanker 2007, ix. For the shared semantics inherent within Roman art, see Hölscher 2004.

tenants, cash-crops and employed gardeners, and cash-crops and outdoor dining) make this research vulnerable to over-generalisations. Without the proper classification of garden type, patterns of use which may be useful for better understanding the development of utilitarian garden space in Pompeii may be missed. For example, while some utilitarian *hortus* properties in the below sample include a masonry triclinium in the garden space, others possess dining rooms nearby, or a high possibility of impermanent furniture being used outdoors at the time of the eruption. This makes it difficult to label one garden as commercial-dining garden, and not another. In other cases, while it is easy to identify which utilitarian *horti* belonged to a *domus*, evidence for upstairs accommodation or residencies in other properties can be found, indicating domestic uses of garden space in a different capacity. Nonetheless, broad classifications can aid more in-depth analyses of each space by uniting gardens under certain shared features.

In the scenario below, the domestic utilitarian *hortus* is the first to be assessed. This type of garden is found attached to a singular *domus*. It is often located at the rear of the property (bounded by a wall) or in a peristyle. In each case study, sufficient evidence for the cultivation of crops is indicated by furrows, archaeobotanical or archaeological evidence (for example, embedded pots, root cavities, or macro remains) or, in rare cases, by garden layout and size. Using spatial syntax analysis, we may analyse the social use of utilitarian *horti* found in domestic properties. In reflection of previous studies in public and private space in Roman society, I hypothesise that utilitarian domestic gardens will have high stranger *visibility*, low stranger *accessibility*, and a high level of *accessibility* for household members. Controlled access to utilitarian *hortus* space would allow visitors to view the shared semiotic system of ideologies seen above in the space of the *hortus*, but not access the *hortus*. Alternatively, members of the household (including slaves) may access the space for maintenance and cultivation, though not as regularly as *communia*.[742] In larger, more elaborate, properties, visibility and access are expected to be restricted to all strangers, in line with the typical layouts of the country villas of the dominant class.[743]

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[742] Spatial syntax analysis does not differentiate between slave and free members of the household, all of whom would likely have used spaces differently.

[743] In the literary records, a *hortus* was initially understood as an enclosed area held separately to other agricultural endeavours (see Chapter Two). See, for example, Pliny's (*Ep*. 2.17.15) Laurentine villa which includes a walled garden and Col. *Ag*. 10.27-8. On the division of space, see Cic. *Sen*. 15.54 (gardens and orchards), Cic. *Sen*. 15.56 (*succidiam alteram*), Var. 1.7.9, Plin. *HN* 17.204, 19.60, and Cato. *Ag*. 1.1.7.

The commercial-dining garden category refers to properties with evidence for dining in the garden space, as well as cash crop cultivation. This is most often indicated by a permanent dining fixture, such as a masonry triclinium, while elsewhere layout, accessibility, and archaeological evidence can indicate cases where impermanent furniture was likely used. In some cases, upstairs accommodation is indicated by stairs, though it is not always possible to ascertain whether this was for paying *caupona* guests or residential tenants in *cenacula* and *pergulae*.[744] It is anticipated that some dining gardens will exhibit high stranger *accessibility* and a higher propensity for direct access to *hortus* space than domestic properties, along with a high visibility of outdoor dining areas to attract customers. In other cases such as in properties used for ceremonial or religious activities, access to strangers would be highly controlled.

Commercial-dining gardens differ from the final and broadest category, commercial gardens, due to their capitalisation of garden space for both cash crops and outdoor dining (either as a semi-private *triclinium* or *al fresco* dining options for customers). Instead, commercial garden properties are exclusively dedicated to cash-crop cultivation. Many of these gardens were created in the space of demolished or converted domestic properties, thereby preserving the non-distributed layout of the former construction(s) for security and production purposes (see Chapter Six for an analysis of this phenomenon at Pompeii).

Each of these three categories contribute new meaning to the role of the atrium house first established by Wallace-Hadrill in 1994, extending its benefits beyond the social and into its adaptation as a space of security and utilitarian use in converted commercial properties.[745] As in the case of some commercial-dining gardens, accommodation can sometimes be found in commercial garden properties. However, the occupation of *cenacula* by workers or owners is not always possible to trace, though are a possibility in all non-domestic properties.[746] Due to the nature of their purpose, it is expected that commercial gardens will place an emphasis on security and thus exhibit low stranger accessibility, or no direct access to garden space. As

[744] For more on landlords and tenants, see Laurence 2011, 134-40, 152 and Frier 1980.
[745] See also Flohr 2012.
[746] Slaves would have also occupied rooms in the *domus*, but this would most likely not be fixed; see Wallace-Hadrill 1998, Pirson 2007, Joshel and Petersen 2014.

many commercial properties have been converted from domestic properties, spatial syntax analyses will be supplemented with direct access analysis to provide further insight into intended accessibility levels and to prevent a skew in results driven by the preservation of original *domus* structures.[747]

5.3 Agricultural horti *in the* domus

This section positions the domestic utilitarian garden first as an object of social display, and second as a source of nutrition and food for gifting, dining, and surplus sale. This category is the least common among all the utilitarian garden categories found in Pompeii. The functional walled garden found on the estates of wealthy Romans can be found in a small number of the wealthiest properties in Pompeii, while the small, rustic patch created in emulation of the former and used primarily as a social tool can be found more often in a small number of others. A third type, the *viridiarium*, which contains a display of both useful and beautiful exotica and greenery, including shrubs and trees, is also considered here. All three appear to represent a cultural shift in first century AD Pompeii from utilitarian *horti* to *horti* which embrace both *luxuria* and *rusticitas*. On the one hand we see the preservation of the traditional *hortus*, kept separate from the rest of the 'estate' as a functional component of the *domus*, and on the other the hand we see the garden used as a means of socially displaying an individual's 'Romanness', as a representational Thirdspace which has both functional and symbolic uses. The latter type is often found in peristyles, pots, *impluvia* (a pool to catch rainwater, often found in *atria*), and as a portion of rear gardens, while the former type is most often a space purposely demarcated from living and sometimes working areas as self-contained and walled spaces. Where domestic utilitarian gardens were placed, who they were accessible to, and to what extent, helps to determine the social and practical roles of the rustic garden in each household. Patterns related to their placement and display will be discussed below using spatial syntax and isovist analysis. However, first, the broader context of domestic space and its operation in Roman society will provide a springboard from which to better understand the domestic utilitarian garden.

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[747] From a different angle, one may consider the preservation of an original *domus* structure to be significant, perhaps to facilitate security.

In Roman society, the *domus* referred to an entire family unit (slaves and all) under the control of the *paterfamilias* (head of the household), as well as the physical properties and 'money-making endeavours' possessed by the family.[748] As such, the *domus* was synonymous with the character of the *paterfamilias* and his household, 'a visual, architectural construct of the *familia*'s identity and proof of participation in Roman society.'[749] More generally, the manner in which the *domus* was constructed according to Roman visual cues, and the reinforcement of this through domestic rituals, confirmed a patron and his family's embodiment of Romanness to an external audience.[750] In other words, the fluency with which each family unit conformed to society determined their position within it. Due to this, the *domus* sat at the centre of public life and hospitality and was the bedrock upon which Roman society was built. The *domus* of a man (or woman) in the public eye was the place to be seen.[751] This was achieved through varying levels of control and access in the *domus*, the design of which served to maintain the hierarchical ordering of Roman society.

Accessibility was often dictated by the social status of a guest and their relationship to the patron of the *domus*. The more barriers one passed, the further one moved from the 'public' domain of *negotium* ('such as vestibules, courtyards, peristyles and other apartments of similar', or *communia*) and into the 'private' domain of hospitality ('such as the bedrooms, dining-rooms, baths and other apartments which have similar purposes').[752] The latter were spaces into which 'no one can come uninvited', while the former were considered as open access 'by right'.[753] In line with the semi-public nature of the *domus*, a *paterfamilias'* importance was analogous to the number of guests visible in his *domus.*[754] When fashioning one's own social identity, the contents of the *domus*, and the movement of a host and his or

[748] This included members of the *familia* by birth right, those bound to the *paterfamilias* by marriage, slaves, freedmen (Hales 2003, 1-2). See also Cooper 2007.
[749] Hales 2003, 2.
[750] Hales 2003, 5.
[751] A good house was one which could be seen by all as in, for example, the oft-quoted instance of the elaborate house of Livius Drusus on the Palatine, later to become the site of Cicero's own house (Berry 2007 (trans. Shipley 1961), quoting Velleius Paterculus).
[752] Vitr. *De Arc.* 6.5.1. For a discussion of the use of *cubicula* as reception rooms, see Riggsby 1997, 41-3.
[753] Vitr. *De Arc*. 6.5.1
[754] Berry 2007, 12. Vitruvius also emphasised the importance of a public figure keeping his domus open in the public nature of an elite household; see also Hales 2003, 3-5. On the same subject, Seneca (*Ep*. 21.6) stated the following: 'Whenever men have been thrust forward by fortune, whenever they have become part and parcel of another's influence, they have found abundant favour, their houses have been thronged, only so long as they themselves have kept their position.' (*Quoscumque in medium fortuna protulit, quicumque membra ac partes alienae potentiae fuerunt, horum gratia viguit, domus frequentata est, dum ipsi steterunt.)*

her guests within, were of the utmost importance and significance for social advancement and survival:[755]

> Ritualised domestic activities involved the playing out of *mores*, traditional customs and values, bringing such constructs of Roman behaviour to life in order to justify one's identity as Roman. The decoration of the house in the course of such rituals and even the permanent arrangement of rooms in the house plan to accommodate the occurrence of these rituals can be seen as a constant confirmation of the householder's Roman identity.

The social status and political standing of a host is therefore made vulnerable when not proficient in the shared semiotics of 'Romanness'.[756] The aforementioned axis established by Wallace-Hadrill, and used by Grahame, encapsulates the hierarchical ordering of Roman society as played out in the *domus*, the space of the house itself becoming a reflection of assigned societal obligations and roles.[757] The widely reproduced diagram developed by Wallace-Hadrill (Figure 30) is reflected in the spatial syntax outcomes in Grahame's study on Pompeian domestic space, with grand areas often found to exhibit a great deal of control over other spaces.[758] The decoration of each room could also aid in establishing a room's use.

[755] Hales 2003, 3.
[756] This was the case at the fictional feast of Trimalchio where astonished guests were subjected to display upon display of the host's history, character, and wealth
[757] Thébert (1987) expresses similar sentiments to Wallace-Hadrill in her discussion of the public role of elite African houses. Hales (2003, 3) takes as an example of this the House of Pansa (VI.6.1) in Pompeii, which promotes the (Vitruvian) canonical design of atrium, peristyle, hortus, 'opening progressively around a central axis of symmetry'.
[758] This same methodology was applied by von Stackelberg to two garden spaces in Pompeii, in the House of the Menander (I.10.4) and the House of D. Octavius Quartio (II.2.2).

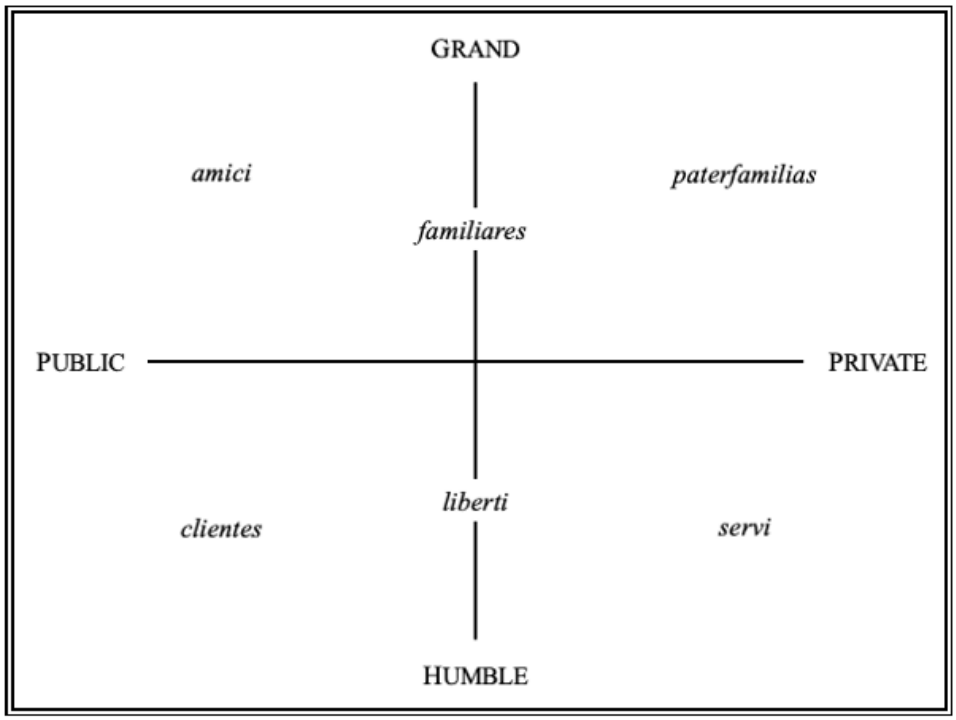


Figure 30: Axis of spatial differentiation in the Roman *domus* (per Wallace-Hadrill 1994, 38).

Therefore, while the dichotomy of 'public' and 'private' space was not understood by the Romans as it generally is in post-Industrial Western society, similar concepts nonetheless importantly served to reinforce hierarchies of space.[759] To be clear, 'public' in the English vocabulary is defined both as a community of people, generally speaking, as well as an adjective for describing something in 'open view', or concerning 'the people as a whole.'[760] As we have seen, a guest own social status and relationship to the host dictated which rooms were accessible, often aided by decorative cues and moveable barriers (such as curtains or slaves).[761] In this way, access is communicated either by invitation or intimation, via the shared semantics of Roman social conformity. Spatial syntax analysis provides the tools to 'read' architectural space from the archaeological record for the cues related to access in both commercial and domestic properties.

[759] In a modern home, areas for sleeping, eating, cooking, and personal hygiene are often marked out in a uniform way. Each has its own level of privacy, as implied by its function. For example, a new guest to a home would not, if conforming to societal norms, enter a bedroom without permission as this space is deemed private. The Romans did not have the same concept of assigned functions by room, and therefore were restricted by different social conformities in relation to access than a contemporary individual may be. For discussions, see Hales 2003, Allison 2008, and Flohr 2012, 8, and Tuori 2015. Foxhall (2013) importantly investigated engendered space in her volume on gender in classical antiquity.
[760] Collins Dictionary 2022.
[761] Ling 1991; Wallace-Hadrill 1994; Watts 1996; Clarke 2003; Haeckl and Gazda 20102010.

I will now move on to an appraisal of domestic utilitarian *hortus* case studies from Regions I and II of Pompeii, the greenest (and arguably semi-agrarian) district in the city. In so doing I will ask whether a utilitarian garden in the *domus* intended to be 'grand', 'humble', or both, particularly given its status as an embodiment of Thirdspace? I will also consider whether the utilitarian *domus* garden intended to facilitate interactions in space, or whether it was instead reserved for privileged guests of a higher status or closer relationship with the host. The application of the theoretical concepts covered above, in particular Wallace-Hadrill's axis, Soja's Thirdspace, and Hillier and Hanson's methodology, can do much to help me interpret the syntax of different properties when establishing the various social and economic roles of utilitarian gardens.

5.3.1 Social symbols or sources of sustenance?

I have identified only four domestic rustic garden properties in Regions I and II of Pompeii. These are summarised in Table 10.[762] As expected of domestic properties, where the social hierarchies are commonly maintained through the articulation of space, three out of four of the sample have 'non-distributed' spatial orders. It is notable that vines are absent from the gardens, with only more 'valuable' crops requiring protection from theft, and thus more valuable (see below), being grown. As seen in Chapter Two, vegetables, nuts, and fruits are the types of foods that we would expect to be grown in domestic rustic *horti.* These items would have provided welcome variation from the Mediterranean triad regime dominating diets in Campania.

[762] I have not counted the '*Domus'* of Euxinus as a domestic property due to the presence of a commercial cash-crop garden at the rear and its connection to a working, 'distributed' *caupona* property. Tenants or owners may have resided here, but this was not its primary use, and would therefore skew results if considered as such.

Property and address	**Spatial order**	**Direct access?**	**Primary crop**	**Supporting information**
House of the Ephebe (I.7.10-12/19)	Distributed	No	Vegetables	Rustic patch divided from rest of garden with a reed fence
House of Menander (I.10.4)	Non-Distributed*	No	Vegetables?	Walled rustic garden
House of the Hebrew (I.11.14)	Non-Distributed	No	Unknown	Walled rear rustic garden
I.20.4	Non-Distributed	No	Trees (fruit?)	Peristyle decorated with landscape *pinaxes*

*For a full summary and justified access plans, see von Stackelberg 2009, 117-20.

Table 9: Domestic gardens in Regions I and II categorised by spatial order (distributed/non-distributed), access (direct/non-direct) and primary crop (colours are assigned by category).

The first case study in the domestic category is the garden in the House of the Ephebe (I.7.10-12) (Figure 31). This *domus* is situated in the *insula* directly south of the busy Via dell'Abbondanza, facing onto the Vicolo dell'Efebo.[763] The garden, measuring around 190 square metres, is adorned with frescoes throughout, mainly of an Egyptian or mythological nature, especially around the large outdoor masonry *triclinium* which was shaded by a vine-covered pergola in antiquity. As adopted in the *Corpus Topographicum Pompeianum* and by Eschebach, this study will treat the House of the Ephebe as a standalone property.[764]

[763] The Vicolo dell'Efebo, despite being narrow, was likely traversed by carts due to the ramp leading up from the pavement on the northern end of the street from the Via dell'Abbondanza.
[764] Van der Poel et al. 1986; Eschebach 1970.

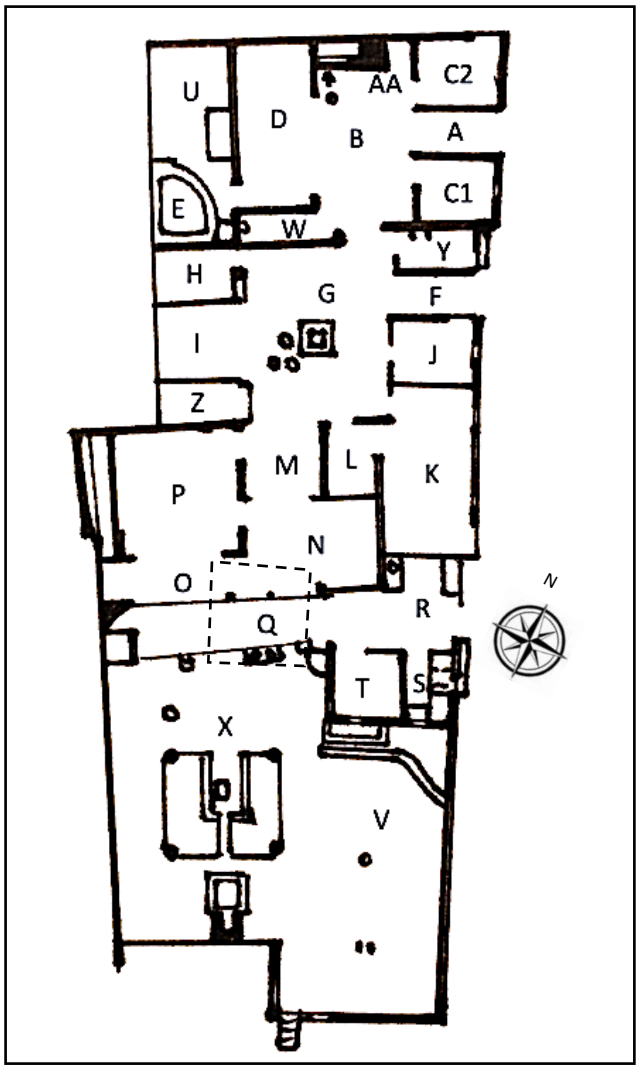


Figure 31: Floorplan of the House of the Ephebe (1.7.10-12/19), after Van der Poel 1986.

The global space of this property can be described as 'distributed', meaning that the property boasts a high overall level of accessibility and encouraged encounters through the integration of social categories throughout the *domus* (Figure 32). The large rear garden had, in antiquity, been split into two convex spaces by the placement of a reed fence (0.19m high) topped with herms (see Figure 31).[765] Node X contained an outdoor *triclinium*, a pergola, a water feature, statues, and garden frescoes, while node V contained a marble semi-circular bench and circular table, garden frescoes, and a small patch at the northern end 'arranged in

[765] Jashemski 1979, 50.

furrows, as is characteristic of vegetable gardens'.[766] Given its bounded nature, and the containment of shrubs and trees both utilitarian and beautiful, we can reasonably describe node V as a type of *viridiarium*. It is the visibility and accessibility of this area that I am concerned with here. Careful provision had been made for the garden's water supply; a basin at the edge of the garden had two openings which could be opened and closed alternatively to irrigate one half of the garden or the other.[767]

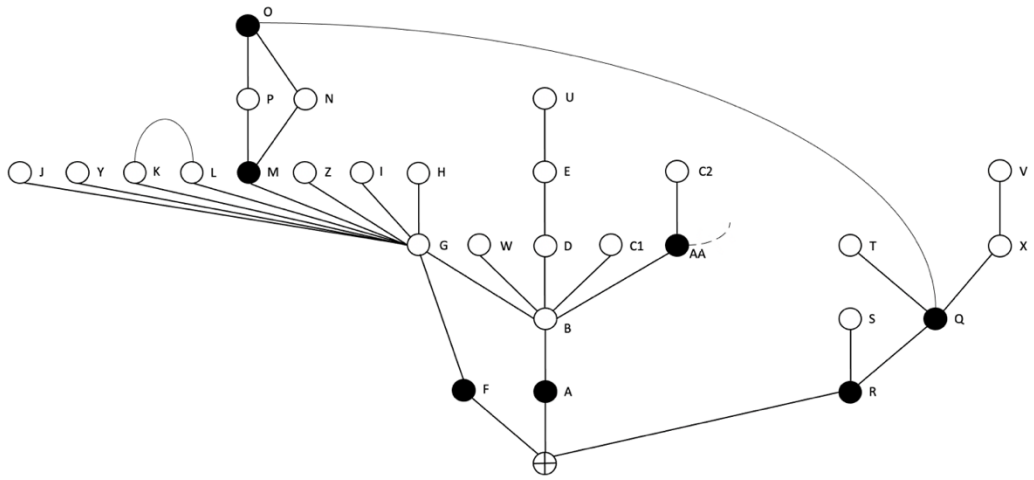


Figure 32: Justified access map of the House of the Ephebe (I.7.10-12/19).

[766] Jashemski 1979, 92-3.
[767] Jashemski 1979, 93-4.



Figure 33: North-west view of garden area, viewed from node V. The *triclinium* with pergola columns, the original marble bench and table, and a reconstructed reed fence in the style found on the garden fresco on a wall in node V, can be seen. Image: Pompeiiinpictures (2021).

The size of the rustic patch is not specified in the excavation reports. However, it cannot have extended past the marble table located in the northern end of node V, in line with the southern end of the masonry *triclinium* (seen as 'V' in Figure 31). A reserved estimate for the vegetable patch here can therefore be set at around twenty metres squared (215 square foot). To estimate the output of this patch, I propose a hypothetical combination of varieties may have been grown here at any one time.[768] Literary evidence in combination with the

[768] Martial (*Ep*. 5.78) lists lettuce, onions, cauliflower, beans, pears, chestnuts, olive, peas, lupines, mallows, mint, and elecampane among the *hortus* produce served to guests at his meal. Juvenal also provides a menu, though much smaller, listing asparagus and fruits among the *hortus* produce. In 'Vergil's' *Moretum* (*App. Verg.* 80-100), lettuce, leeks, sorrel, cabbage, beets, endive, and onions are listed as being grown, alongside garlic. Pliny the Younger (*Ep*. I.15) lists beetroot, cucumbers, lettuce, and onions as the garden produce served alongside other foods at his feast, while Gallus (in Becker 2010, 361) tells us that asparagus, cucumbers, and pumpkins were often served at the *gustatio*. Evidence for the cultivation of peas and beans are frequently found in gardens in Pompeii, while nearby Herculaneum was famous for its cabbages and onions (Rowan 2016, 115). See also Cato *Ag*. 8.1; Col. 10.127–39, 12.10.1; Plin. *HN* 15.53, 15.71, 15.102–4, 19.140. Martial (*Ep*. 11.18.) famously states that his garden is not large enough to grow a cucumber in. Garlic is one of the key ingredients used in creating a *moretum*; see Verg. *App. Verg. Mor*. 85-100. For further discussions of the produce grown in market gardens, see Chapters Two and Three. See also Watts 1996, and Rowan 2016.

archaeobotanical finds discussed in Chapter Four can help us to create a hypothetical garden of asparagus, beetroot, cabbage, cucumbers, garlic, leek, lettuce, onions, and peas.[769] This hypothetical plot would have provided enough vegetables to support approximately three individuals per annum.[770]

This estimate is very rough. Despite Strabo's attestations that Campania enjoyed between two and four harvests per year, we cannot accurately reproduce the conditions of growth or know exactly which varieties were grown here, or in which quantity. Further, the individual spacing, soil, aspect, harvest times, and water requirements of each variety of vegetable or herb would have varied greatly. This is in addition to the other Mediterranean staples of grain, wine, and oil, and some meat but does not include herbs, which may have also been grown here.[771] Given the size of this property, and the likelihood of a household larger than three individuals (including slaves), it is safe to conclude that this patch would not have supported the nutritional requirements of the household. However, it may have supported, to some extent, supplies for feasts hosted in this property, and/or supplemented household meals. Therefore, this garden was not likely to have been used in an economic capacity, leading us to our next enquiry: its social use.

Figure 34 shows three stippled floorplans for the House of the Ephebe. These are split out into Global Integration Potential, which shows the accessibility of each room within the *domus* for household members, Local Interaction Potential, which shows the rooms most frequented, and Stranger Interaction Potential, which shows levels of room accessibility for house guests.

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[769] A summary of the estimates detailing harvest needed in pounds, row length, and plants needed are as follows: Asparagus: 6 lbs, 20 ft, fourteen plants; Beetroot: 10.5 lbs, 7 ft, forty-two plants; Cabbage: 45 lbs, 30 ft, twenty plants; Cucumbers: 24 lbs, 20 ft, ten plants; Garlic: 3 lbs, 12 ft, twenty-four plants; Leek: 3 lbs, 5 ft, twenty-one plants; Lettuce: 18 lbs, 36 ft, thirty-one plants; Onions: 24 lbs, 24 ft, seventy-two plants; Peas: 9 lbs, 23 ft, sixty-nine plants.

[770] This estimate was generated using the calculator created by Poindexter 2019 and considered yield and ground size. I also allowed for a path of approximately one by six metres (based on the estimated length of the plot at six metres and the difference between the required space for the harvest, 209 square feet, and the estimated size of the plot, 215 square feet).

[771] We have no pollen records for this garden so cannot conclude this with certainty.



Figure 34: Stippled maps for the House of the Ephebe (I.7.10-12/19), showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

Node V with the vegetable patch exhibited low accessibility for both household members and guests. On Wallace-Hadrill's axis, this would sit on the 'Private' and 'Humble' portion (see Figure 35). Room V has low presence-availability in all three maps. In other words, this means there was a low likelihood that any individuals, regardless of their relationship to the *domus*, were interacting in the vegetable patch freely. Interestingly, the *triclinium* area (node X) shows moderate accessibility for strangers but registered as having low accessibility for household members on the GIP and LIP maps. This supports the material finds here, including permanent dining furniture, frescoes, statues, and flowing water features designed to impress guests at a feast. All material finds are also consistent with this space being a *viridiarium*, intended to be viewed either from the marble bench placed in the enclosed area, or the *triclinium*, as seen above (further demonstrating the possibility of viewing vegetable gardens, as one might view *nemora tonsilia* or *ars topiaria*).[772] For these reasons, it is unlikely that this space was intended to be used daily by the household; once admitted into the entertainment area of the garden (node X), the majority would only be able to view the rustic patch from the *triclinium* but not access it without permission.

[772] See notes 180 and 444.

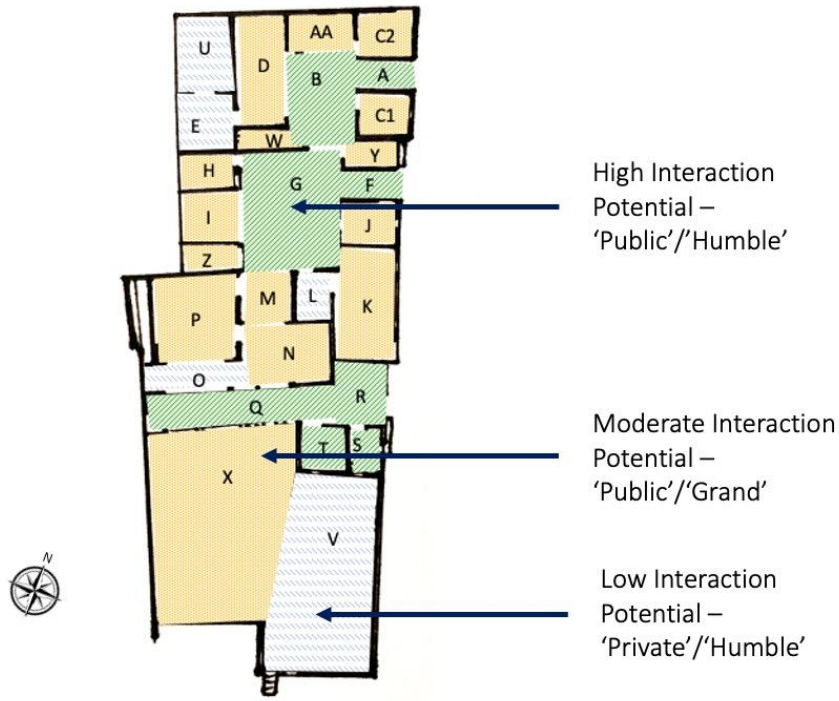


Figure 35: SIP map of the House of the Ephebe showing overlaps with the Public-Private Axis (developed by Wallace-Hadrill 1994).

Similarly, the rustic area (node V) was not designed to be easily accessed by the household or guests. Resident slaves instead likely maintained this space. Therefore, the utilitarian rustic patch in this property was intended to be *viewed*, rather than *accessed* or employed in everyday use. This view served to communicate the master's awareness of the symbols of Roman identity in the *domus*, and his or her household's conformity to the social codes and dominant ideologies seen in Chapter Two. By implication of this rustic space, the household's Roman identity was advertised in a symbolic combination of the traditional values of *frugalitas*, *simplicitas, rusticitas,* and *autarkeia*, framed by newer Imperial imagery related to exotic lands (Egypt) and trade.[773] The reed fence dividing the two garden areas likely reinforced these controlled levels of accessibility for guests. The power of spatial

[773] The family living here are thought to have been important merchants involved in overseas trade; see PompeiiSites 2020. See Barrett (2017) for a discussion of the Nilotic scenes in the garden frescoes of this property.

syntax analysis is supported by the fact that this fence is not considered when undertaking the calculations. A brief look at dining customs may shed further light on how controls over *hortus* space accessibility and visibility operated.

At the Roman feast, individuals would be seated according to status, either by the host, or a slave tasked with the role (Figure 36). The *Lectus Imus* was reserved for members of the household, while the most important guests would recline on the *Lectus Medius*. The *Lectus Summus* was for lower status guests.[774] From the *Lectus Medius*, the focal point would have been the rustic patch, as well as the reed fence and herms in front, and the garden frescoes on the wall behind. This view served to communicate the master's awareness of the symbols of Roman identity in the *domus* to his or her most important guests. By implication, the master's Roman identity was advertised in a symbolic combination of the traditional values of frugality, subsistence, and agriculture, and framed by newer Imperial imagery related to exotic lands (Egypt) and trade.[775] When the *triclinium* was not in use, the rustic patch would have been hidden from the view of household members and guests using the main areas within the central *domus*. The controlled visibility and accessibility of the rustic patch thus positions it as a space of privilege in the House of the Ephebe, to act as a social symbol of *virtus* and autochthony, and as a source of supplementary items for the diet. This *viridia,* or plant display, contained both useful and visually pleasant green plantings, and was extended further by the *viridiaria* paintings depicted on the walls. Thus, this space combined Republican and Imperial ideals in one space and, as such, acted as a Thirdspace.

Other case studies from the town support the view that the utilitarian garden in the *domus* was exploited for the social impetus that it, and its produce, provided for the *paterfamilias* and his family. As we saw briefly above, similar findings are witnessed in the *viridiaria*-style peristyle garden of the House of C. Julius Polybius (IX.13.1) used for growing fruit and nuts.[776] While the peristyle was not readily accessible to visitors (only by invitation, as in the House of the Ephebe) it was nonetheless visible to those dining in adjoining rooms, or for those standing in the portico (the latter of which would be considered a *communis*

[774] For more on status at the Roman feast, see Gold and Donahue 2005 and Hudson 2010.
[775] This family are thought to have been important merchants involved in overseas trade; see Pompeii Sites 2020. See Dianigo (2017) for a discussion of the Nilotic scenes in the garden frescoes of this property.
[776] The imprint of a long fruit ladder, of the kind used in the area today, was found in the peristyle, while numerous root cavities suggested the cultivation of a variety of fruit and nuts; see Jashemski 2002, 19.

space).[777] *Pinaxes* (framed pictures) of landscapes circling the portico would have further transported occupants and guests to the bucolic countryside, as would the third style frescoes throughout the *domus* decorated with *viridia*.

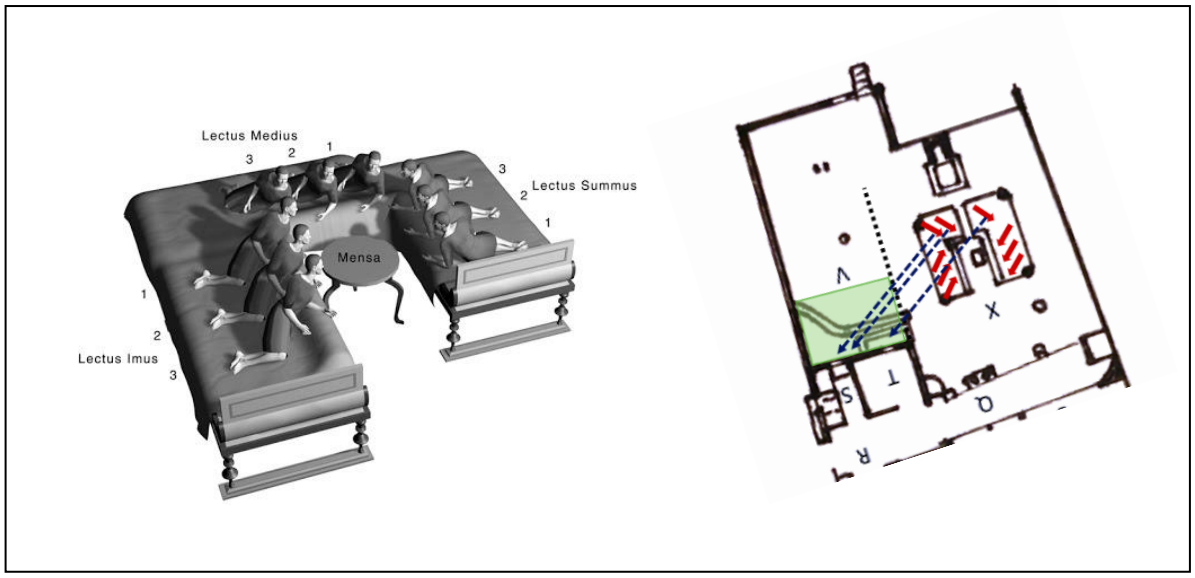


Figure 36: The garden *triclinium* at the House of the Ephebe. Lines of sight are indicated by blue dashed-line arrows, location of the rustic *hortus* by the green shaded area, and reclining positions and directions by red arrows. Image: (Left) Dianigo 2020, (Right) Author's own.

An elite property from the town provides a useful juxtaposition to the 'on-show' gardens in the House of the Ephebe and the House of Julius Polybius. The House of the Menander (I.10.4, 14-7), one of the largest houses in the town and occupied in antiquity by individuals of a high status, boasts a large, walled, rustic garden (measuring approximately 140 square metres), entered from the south-west of the large central peristyle.[778] In the rustic garden, Maiuri recorded evenly spaced circular areas with root cavities in the centre of each, though no measurements were taken.[779] Agricultural tools were found in the adjoining storeroom, perhaps used for both the rustic *hortus* and field work outside the town walls. A

[777] Vitr. *De Arc.* 6.5.1.
[778] Due to a *graffito* in the *fauces* and a seal found in the house, it is thought that this property was owned by Quintus Poppaeus at the time of the eruption, of the Poppaeus family to whom Nero's second wife Poppaea Sabina likely belonged; Archaeological Park of Pompeii 2020. The rustic garden alone measures
[779] Maiuri 1933, 216-219.

cellar on the lower level could also be accessed from the garden.[780] This garden, and the walled example found on the entertainment and residential complex of Julia Felix, is of the type commonly found in the *villae rusticae* (farming estates) in the Italian countryside.[781] The spatial syntax outcomes for the House of Menander, first discovered by von Stackelberg, reveal a 'moderate to weak level of control over…neighbouring spaces', thus conforming with the Ephebe and Polybius gardens. However, the rustic garden claims 'easy access from within the house and the facilitation of informal meetings.'[782] As such, this rustic garden was intended to follow the format of elite countryside *villae* and provide security from non-household members, while also allowing essential access from within the house for the maintenance of garden produce within.[783]

Using the same methodology as applied to the House of the Ephebe for estimating garden yield, and taking the same plant varieties as a hypothetical base, the rustic garden in the House of the Menander had the potential to provide enough to support for the diets of just under twenty adults.[784] While this domestic utilitarian garden did not serve a social role in its physical form (it was not a focal point for guests or household members), it would have fulfilled this role with the food that it produced. Given the size of the garden, there is also the possibility that the produce cultivated here served an economic role for the household, in addition to potentially supporting the nutritional requirements of the household (hence the agricultural tools). This garden, of the style found in country villa estates, also confirms the owner's 'spatial competence and performance' not only as a member of Roman society, but also of the local elite.[785]

In all the domestic properties examined above, the controlled status of the rustic *domus* garden is apparent. The utilitarian garden of first century AD had become a space of representation, a Thirdspace which combined epistemes of humble, ancestral beginnings, and

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[780] To the south-east, a commercial area, complete with a shop, processing area, and a wagon, served the commercial interests of the patrons, perhaps to transport some of the produce grown here.
[781] For example, three gardens were found in the villa at Settefinestre, while Pliny the Younger talks of his own walled rustic garden for the production of vegetables at his villa in Laurentium.
[782] von Stackelberg 2006, 117.
[783] This is perhaps one of the reasons why a store of silver treasure was found in the nearby cellars (beyond area S).
[784] This is in addition to the calories consumed from grain-based products, such as bread, as well as fruit, nuts, and meat.
[785] Lefebvre 1991, 38.

Imperial desires for social display and advancement. They were also a source of nutrition for households, even if only on a supplementary scale. Data showing low levels of rustic garden accessibility for residents and guests, and the high garden visibility for guests (when viewed from an entertainment or dining area), supported the social role of the rustic domestic *hortus*. While 'private' and 'humble' in their restricted status and rustic image, these gardens could at the same time be 'public' and 'grand' for the guests invited to view them. As expected, the data from this category varies from the next category which, instead of controlling access, encouraged it to increase footfall. However, in the final category, the commercial garden, similarities are found between these two.

5.4 Commercial-dining gardens

In the commercial-dining garden, the economic opportunity for cash crop production was combined with outdoor spaces dedicated to dining. The rising commercialisation of Pompeii and the growing interest in elaborate feasting seen in previous chapters appear to have contributed to the choices made about the inclusion of dining areas in cash crop gardens, though whether the majority of these were created before or after the earthquakes of AD 62/3 will be established.[786] So too does their placement appear to be strategic, in terms of the urban landscape and the triclinium itself, for increasing footfall and economic profit. While *triclinia* have been studied in Pompeii, never have they been assessed for their spatial qualities, or as a specific 'category' of garden to be compared to others.

As established in previous chapters, by the early Imperial period the *convivium* was an established political tool, useful for promoting the social status and rank of a host and his or her guests. This social event evolved into a complex affair requiring the thorough planning of guest lists, seating arrangements, entertainment, topics of conversation, ambience, and food and wine to serve: 'The increasing importance of the private table during the Imperial period led to the transformation of dining practices in the private sphere'.[787] In apparent simulation

[786] Following the major earthquakes which damaged much of the town in AD 62/3, twenty-three new agricultural gardens were constructed in Regions I and II. These changes are discussed in depth in Chapter Six, though it is worth noting that just over fifty percent of these included outdoor masonry *triclinia*. This demonstrates the growing importance of commercial dining opportunities in the mid-first century AD and supports the related findings of previous chapters.
[787] Zarmakoupi 2014, 198-203.

of elite villas in the Campanian countryside, outdoor dining was relocated from the 'austere forms of the peristylia-gardens' to the wider landscape, including the garden, making use of rustic and landscape 'views' in Pompeii. The remnants of this shift can be observed in the large number of masonry *triclinia* found in domestic and commercial gardens throughout the city.

I have identified eighteen commercial-dining gardens out of a total of thirty-two agricultural *horti* in Regions I and II of Pompeii. While gardens growing cash crops may have also incorporated indoor dining rooms or garden rooms (*oeci*) for the same use, these are not counted in the below case study.[788] In the examples below, the application of spatial syntax analysis exposes common accessibility patterns in commercial-dining garden properties to demonstrate the ways in which these spaces were positioned and utilised in Pompeii. Here I show that 'non-distributed' arrangements of former domestic properties were typically exploited for security and communal uses, while 'distributed' layouts were more commonly employed to attract customers. A possible link between contents and access is also uncovered. I begin with an examination of access to commercial-dining properties; where they were placed, and how they were accessed, can reveal much about the social and economic priorities of the population in the mid-first century AD.

5.4.1 Access to commercial-dining gardens

Direct access to a commercial-dining garden increases economic opportunity for owners or gardeners as visibility and subsequent interest or admittance for potential customers is increased. Table 10 organises all commercial-dining gardens in Regions I and II according to the level of access to the garden (Direct Access or No Direct Access) and their spatial order (distributed or non-distributed). This allows clear patterns between access, configuration, and garden contents to be observed.

Table 10 reveals the impact that crops had on the use of agricultural garden properties, and the types of individuals accessing them. In all Direct Access (DA) gardens, the primary

[788] This is due to this study being concerned with the experience of the garden and its direct contribution to the social and economic operations of the local population.

product was vines.[789] In all but one of the No Direct Access (NDA) gardens,[790] other crops dominated, such as fruit and nut trees and flowers. This means that fruit, nuts, and flowers were likely deemed more worthy of protection than vines, perhaps due to their higher market value.[791] Security therefore appears to be a central motive in NDA properties. The spatial configuration of the property appears to have also been used to the same end. The dominance of non-distributed properties in the NDA sample, making up seven out of eight of these gardens, makes security of certain crops via the prevention of entry to unwanted visitors, particularly into the deepest parts of the property, even more of a likelihood.

An exception to the data can be found in the *Caupona* of the Gladiators (I.20.1-3). This NDA garden was cultivated with vines rather than the trees or flowers typically found in other NDA properties. Nonetheless, this property was found to be 'distributed', as in all DA properties where vines were grown.[792] While direct access to this garden was only prevented by the preservation of a *fauces* from a previous domestic property (node H),[793] the inclusion of a large garden cellar in the south-eastern corner of the vineyard (node K) may have increased the garden's need for security. The upper-floor accommodation, accessed by the stairs near the entrance to the garden, may have required the same.[794] The SIP map for the *Caupona* of the Gladiators supports this (see right floorplan on Figure 37); the central garden space (node K) shows a low Local and Stranger Interaction Potential and a low level of

[789] This has not yet been confirmed in property II.3.7-9, though Jashemski (2002, 85) refers to it as a 'restaurant garden'. See also Della Corte (1965), 387. Between entrances 8 and 9 of garden II.3.7-9, a dipinti (no longer extant) was found stating that only permitted individuals may enter the sacred space of the garden. was found. This marks this space out from others with direct access as one specifically unintended to be accessed by those without permission.

[790] Where it was possible to tell from archaeobotanical remains. The House of Medusa (I.12.15) was cultivated in plant material at the time of the eruption, but this has not yet been excavated in detail; see Jashemski 2002, 55. In this property, though the triclinium is tucked around the corner of the garden in a separate room, soil was excavated between the couches, indicating that this was an 'outdoor' *triclinium*.

[791] See discussion of values in Chapter Four.

[792] Again, where it was possible to tell from archaeological remains.

[793] In the Garden of Fugitives (I.21.1-2), the spacing, shape, and size of cavities, plus a lack of staking, were taken as evidence for the growth of rosebushes, while in the House of the Garden of Hercules (II.8.6), a commercial flower garden was uncovered. In both larger gardens, collections of glass unguents for storing perfume were found. A similar site was found in the House of the Flowered Lararium (II.9.3-4) where a plant nursery was being raised; the size and proliferation of cavities in this garden, alongside young trees, suggests the cultivation of flowers here *en masse*. In the House of the Basket Maker (I.14.2), a small orchard of 49 tree cavities, including olives and figs, was excavated. Finally, I.22 was identified by Jashemski as a large orchard (I.22), with roughly 300 trees being grown here at the time of the eruption.

[794] We see this in other examples in Regions I and II (for example, see I.12.15). Due to the statue of a gladiator found near the triclinium, excavators believe that this garden was used by gladiators from the nearby amphitheatre. However, this was more likely a decorative choice made by the owners due to the proximity of the amphitheatre, and the customers from here likely frequenting the inn.

Global Integration. As this property may have housed temporary guests in a hospitality capacity or resident tenants in the upper floor apartment(s), it makes sense that the commercial vineyard here is not widely accessible to residents or 'guests' as the area of the outdoor *triclinium* is.

No Direct Access (NDA) gardens		
Property and address	**Spatial order**	**Primary crop**
House of Medusa (I.12.15)	Non-Distributed	Unknown
I.14.1/11-15	Distributed	Unknown
House of the Basket Maker (1.14.2)	Non-Distributed	Trees (fruit and/or nuts)
House of the Cylindrical Columns (I.16.1A-2/5-7)	Non-Distributed	Trees (fruit and/or nuts)
Caupona of the Gladiators (I.20.1-3)	Distributed	Vines
Garden of the Fugitives (I.21.1-2)	Non-Distributed	Trees (fruit and/or nuts) and flowers
Large Orchard (I.22.1-3)	Non-Distributed***	Trees (fruit and/or nuts)
Restaurant (II.8.1)	Non-Distributed	Vegetables
Restaurant (II.8.2-3)	Non-Distributed	Unknown
House of the Garden of Hercules (II.8.6)	Non-Distributed	Flowers
House of the Flowered Lararium (II.9.3-4)	Non-Distributed	Trees (young) and flowers

Direct Access (DA) gardens		
Property and address	**Spatial order**	**Primary crop**
The *Caupona* of Euxinus (I.11.10-11)	Distributed****	Vines
I.14.4/10	Distributed	Unknown
I.21.3	N/A*	Vines
II.1.7B/8-9	Distributed	Vines
Potter's Workshop and House (II.3.7-9)	Distributed	Unknown
Large Vineyard (II.5)	Distributed***	Vines
House of the Summer Triclinium (II.9.5-6)	Distributed**	Vines

Table 10: Commercial-dining gardens in Regions I and II categorised by spatial order (distributed/non-distributed), access (direct/non-direct) and primary crop (colours are assigned by category).[795]

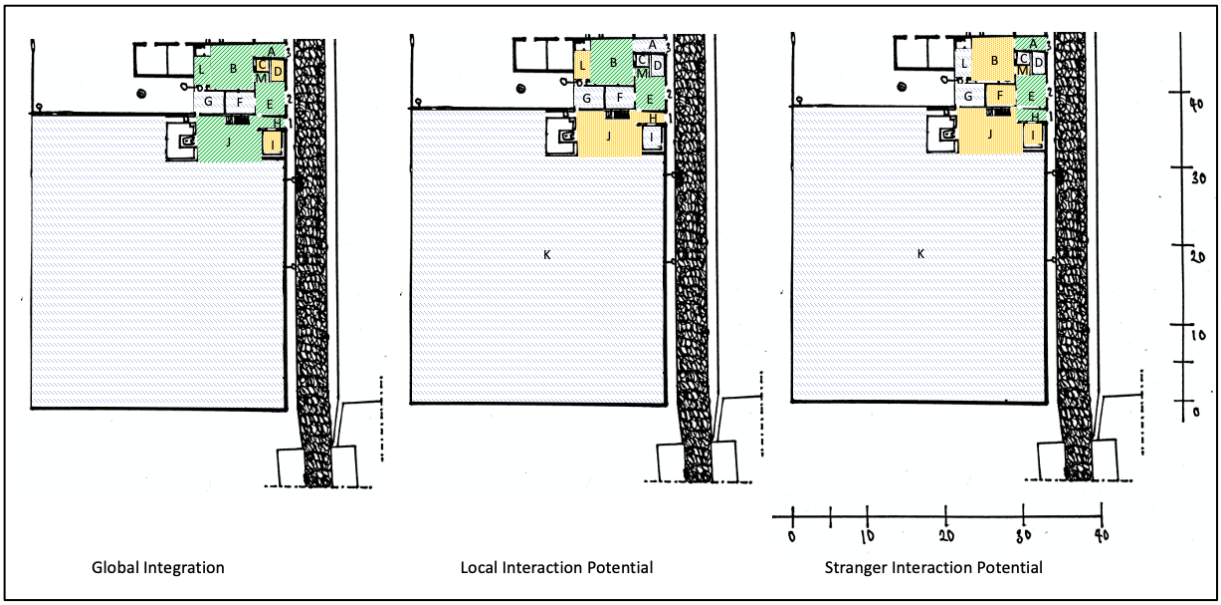


Figure 37: Stippled maps for the *Caupona* of the Gladiators (I.20.1-3), showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

The 'non-distributed' layouts of former domestic properties were preserved and utilised in all NDA properties where evidence for a *domus*-to-commercial property conversion can be observed.[796] The preservation (or construction) of 'non-distributed' spatial

[795] *This property is one area only and therefore cannot be described as either distributed or non-distributed.
**Not yet fully excavated, though the current uncovered layout suggests a distributed floorplan.
***The indoor areas of the Large Vineyard and the Large Orchard have not yet been fully recorded/excavated, but distribution can be assumed based on the portions of wall that have been uncovered thus far, and the points of entry for each.
****I have split the 'Caupona' and the 'Domus' for the purposes of categorising these gardens, despite them being combined. Both show as distributed when combined or separated.

[796] Three exceptions to this are the *Caupona* of the Gladiators, the Garden of the Fugitives (I.21.1-2), and the Large Orchard (I.22.1-3). The former property shows evidence of constructions being demolished (likely post-AD 62/3) to create a large vineyard with limited indoor service areas, while the latter two exhibit no evidence of conversion post-AD 62/3, suggesting they were likely purpose-built as large market gardens in the southern-most *insulae* of the town (where there was more room during developmental years; see Chapter Six). Despite

orders in commercial-dining properties was likely for security and hints at activities outside of the capacity of *cauponae*. For example, at least two were operating as flower gardens and nurseries, while two further properties show evidence for acting as sites of worship. In all cases, access would need to be limited. Two other properties from II.8 were used as restaurants, with indoor and outdoor hearths and *triclinia*, and shop counters at the front. Owners would have benefited from having wares for sale at the front of the property. Alternatively, properties aiming to attract customers, as in the *Caupona* of Euxinus (I.11.10-11), more often exhibited 'distributed' layouts to encourage social integration.

So far, spatial data has demonstrated that security and contents directly influenced the spatial order of commercial-dining properties. However, a closer look at the location of these properties can tell us more about the individual choices made by property owners or developers in relation to both their construction and their economic function. In Figure 38, the locations of all commercial-dining and commercial gardens are shown, along with their access points. This map demonstrates that commercial-dining-garden placement was often geared towards footfall from nearby entertainment venues or major streets well-integrated into the town's street system to attract customers. The data from Laurence's study of the urban fabric of Pompeii, and how this reflected the cultural choices of the population of Pompeii, enables further patterns to be brought to the surface. Brown dashed lines show well integrated streets in the overall street system of Pompeii (high in footfall and wheeled traffic). Those which were not well integrated (and therefore unmarked by dashed lines) were the result of local actions taken to restrict traffic movement in certain streets (for example, the areas around the entertainment buildings on the Via di Castricio).[797] Variations of blue shading indicate wheel ruts (and their depths) made by the carts traversing the streets in antiquity; streets with no blue shading indicate those with the deepest wheel ruts, and therefore the most frequented by carts.[798]

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this, the Garden of the Fugitives and the Large Orchard mimic the non-distributed spatial order of domestic properties, or commercial properties converted from *domus*.

[797] Laurence (2007, 2011), and Viitanen et al. (2012) after him, were able to demonstrate that traffic-controlling interventions in this south-eastern portion of the city caused traffic to be focused on the streets leading to the Porta Nocera, where a large number of our gardens are clustered, and the Porta di Stabia, both streets dominating the road network in this portion of the town. For example, water fountains were sometimes placed strategically to block cart traffic. See Laurence 2011, 52 (see also Figure 3.5 in Laurence 2007, 53).

[798] From this data, Laurence demised that localised areas existed in Pompeii (through a consideration also of fountain placement). N.B. The portion of the Via di Castricio leading to the Amphitheatre does not have data for wheel marks; there is a lot of missing data for Regions I and II (see Laurence 2011, 56).

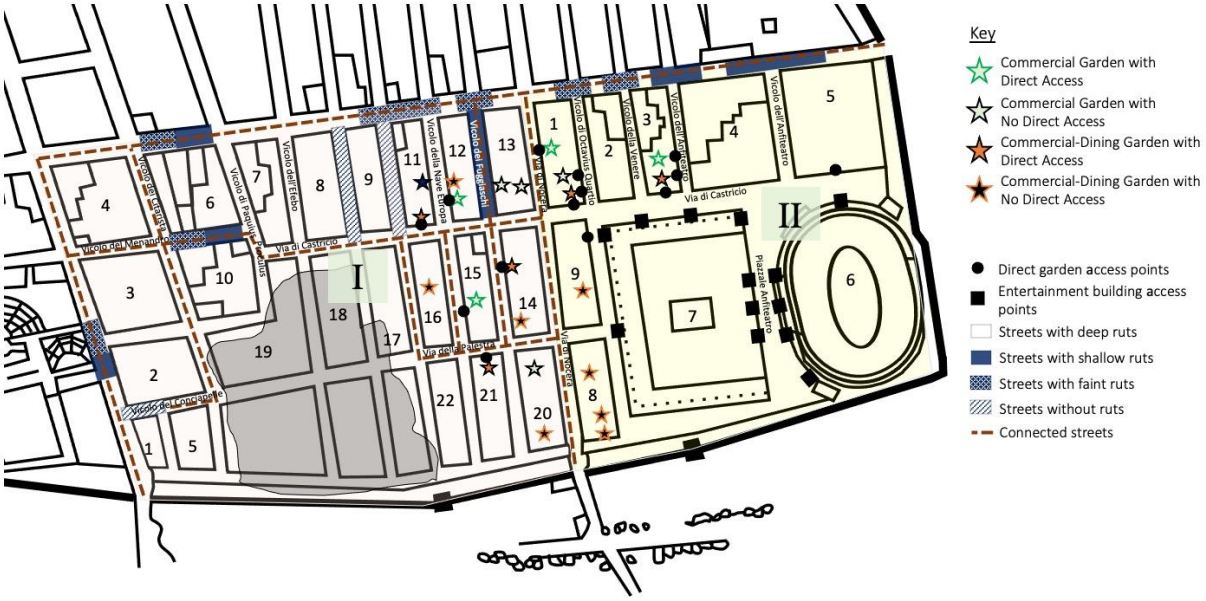


Figure 38: Map of Regions I and II, Pompeii, showing market garden and garden dining properties showing points of direct access, access points for entertainment venues, wheel rut depths, and connected streets. Image: Author's own.

The bucolic setting of commercial-dining properties provided an important unique selling point for garden owners and gardeners in the early Imperial period. In support of this, Dunbabin references the activity of *triclinium* rental in inns during the Roman period.[799] Similarly, a painted advertisement recorded by Mau used the *triclinium* with three couches as an attractive selling point for the 'inn to let'.[800] The position of commercial-dining gardens in the town, and of *triclinia* within them, was important for owners, gardeners, or landlords wishing to attract customers. Of seven DA commercial-dining gardens, five were strategically located on the foot-traffic only portion of the Via di Castricio (see Figure 38), a street which connected the entertainment buildings to the forum.[801] Four of these were located directly opposite the Large Palaestra and the Amphitheatre, enticing hungry customers after exercise

[799] Dunbabin 2003, 92-3.
[800] Mau 1899, 400. Davis (1998) wrongly reads this as a *triclinium* for rent.
[801] 'More than half of the streets leading to the south of Via dell'Abbondanza into Regions I and II were blocked off to wheeled traffic', presumably due to the higher level of footfall here for the Amphitheatre and the Large Palaestra; see Laurence 2007.

or a game.[802] Travellers or locals visiting the Amphitheatre, Large Palaestra, and Piazzale Anfiteatro (the latter perhaps for the *nundinae*) may have been inclined to dine in one of these gardens when out. All these gardens would have only added to the general atmosphere of hospitality in Regions I and II.

A straight line-of-sight from the street to *triclinia* in DA gardens would have increased the chance of enticing paying customers into the bucolic space of the garden; this was the case in six out of seven commercial-dining properties in the DA sample.[803] Placement within the town, according to crop and economic motive, was also key. Seven of the eleven NDA properties were clustered around the Via di Nocera, a street leading from the Porta Nocera (and the *necropolis* beyond) to the busy Via dell'Abbondanza, filled with shops and people. Among these NDA properties were the restaurants, flower and tree nurseries, and potential *cauponae* with upstairs accommodation.[804] Alternative entry for these properties was almost always gained from a door facing onto the busy Via di Nocera or onto streets well integrated into the wider street system of Pompeii with frequent cart traffic (as indicated by ruts, see Figure 38). The sale of produce in frontal regions likely encouraged the decision to not allow direct access to gardens on streets with heavy footfall, wheeled traffic, and livestock.[805] Three of the four remaining NDA commercial-dining gardens were very large market gardens, likely cultivating more than just vines (and thus requiring extra security).[806] Property placement and access orientation therefore reveals important information relating to how commercial-dining gardens were used, who frequented them, and the level of security of access required to either protect or promote the goods and dining areas contained within.

5.4.2 Case studies: The importance of location and placement in commercial-dining properties

[802] II.1.7B/8-9, II.3.7/9, II.9.5-6, and II.5.
[803] In the other, the *Caupona* of Euxinus, the dining tables thought to be in the garden would also likely have been visible.
[804] These properties are I.8.1, I.8.2-3, I.8.6, I.9.3-4, I.14.1/11-15, I.14.2, and I.20.3.
[805] We saw earlier that these tended to be used for the cultivation of fruit, nuts, and/or flowers. Heavy front doors and shutters with locks were commonplace in Pompeii, but daytime access to open spaces may have reduced security. In the top of a few walls from Pompeian garden properties, sherds of broken amphorae have been found, presumably to provide security for the produce grown within. Elsewhere, Jashemski (2015, 247) states that in each one of the commercial gardens excavated by her in the town, a dog skeleton has been found, likely for guard purposes.
[806] These three properties are I.16.1A-2/5-7, I.21.1-2, and I.22.1-3. The final, I.12.15, had a semi-outdoor *triclinium* and upstairs accommodation, the latter probably increasing the need for security.

Real examples from the sample provide useful illustrations of the findings so far. The first is the connected properties of the *Caupona* of Euxinus (I.11.10-11) and the *Domus* of Euxinus (I.11.12), located on the 'integrated' portion of the Via di Castricio, open to foot and wheeled traffic.[807] Excavations of the '*Domus'* (entrance 12), a DA property, found a rear garden evenly cultivated with vines. In the *'Caupona'* (entrance 11), an NDA property, a larger garden was found to also be planted with vines, though more informally, alongside some trees. In the *caupona*, a frontal shop with a counter led onto the large garden and was accessed from the main street, the Via di Castricio. Combined and separate, these two garden properties show as 'distributed', meaning that access and interactions were generally encouraged.

The main vineyard (N) in the *caupona* exhibited high Global Integration levels and high Interaction Potential for both workers (Local) and customers (Stranger) (Figure 39). It was in this area that Jashemski suggested that customers would dine at temporary dining fixtures in the shade of the vines and trees planted here (of the kind seen in a fresco from Pompeii, shown in Figure 40).[808] This was undoubtedly more appealing than indoor *cauponae* dining rooms found elsewhere in the town.[809] Although node E, a garden room (*oecus*), shows a low level of accessibility for workers/occupants of the property, its design as a semi-private space for customers is reflected in its moderate level of accessibility on the SIP map, as typically found in *domus triclinia*. By way of an invitation, or perhaps by hire, customers would have gained access to this space. Due to lack of (excavated, remaining, or recorded) material evidence, we cannot know if the internal rooms in the '*Domus'* were used for customer dining also, or whether this was used as a living area by Euxinus and his *familia*, though the SP map suggests that this vineyard provided a more private alternative to the public *caupona* garden (due to its low SIP).

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[807] The *Caupona* garden measures approximately 300 square metres, while the Domus garden measures around 200 metres. The remaining small, enclosed utilitarian dining garden at I.21.3 appears to have been delineated from an adjoining property by a closed door to make a purpose-built dining garden, very likely for purely commercial output. This property is unusual in that it has no indoor areas, only one outdoor space, the triclinium likely used by the gardener/owner to supplement income or for personal use.

[808] Of the sort seen in frescoes from the town, for example, at the Osteria della Via di Mercurio (VI.10.1).

[809] Inns were notoriously dark and smoky and filled with illicit activity; see Hor. *Sat*. 1.5.71–74 and *Ep*. 1.11.12; Petr. *Sat.* 98, 124. Cheating, violence, and murder were also associated with *cauponae*: Cic. *Inv*. 2.4.14, Cic, *Phil*, 2. 31.77, Cic. *Mil*. 24, Hor. *Sat*. 1.1.29.

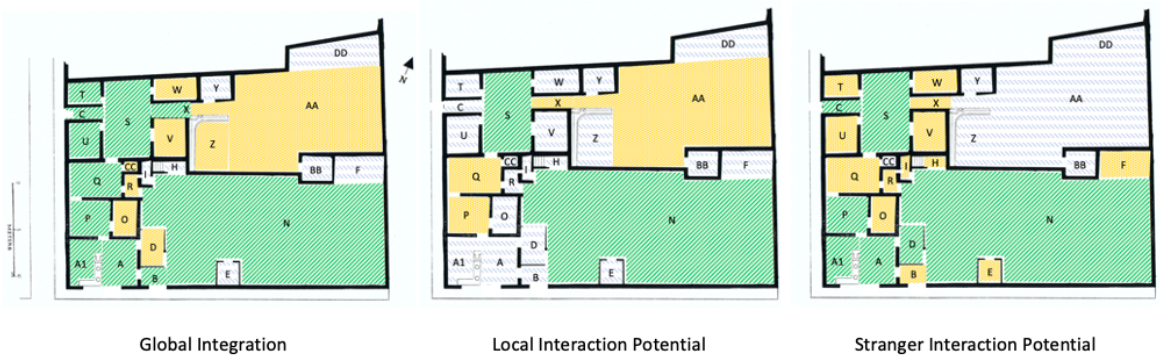


Figure 39: Stippled maps for the *Caupona* and *Domus* of Euxinus (I.11.10-12), showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

Similar patterns in spatial order and internal and urban placement can be found in the vineyard property at II.1.7B/8-9, also located on the Via di Castricio. This is one of the properties with a DA point located directly opposite the Large Palaestra. In this garden a large, cultivated area and a treading floor were found, indicating that vines were likely grown in the open space (node A in Figure 41).[810] To the north of node A, a *triclinium* shaded by columns and vines was excavated (node B), alongside an altar, a well, and a long 'serving' table along the northern wall. A nearby kitchen with a hearth (node E) would have been used to serve customers at the outdoor *triclinium*.[811] Two direct access points to the garden ensured that this space was highly accessible to strangers, while the ring-link orientation of nodes once again created a 'distributed' spatial order. With an open door at entrance 8, the large *triclinium* (node B) would have been directly visible to passing pedestrians.

[810] Vines are also grown here today.
[811] Where a hearth was not available, transportable braziers would be used to cook food; see Allison (2004) for the various locations in which cooking activities may have taken place in the *domus*.



Figure 40: Fresco from the south wall of the rear room in the Osteria della Via di Mercurio showing individuals seated at unfixed tables and benches. Meat, such as sausages and ham, hang above them. A small slave on the right is serving the group (image taken c.1860-1880). Image: Rick Bauer/Pompeiiinpictures 2020.

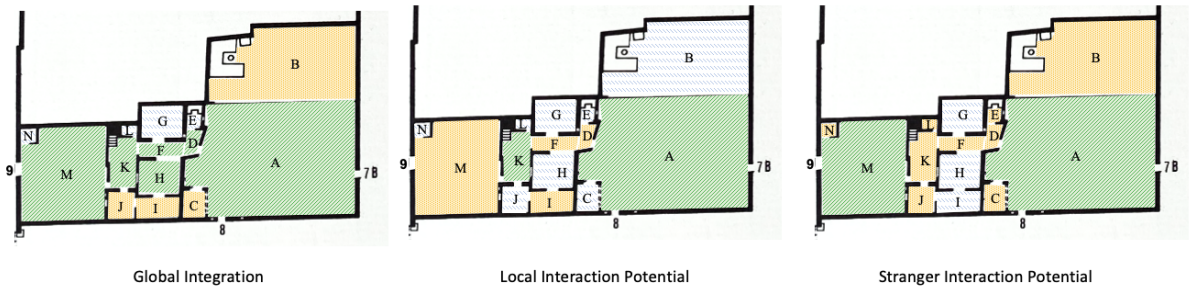


Figure 41: Stippled maps for the II.1.7B/8-9 showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

In terms of Global Integration, much of this property was easily accessible from within the 'household'. One of the exceptions to this was node B. On the LIP map, this node shows a low interaction potential, and very little control over other spaces within the property. This is likely due to this space only being used on occasion or for dining with guests or for

customers.[812] It is not known what the upper floor contained (accessed by the stairs in node K) though rental or inn accommodation is likely. In the latter case, we see a similarity between this and the *Caupona* of the Gladiators, while in the former, the triclinium may have acted as a unique selling point for tenants wishing to host their own friends.[813] Social benefit, then, was being derived from commercial-dining gardens by individuals of 'lower' social economic status. Such findings have important consequences for the traditional view of feasts *in triclinio* as being an 'elite' activity.

As in the *Caupona* of Euxinus, customers would have been treated to a rustic scene *in urbs* as they enjoyed local wine and food, in a Thirdspace which encompassed complex symbols of rusticity and frugality, as well as the benefits of imperialism. This commercial-dining garden was not only benefitting the owner of this property via the capital raised from the *triclinium* or the leasing out of the garden or apartments. It was also benefitting any garden or apartment tenants and/or any external customers hiring out the space. When dining in any commercial-dining garden, the social capital of this space would be transferred onto any who used it.

In these properties, footfall rather than security was the highest priority and, as we have seen, the cultivation of vines (less liable to theft that nuts, fruit, and vegetables) made direct access possible. However, in some cases, extra security via increased barriers to garden spaces was required. One such example is the commercial flower garden, now named the House of the Garden of Hercules (II.8.6), located on the Via di Nocera (plan in Figure 42).

In Insula II.8 (where three of our commercial-dining properties are located), Nappo reports that five buildings were demolished to accommodate a new, large garden at the rear of II.8.6. Pre-established patterns of spatial order and access once again emerge here. Based on the root cavities and glass unguents found here, Jashemski identified this as a commercial flower garden. Flowers and olives were raised here to produce perfume, the olive oil likely

[812] In other words, frequent access to the dining section of the garden was not required by owners or workers and slaves.
[813] For example, in the advert painted on the external wall of the Estate of Julia Felix, communal dining areas are advertised as an appealing feature of the domestic areas for rent. However, this is in contradiction to the words of Vitruvius who states that such spaces are only fitting of individuals in the public eye, and by intimation, very wealthy.

used in the perfume-making process. As similarly found in the nearby House of the Flowered Lararium (II.9.3-4), another nursery property, a large masonry *triclinium* and shrine were found (see Figure 43).[814] Similar patterns to those seen previously can be observed here; highly accessible frontal regions, as adapted from the 'non-distributed' layout of a former domestic property, moderate garden accessibility for guests, and multiple indoor storage rooms. It is likely that the outdoor dining area in this property was used by workers, the owner, and/or a guild of perfumers, while also providing an additional revenue stream in the form of dining experiences.



Figure 42: Stippled maps for the House of the Garden of Hercules (II.8.6) showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

The House of the Flowered Lararium, located just two doors down from the Hercules garden, was a large rear garden created post-AD 62/3 to span the width of the property. This garden was identified by the excavators Professor De Simone and Dr Sodo as a plant nursery,

[814] In antiquity, this would have been shaded by vines, supported by the four columns at each corner of the triclinium; see Jashemski (1979) for various examples of this in Pompeii. Small statuettes of a small, winged female and a draped figure (with some red pigment remaining) were found inside the shrine, and a statue of Hercules next to it. A doghouse made from half of a *dolia* was found south of the triclinium. Near to the triclinium, original excavators (1953-1954) found a skeleton with two gold rings, five gold coins, a strigil, probes, and other medical instruments.

planted with grape, hazelnut, oak, plum, and beech.[815] The smallest cavities, around 4-8 cm in diameter, were identified as flowers growing throughout the garden.[816] This property is interesting in that it appears to have been converted for semi-public use, given the presence of the electoral advertisement in one of the main atriums of the property (Node B).[817] This is reflected in the spatial syntax data, which reveals the frontal regions as open to visitor access, while the garden at the rear was reserved for invitation. The *triclinium* to the rear-centre of the garden, shaded by a pergola, may have been used on a hireable basis, with guests or customers served via the garden kitchen (node G), or by *universi* or *collegia* associated with garden work or plant production.[818] This may explain the presence of an electoral notice in node E.[819]

[815] Excavations of this property were carried out in the 1980s by a team led by Professor De Simone and Dr Sodo.
[816] Ciarallo (1989, 21) describes the garden as 'laid out in eight ground strips bordered by furrows,' the planning of which occurred in an east-west plan (as typical of a plant nursery). The garden was organised according to an equal four-part axis, along which the largest two cavities flanked the *ambulationes*, dividing the garden in half. 160 cavities were found here. Ciarallo also references the advice of Pliny and Columella "*per poi essere trapiantate dopo due o tre anni, una volta raggiunte le dimensionidi un avan braccio*".
[817] The notice calls for the election of Lucius Ceius Secundus as *duumvir* (L. C. S. II. VIR.). This individual's election is called for elsewhere by the '*Urbulanenses'* ('next to the 'Urbulanian Gate', i.e. today's 'Sarno Gate'') in this neighbourhood (see Cooley and Cooley 2004, 117), with almost all of his notices appearing in Region I (see Viitanen 2017). Another electoral notice, also calling for the election of Lucius as *duumvir*, was found on the wall between VII.3.20 and VII.3.21 has since been incorrectly taken as perfume by other publications. A mistranslation by Davenport Adams (1881) of '*perfusor'* as 'perfumer' (instead of a bath attendant who pours water over bathers).
[818] Electoral notices by a *pomari universi* (fruiterer collective) have been found in Pompeii (*CIL* IV 149, *CIL* IV 180, *CIL* IV 183, *CIL* IV 202, *CIL* IV 206). Cooley and Cooley (2004, 174-5) do not reference a perfumer in the list of trades mentioned in Pompeian inscriptions. See Chapter Six for further discussion.
[819] *Collegia* and *universi* often called for the election of individuals; see Cooley and Cooley 2004.

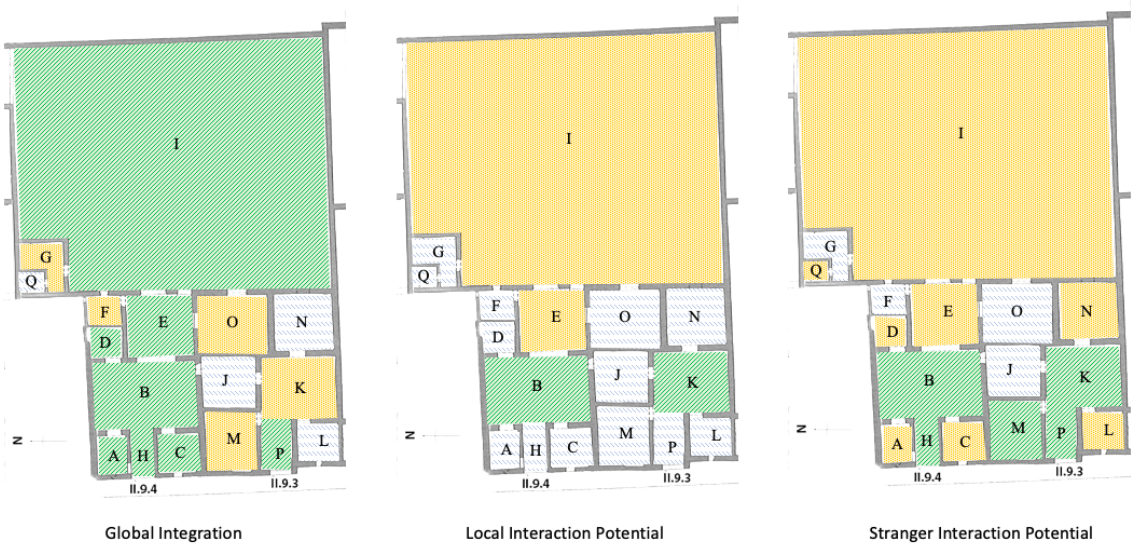


Figure 43: Stippled maps for the House of the Flowered Lararium (II.9.3-4) showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

For workers, the garden and much of the property at entrance 4 were very well integrated, meaning that the nursery was intended to be highly accessible to gardeners. The presence of young plants requiring lots of watering would have contributed to the decision to make this garden as accessible, yet secure, as possible. It is conceivable that some of these frontal regions were used to sell produce from the garden; the front doors of this property were a short distance from the Porta Nocera where one of the town's large *necropoli* was based; perhaps the flowers being grown between the young plants acted as an extra revenue stream.

The examples seen above uniquely demonstrate that the lucrative business of cash-crop cultivation was not one dimensional, but often supplemented with dining experiences which appealed to the consumer zeitgeist of the period. Renting out *triclinia*, either for feasts or casual dining, was facilitated by the strategic placement of commercial-dining gardens along streets leading to entertainment areas, and they provided a rustic environment from which to boost one's social standing and cultural kudos regardless of social status (one did not need to own a triclinium to have access to outdoor dining experiences *in triclinio*). The

commercial-dining garden was thus a Thirdspace into which local Pompeians may be transported to the countryside, the realm of the wealthy, and within which to perpetuate Imperial practices related to exotic goods, social display, and fine dining. However, despite their popularity (making up eighteen out of a possible thirty-two agricultural gardens in Regions I and II), no notable rise in agricultural gardens with outdoor dining facilities can be observed between pre- and post-AD 62 gardens, meaning that any 'new' gardens with outdoor *triclinia* were following a pattern already established in the first century AD.[820] Depending on the view taken, this could either go against the conclusions of previous chapters, hinting at an increase in commercial activity and its imprint on urban development, or may instead be revealing of the ingrained position of outdoor dining in the Pompeian consciousness and identity.

The application of these methods to a broader sample of houses in the future would serve to support or deny these findings for the rest of the town. But were these patterns existent in the largest of the three categories, the commercial agricultural garden? How did the owners, tenants, and gardeners of these properties capitalise on economic opportunities through spatial placement? The following section aims to provide answers to these questions.

5.5 Commercial gardens

As highlighted in this chapter's introduction, the crossover between domestic and commercial function was common in agricultural garden properties in Pompeii. For clarity, this section covers all non-*domus* properties with evidence for cash crop production. I identify these here as commercial gardens. As with the previous two sections, spatial syntax analysis will be applied to a sample of these gardens to identify patterns of use and spatial planning (on macro and micro levels). In so doing, motivations for storage, processing, export, and worker access marks these gardens out as unique from those of domestic or dining functions, while security once again represents a central concern. Unlike the dining garden, however, direct access does not appear to be determined by garden contents, but rather by the needs of the owners or workers. These needs will be covered in more detail below.

[820] Of the market garden properties without evidence for development post-AD 62/3, nine exhibited outdoor dining facilities. The same figure applied to those with evidence for development post-AD 62/3.

Commercial agricultural gardens can be described as garden spaces used for the cultivation of cash-crops sold for economic profit. Unlike domestic properties, commercial gardens were not intended to have any social impact, though they may have had an indirect effect on an owner or gardener's reputation.[821] Instead, these spaces were commonly cultivated for cash crops (economic profit), and secondarily as a supplement to the nutritional needs of the owner and/or gardener.[822] Many of these gardens were converted from domestic properties to make use of their typical 'non-distributed' spatial orders. This conversion is often indicated by the preservation of *atria* and peristyles.[823] In this way, the need for storage and production areas, as well as security, were met; open access to non-workers (strangers) was often discouraged by the deep placement of commercial gardens from the external space of the property. Despite the bias imposed by the adaptation of domestic constructions, spatial syntax analysis nonetheless provides valuable insights into property development choices, including the choices made to maximise productivity.

I have identified ten commercial gardens in Regions I and II of Pompeii (see Figure 38). The majority were in the northern-most *insulae* of Regions I and II, located between the Via dell'Abbondanza and the Via di Castricio. All but one was located on streets well-integrated into the street system of Pompeii, with cart access. All had some form of interior courtyard, some being adapted from an atrium or peristyle; half of the commercial garden properties had wide entrances and/or ramps for allowing carts directly into the properties for loading.[824] Others would have been loaded on the street or perhaps in the entrance-way of the garden.

Many of the commercial market gardens in Regions I and II made use of the typical non-distributed design of domestic properties (see Table 10). In other words, developers of commercial agricultural properties in Regions I and II tended to favour layouts which

[821] In several literary sources of this time, farmable land is positioned as having a positive effect on the social reputation of the owner, in providing for society; see Chapter Two for a discussion.
[822] The term owner is used loosely here as gardeners may also have been tenants, either living on the property or renting the garden space out as a source of income. The possibility of sharecropping (discussed in Chapter Two) should also be considered in all commercial gardens (including commercial-dining).
[823] See Chapter Six for a full discussion of the ways for identifying properties converted from *domus*.
[824] I.11.12, I.15.1-3, II.4, I.13.12-14, and I.20.5.

favoured control in one or a select few 'nodes', therefore increasing security via the increased control of access. The distributed properties were often found to have multiple entry points to the property, while the non-distributed properties were more likely to have one entry point (as might be expected in a traditional *domus*). This supports Grahame's finds in Region VI of Pompeii.[825] However, it goes without saying that not everyone would have had access to garden spaces through direct access doors; gates likely blocked entry for many, not to mention social customs and the anticipation of meeting a worker inside.

In the House of the Ship Europa (I.15.1-3), the largest market garden in the town with no outdoor masonry triclinium,[826] two domestic properties had been combined into one, with one large garden at the rear split across two terraces, running along the natural north-south sloping topography of this part of the town. The outcomes of GI and SIP analysis correlate with the previous domestic function of the property, with frontal regions and corridors highly accessible (Figure 44). Jashemski suggests that some of the indoor rooms may have been used as dormitory space for workers,[827] a hypothesis reflected in the Local Interaction Potential map; side rooms, with a low interaction potential and a low level of control over other rooms, may have been storage or living areas due to the higher level of privacy needed, or being accessed less frequently (as a storeroom might be).[828] More importantly, the LIP map demonstrates that this property was adapted to decrease social interaction but increase global accessibility among workers.

[825] Grahame 2000, 44-5 and see above.
[826] Counted among the largest are the House of the Ship Europa the Large Orchard (I.22), the Garden of the Fugitives (I.21.6), and the House of the Cylindrical Columns (I.16.2-3), all clustered in four insulae located one block to the west of the Via di Nocera.
[827] Jashemski 1974, 392.
[828] Material evidence supports this; the two basins in node BB were likely used to wash the *amphorae* stored at node W and elsewhere, both of which exhibited low LIP.

Property/ address	**Spatial order**	**DA?**	**Primary crop**	**Property use and details**	**Open indoor area**	**Wide entrance**
Domus of Euxinus (I.11.12)	Distributed	No	Vines	Vineyard attached to a *caupona* (I.11.10-11)	Atrium	Yes
I.12.9/14	Non-Distributed	No	N/A	Large garden with indoor *triclinium*	Courtyard	No
House of Lesbianus and Numicia Primigenia (I.13.9)	Non-Distributed	No	N/A	Large garden and upstairs accommodation (?)	Courtyard	No
House of the Larario Isiaco (I.13.12-14)	Non-Distributed	No	Vines	Large garden with ramp to indoor area, embedded *dolium*, and attached shop	Courtyard	Yes (plus ramp)
House of the Ship Europa (I.15.1-3)	Distributed	Yes	Vines	Large garden	Peristyle and rear garden room with DA	Yes
Shop-House Garden (I.20.5)	Non-Distributed	No	Vines and trees (equal)	Embedded *dolia* in garden, rear storage areas, and upstairs accommodation (?)	Courtyard	Yes (plus paved ramp)
Casa Imperiale (II.1.10)	Non-Distributed	No	N/A	Rear garden, indoor courtyard, and upstairs accommodation (?)	Courtyard	Unknown - step at entrance

House of the Sibyl (II.1.7A/11-12)	Distributed	Yes	N/A	Religious site with a *sacellum* garden room	Courtyard	No
II.3.3A-6	Non-Distributed	Yes	N/A	Religious site and *caupona* (?) with front taberna and garden *sacellum* room	Courtyard	No
Estate of Julia Felix (II.4)	Distributed	No	Vegetables	Walled rustic garden	Courtyard	Yes

Table 11: Commercial gardens in Regions I and II categorised by spatial order (distributed/non-distributed), access (direct/non-direct) and primary crop (colours are assigned by category).



Figure 44: Stippled maps for the House of the Ship Europa (I.15.1-3) showing Global Integration (left), Local Interaction Potential (centre), and Stranger Interaction Potential (right).

The heat map, when combined with archaeobotanical and material evidence, also serves to reveal the adaptation of the garden's terraces according to the needs of workers (see Figure 45 for Jashemski's detailed plan, including all excavated root cavities). The upper terrace, highly accessible to workers, contained a water basin, an irrigation area, and a pile of crushed lava (for construction or vine maintenance). The root cavities in this portion of the garden were either old vines or trees. In the lower terrace, a formally planted (young) vineyard, two man-made holes, and a path running between two vegetable gardens, were uncovered by excavators.[829] Trees were planted along both the east and west ramps which joined the upper to the lower terrace. A ladder (near hole B) would have provided an extra access point to workers.[830] The direct access point at entrance 4 (see Figure 44) was likely added to provide ease of access when extra water was required for the young vines, trees, and vegetables,[831] or for loading produce directly onto carts on the street outside (and vice versa). Given its higher aspect, and the trees planted here, visibility of the garden from this door was intentionally blocked.[832] Despite the addition or preservation of a direct access point into the main garden area, security was clearly an important factor in this property, while indoor areas were utilised to maximum capacity for functional purposes.

In two other direct access market gardens, a very different function to the House of the Ship Europa was discovered during excavations. In both the House of the Sibyl (II.1.7A/11-12) and property II.3.3A-6, open rooms for worship were excavated, with items of religious significance (such as *lararia* and deific statues) found inside. Large, planted gardens were found in each, though damage caused to both during original excavations meant that only a scattering of root cavities could be recovered by Jashemski. However, it is possible that plants were being grown here for sacrificial, ceremonial, and medicinal use, as well as for use at communal feasts by worshippers.[833] Both had entrances leading onto the pedestrianised roads

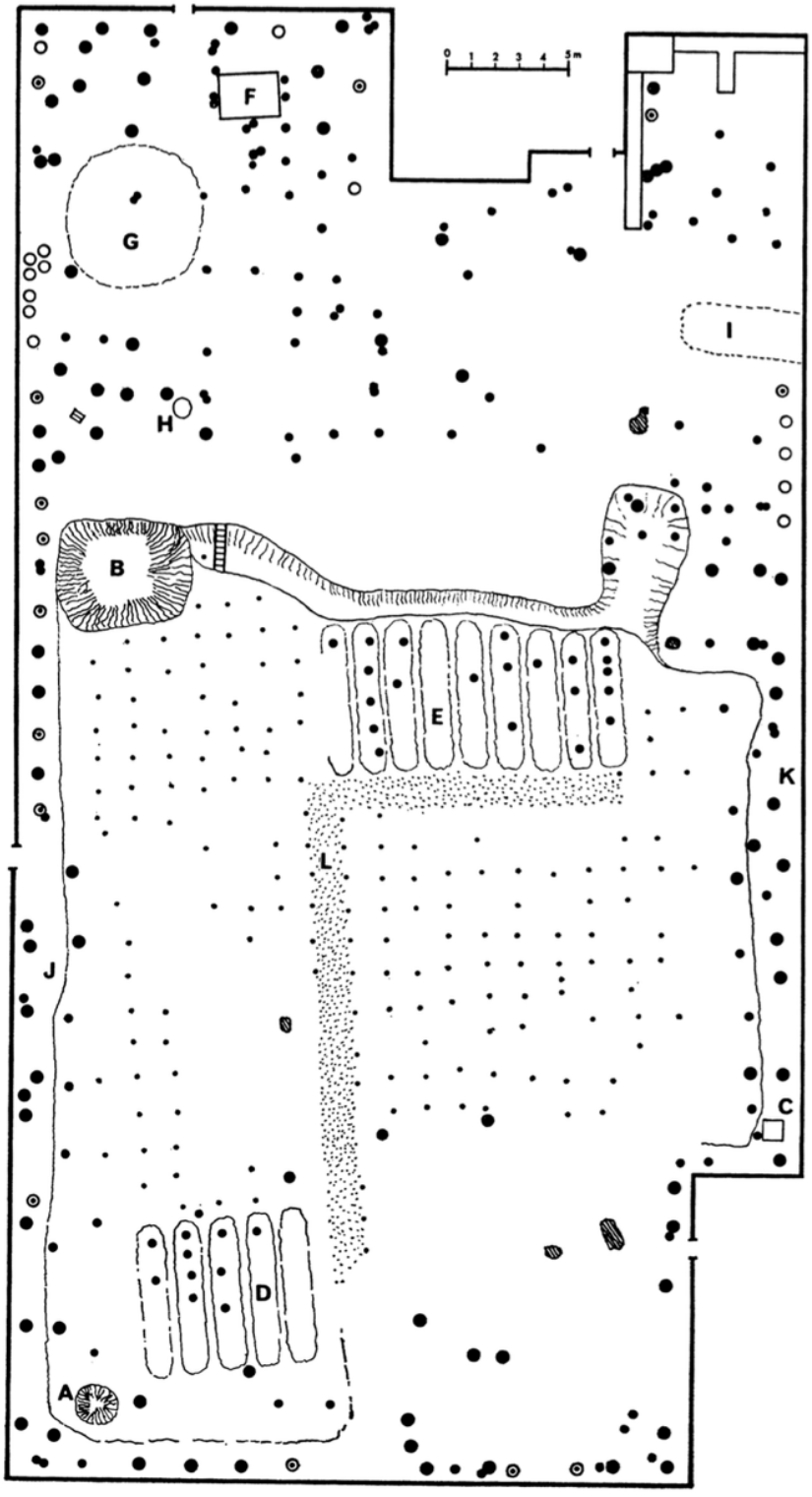
[829] It is possible that the lower terrace once occupied constructions prior to its conversion into a large garden.
[830] There is a lack of archaeological evidence to suggest that this property was used as a sale point as well as a production centre, though the frontal regions of the property (HH, JJ, EE, A, B, and LL) were, according to the spatial syntax outcomes, highly accessible to strangers.
[831] The public water fountain at I.16.4 would likely have been used to water the garden in the event of a shortage of stored rainwater. This fountain was approximately ninety metres away from entrance 4, while the next closest fountain (I.13.10) was approximately 130 metres from entrance 4.
[832] This street, the Vicolo della Nave Europa, is well connected on Laurence's (2011) plan, with deep cart ruts.
[833] Plants played a central role in religious ceremonies. Columella (*Agr*. 10.95-106) and Cato (*Agr*. 1.7, 8.2) talk of the profitability of keeping a flower garden close to the city, for the creation of garlands (for ceremonial and

running south from the Via dell'Abbondanza, and close to the entrances to the Large Palaestra. Footfall, rather than security, appears to have been the priority in each; presumably large numbers of religious sects or members of the public (particularly during the *Fasti*) would have been visiting these gardens.

The need for workers to have regular and easy access to indoor and outdoor workspaces, from the garden as well as the street, may be a reason for the distributed layout of the Europa garden, as might the loading and unloading of produce and materials to carts in the street, inner courtyards, or gardens (for example, see I.20.5 where an inner courtyard and wide internal garden entrance was found).[834] Water access at local fountains (in the event of no running water, or a lack of stored water), would have been made easier with additional entry points and irrigation systems (as, for example, in the Garden of Hercules). To support this, all commercial market gardens were located on a 'well-connected' street. However, despite almost all properties having some form of courtyard at one of the entrances to the property, only two showed evidence for a ramp at the garden or courtyard entrance. Nonetheless, this open service space would have allowed vessels to be filled and prepared for loading onto carts in the street outside. Seven out of eleven of the commercial garden properties also showed evidence for upstairs accommodation and/or inns on site, making it likely that some of the produce may have been sold or served to customers.

dedicatory use). Incense was very popular in the Roman period for ceremonial and religious use; see Pennacchio et al. 2010, 9; Stowers 2011; Knust and Várhelyi 2011.

[834] See Poehler (2011) for a quantification of all ramps with wide access in Pompeii.



Ill. 4. Market-garden orchard (I. xv). a) small hole; b) large hole; c) square hole; d) SW vegetable garden; e) N vegetable garden; f) basin; g) pile of crushed lava; h) cistern; i) Fontana's channel; j) W ramp; k) E ramp; l) path. Dots indicate grapevine roots; small solid circles indicate roots 10 cm. or less in longest diameter; large solid circles indicate roots 11 to 29 cm. in longest diameter; irregular shapes indicate tree roots 30 cm. or more in longest diameter. Large empty circles indicate pots; circles with dots indicate root cavities containing pots

Figure 45: A plan of all root cavities and features in the House of the Ship Europa commercial market garden (I.15.1-3). Image: Jashemski 1974, 395.

As this final category has shown, the further sub-categorisation of commercial gardens is a difficult, and unnecessary, task due to the many overlaps found in the Regions I and II sample alone.[835] On the other hand, the assignment of distributed or non-distributed labels to these gardens demonstrates that our expectations of these gardens (for example, low stranger access and controlled access) cannot be determined with spatial syntax alone. Archaeological material (for example, gates and pot sherds in walls) are required to embellish our understanding of the shaping of space to suit the functional requirements of the workers and owners of market gardens in Pompeii, while urban placement can sometimes provide interesting intelligence about their development and use in the mid-first century AD.

5.6 Conclusions

The application of spatial syntax and isovist analysis to a variety of utilitarian gardens in Regions I and II has revealed the vast number of ways in which agricultural gardens were used, designed, and positioned on a micro and macro scale for the social and economic motives of owners, residents, walk-in customers, and social groups (such as *collegia* and *universi*). When combining these findings with the early Imperial historical context seen in previous chapters, we can begin to see a response in the form of a steady or growing demand for *hortus* produce, and new dining experiences in and out of the *domus*. An unexpected crossover between the social and the economic function in each garden category, particularly in the domestic and commercial-dining categories, was revealed as a result of reflections on Thirdspace.

Among the findings in this chapter, most significant was the discovery that garden contents (namely crops and *triclinia*) influenced the spatial order and urban placement of all agricultural garden categories, or vice versa. Particularly in those cultivating fruit, nuts, and flowers, security was found to be crucial, while in others (where the primary crop was vines), customers were encouraged as a revenue stream alternative to cash crops. Most significantly,

[835] The possibility that workers were sleeping in the indoors area of the House of the Ship Europa is not inconceivable, with other properties showing evidence for upstairs and downstairs accommodation and living activities. For example, in the Shop-House Garden (I.20.5), stairs leading upstairs from a room inaccessible to strangers may have provided accommodation for the family whose cooking equipment and toys were discovered at the rear of the garden.

the discovery that commercial-dining garden properties tended towards a distributed layout demonstrates an alignment between the spatial order of a property and its economic motive, while the non-distributed spatial order of most domestic and commercial properties demonstrates that security, access control and, in the former case, maintenance of social hierarchies, reveals different priorities by garden type.

Epistemological values attached to certain crops were also reflected in the data studied above; a dominance in 'high-value' crops prone to theft (flowers, fruit, nuts, and vegetables) dominated in domestic gardens and commercial-dining properties where access appears to have been limited to a select few, perhaps residents, walk-in customers, and social groups (such as *collegia* and *universi*). Alternatively, vines appear to have had the most rustic appeal, for the bucolic atmosphere that they generated was used as a unique selling point for commercial-dining gardens with direct access and a direct view of outdoor dining space.

Previous spatial syntax studies within the urban fabric of the town allowed me to make significant headway in understanding the motives behind garden placement, something which has not been considered in Roman scholarship before. Overlapping street integration data with my three garden categories allowed the identification of trends in garden development, construction, placement, and use, and allowed me to further support the changing consumer trends seen in previous chapters related to an increase in dining opportunities and *hortus* produce demand.

Two factors were found to be key to understand the function and use of garden space in Pompeii: placement and consumer trends. Regarding placement, the productivity of workers, maximised economic output, and trade transport influenced commercial garden development, while in commercial-dining gardens footfall was most important, with all gardens in the sample found clustered along two main roads (the Via di Castricio and the Via di Nocera, though access was determined by contents). In relation to consumer trends, we witnessed a combined approach to cash crops and dining experiences in the commercial-dining garden, which appears to have been a continuance of early Imperial trends (the same number of commercial-dining gardens being attributed to pre- and post-AD 62/3 Pompeii). Finally, in the *domus* we were uniquely able to witness a development in the use of the rustic

hortus, from purely a source of sustenance for the household to a source of both sustenance and social capital, and as a manifestation of Thirdspace in the mid-first century AD. All have significant repercussions for how we understand agricultural garden use and the universal importance of these spaces, despite, or indeed because of, their varied roles in social and economic capacities. What is certain is that these spaces have never before been considered as contemporary spaces of importance in first century AD Roman society but have instead been treated as facets of the past by both ancient and modern writers. This data has shown otherwise.

To fully appreciate the development and significance of rustic garden space in this part of the town in the final years of the town's existence, one final historical context is yet to be considered. In AD 62/3, a major earthquake hit the town,[836] causing extensive damage to its infrastructure. The impact of this upon garden development has only previously been acknowledged by a few select scholars and archaeologists, while the spatial and economic impact, even less so in reflection of the historical effect of Imperialism, have not yet been tackled. The next chapter continue my investigation of garden development and use in first century AD Pompeii, this time focused on the final seventeen years of the city's life. In this way I will build a deeper understanding of the impact of a prolonged period of crisis on the city's development and functioning. Using a set of garden case studies and resilience theory, I will examine levels of resilience and adaptation in the town by charting the rise of agricultural gardens in Regions I and II after the earthquakes of AD 62/3. In the process I aim to introduce a new model for identifying new urban agricultural gardens and reveal an overlooked phenomenon which holds the key to painting a clear picture of the social, economic, and nutritional role of rustic gardens in the final years of the town.

[836] See Anderson (2011) on spatial syntax analysis in relation to earthquake damage in the town (esp. 77).

CHAPTER SIX: Agricultural **hortus** *development in Pompeii Post-AD 62/3: A resilience theory approach*

In 1977, Jashemski excavated the Shop-House Garden (I.20.5) in Region I of Pompeii. In her report, Jashemski noted that the garden space was once occupied by a construction demolished following damage from the major earthquake (or quakes) which hit the region in AD 62/3. Various features in the garden led her to this conclusion: wall frescoes intended to decorate interior rooms were discovered on internal garden walls, partial jutting walls (from demolished rooms) were discovered in the garden, and a new cistern installed in front of a blocked door.[837] Root cavities uncovered in the garden showed it to be intensively cultivated with young vines, trees, and potentially vegetables in antiquity, thus justifying the installation of a new cistern. Jashemski went on to identify two further gardens built similarly in the space of demolished constructions, VI.5.7 and VIII.6.5, though her investigations into 'new' agricultural gardens post-AD 62/3 stopped there.

Esposito and Pesando have since commented more widely on the phenomenon of new productive gardens in the city's history. Both have identified two new Roman laws (introduced in the final three decades before AD 79), designed to limit the demolition of urban properties in Roman Italy, as having been influential in the creation of new agricultural gardens in Pompeii post-AD 62/3. Yet neither Esposito or Pesando, nor any other scholar, has made any attempt to identify, map, or typify this type of garden since. Nor have potential motivations behind garden creation at this time, such as economic opportunity, response to crisis, or changing consumer trends, been considered. Such an investigation will enrich our understanding of 'the social relationships and social choices of Pompeian society in space', and this chapter aims to do this.[838]

In the following I focus on commercial and commercial-dining properties in Regions I and II and aim to identify and map those created or extended after the quakes. The main research question is: why were many of these changes occurring after the quakes, and was their creation a response to crisis, economic opportunity, or both? To establish this, I analyse

[837] Jashemski 1977, 221 and n.25; 1979, 188-93.
[838] Laurence 2007, 19.

the micro-actions taken by landowners and gardeners in the final two decades of the city, such as blocking doors, demolishing walls, and adding new (agricultural) features to open space, to discover whether these were tactical responses to economic opportunity, or a response to growing demand for rustic produce, dining experiences. Roman legislative barriers to urban development in the first century AD are also considered.

The same methodology will allow 'new' gardens to be identified using archaeological floorplans and reports. Once mapped, these sites will be linked to seismic activity around AD 62/3 and wider structural and economic changes to both public and private buildings in the centre and periphery of the town. This chapter will therefore demonstrate that organic transitional urbanism created a community better equipped to respond to further change and opportunities in the city's final years (excluding, of course, the devastating eruption), and will once again demonstrate the importance of urban agriculture to the Pompeian population.

6.1 Urban change in mid-first century AD Pompeii: A city in crisis?

The first part of this chapter provides an overview of the historical and geographical contexts relevant to urban change in Pompeii in the early Imperial period, including property ownership and urban development legislation. Following this, I outline the resilience theories useful for establishing whether the changes being made were primarily in response to crisis or opportunity. Food security is the central concern of any social-economic system. The Food and Agriculture Organization of the United Nations (FAO) describes food security as 'physical and economic access to sufficient, safe, and nutritious food' at a level deemed adequate for meeting the basic needs of individuals.[839] As we have seen, by the first century AD Pompeii had a heavy reliance on the market for sustenance. This dependence on the market for food supplies placed its food security in a potentially vulnerable position should the city face any sudden or significant changes.[840] In urban systems, these 'changes' are often experienced as natural disasters, political instabilities, shortages in the market system (for

[839] FAO 2015. For more on food security, see Bullock et al. 2017; Smerlak and Vaitla 2017.
[840] Erdkamp 2012; Holleran and Erdkamp 2019, 283-295; Barthel and Isendahl 2013, 224.

example, as a result of crop failure), and price increases.[841] There is evidence to suggest that two major disturbances may have altered the way that Pompeii functioned, as well as its urban landscape, in this period.

The first is a four-year famine recorded in a tomb inscription excavated in the necropolis outside the Porta Nocera in Pompeii. The tomb, thought by Osanna to have been dedicated to the local politician Cn. Alleius Nigidius Maius just before the eruption, details his provisioning of bread and wheat to the citizens of Pompeii in response to a prolonged food shortage in the town. As this is the only recorded reference to a famine in Pompeii, it is important to keep in mind the possibility that Maius was exaggerating his efforts for euergetistic benefit. In addition to these handouts, Maius was also said to have donated noteworthy public feasts on 456 *triclinia*, equating to a feast for 4,104 adults.[842] Comparing Maius' tomb inscription to *tituli* elsewhere in the town, it is likely that the famine and feast occurred after AD 41, following the start of his political career in the Claudian principate.[843] This famine was, therefore, a recent crisis in Pompeii's history.

Unhappily for the population of Pompeii, as is well known, the famine was not the only disruption to affect the city in its final three decades. In AD 62 or 63, Pompeii was hit by a major earthquake which, according to literary and archaeological evidence, destroyed much of the city's infrastructure.[844] Following this, Pompeii came to be characterised by frequent seismic activity in the seventeen years leading up to the eruption; Pliny the Younger and Seneca both record the commonplace occurrence of tremors in Campania.[845] A large number of public and privately-owned structures were destroyed by the quakes, including the Aqua Augusta, the town's main water source, with a great number still undergoing repair at the time of the eruption.[846] A lack of funding from the central government in Rome is thought by Ruggieri to have impacted the rate of recovery (*resilire*, or 'bounce back') in Pompeii following these quakes; while some buildings were repaired rapidly, such as the Temple of

[841] Fabre (2017, 2) lists natural disasters, population displacement, and conflict in cities as 'three different forms that pose context-specific challenges for humanitarian response'.
[842] This is around twenty percent of the most common population estimate of 20,000 for the town of Pompeii; for a summary, see Flohr 2016.
[843] Moeller 1973, 515-516; Osanna 2020, 220-222.
[844] Tac. *Ann.* 15.22; Sen. *QNat.* 6.1, 1-3.
[845] Plin. *Ep*. 6.20.3; Sen. *QNat*. 6.1. Ruggieri 2017a, 2017b.
[846] Anderson 2011, 74; Lorenz and Wolfram 2014, 808; Ruggieri 2017a.

Isis, others, like the Stabian and Suburban Baths, were clearly lower down the list of priorities, with both still undergoing repair seventeen years later.[847]

These quakes did not, however, have a negative impact on the growing economic status of the population, nor on the construction of buildings related to public consumption and hospitality. Instead, commercialisation increased in Regions I and II and, as we have seen, overall nutrition and economic levels were above the Roman average.[848] In the final years of the city new public buildings, such as fixed trading outlets, were being constructed to keep up with new demand and, potentially, a growing population.[849] Nonetheless, evidence abounds in the town for buildings still undergoing repair at the time of the eruption, as well as plots used for the storage of construction materials.

The conversion of many domestic properties into commercial outlets, including agricultural gardens was not evidence of the mass exodus of the elite in favour of a mercantile class, as Maiuri originally thought. Instead, this is evidence for a shift in economic priorities in the town.[850] It is notable that any 'new' agricultural gardens created in the final two decades do not appear to have been part of a state-organised effort of horticultural transformation, as found in contemporary societies in a state of crisis.[851] Rather, archaeological evidence points towards an organic development of garden space in a *transitional* capacity, resulting from the choices made by various landowners (of *insulae* or individual structures), tenants, and gardeners over time. As mentioned in Chapter Two, the planning required to convert and/or construct new commercial garden space would have required specialist knowledge and equipment, as well as careful time, manpower, and budget management. This would especially have been the case for gardens which were terraced, as in the House of the Ship Europa. Models of resilience can be useful for understanding how these

[847] See Ruggieri 2017b, 491; Fagan 2002, 64.
[848] See Chapter Four.
[849] See Flohr 2016.
[850] Maiuri's views on this matter have long since been discredited, most significantly by Wallace-Hadrill (1988, 1994).
[851] In modern Cuba, property owners are encouraged, or at times legally forced, by the government to convert open or disused land into productive gardens to support the local community (Altieri et al. 1999, 134). Any individual in the city of Havana can apply to cultivate an open, disused space in the city, regardless of ownership. Following an application's submission, the plot owner is allocated a limited number of months to put the site into active use, through cultivation or otherwise, or else the original applicant can cultivate there.

changes were taking place, and for therefore establishing whether they were a response to economic opportunity or something much bigger.

6.2 Pompeii: A resilient city?

Generalised adaptability in the face of change, as well as the quick return of an urban system to a state of relative stability (akin to conditions pre-disturbance), are considered indicators of a resilient city.[852] Almost all discussions of resilience consider generic adaptability to a broad range of possible disturbances as favourable over specific responses to shocks.[853] Following a review of decades of resilience research, Meerow, Newell, and Stults developed the following definition of the term:

> Urban resilience refers to the ability of an urban system… to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.

Given the subjectivity of the measures of 'resilience' in modern scholarship, most especially in relation to the notion of stability, various models have been developed which summarise the characteristics of resilience in urban centres.[854] While these models are often intended to be implemented in foresight, most commonly to urban cities faced with climate change, they can be useful for applying in hindsight to ancient cities such as Pompeii.

In his study of the horticultural collectives established in vacant urban plots in Barcelona during high ongoing levels of unemployment, Camps-Calvet commented on the ability of urban agricultural gardens to contribute significantly to the resilience of an urban

[852] Wagner and Breil 2013, 114; Meerow et al. 2016, 46.
[853] Brown 2012.
[854] While the definition provided by Meerow, Newell, and Stults works in the context of this study, the description provided by Carpenter and Folke (2006) better captures a system's ability to thrive post-disturbance, rather than merely return to a set of 'desired functions'. They define resilience as 'the capacity to absorb shocks, utilise them, reorganise, and continue to develop without losing fundamental functions'. Elsewhere, Carpenter et al. (2001) measure resilience by the 'amount of disturbance that a system can absorb' while maintaining stability through self-organisation. Brown et al. (2012, 534) similarly define resilience as 'the ability not only to maintain basic functions but also to improve and prosper', while more recently Desouza and Flanery (2013, 89) have echoed this in defining a resilient urban city as one able to 'absorb, adapt, and respond to changes'.

system during social and economic crises.[855] To illustrate this, he built on the model established by Folke ('Mechanisms for nurturing resilience') and named retrospection, collaboration, knowledge, and diversity to be hallmarks of a resilient urban system.[856] In the same year, Biggs, Schluter, and Schoon developed a separate model of resilience which agreed with Folke's definition of a robust urban social-economic system, created namely through community participation, connectivity, and knowledge.[857] While many of these principles of resilience can be recognised in modern bottom-up urban horticultural movements, they also provide a vision of how organic urban development improved the urban system of urban centres such as Pompeii.[858]

For a hindsight view of Pompeii's resilience levels in AD 79, a broader framework is of use. The 'Six conceptual tensions of urban resilience' model, developed by Meerow, Newell, and Stults, is beneficial here (Table 12). This model was produced in answer to the need for a central framework with which to better understand different cities' responses to shock. Each 'tension' represents the changes or alterations made within a system under stress and as such provide criteria for assessing and producing more resilient social-economic systems. These 'tensions' ask the researcher to consider temporality, generic adaptability, transition, and transformation when assessing the level of resilience of any social-economic system. Can post-AD 62/3 Pompeii be considered a resilient city? Its conformity with the conditions of the six tensions suggest that it can.

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[855] Camps-Calvet et al. 2015.

[856] The model of resilience developed by Camps-Calvet et al. (2015) includes: 1) Learning from past crises, 2) Coping with uncertainty, 3) Promoting ecosystem services, 4) Nurturing cultural diversity, 5) Learning from various knowledge sources, 6) Building knowledge into practices and habits, 7) Recoupling to ecological dynamics, and 8) Nurturing social cohesion.
See Folke et al. 2010.

[857] The model developed by Biggs et al. (2015) counts the following as factors of resilience: 1) Maintain diversity and redundancy, 2) Manage connectivity, 3) Manage slow variables and feedbacks, 4) Foster CAS (complex adaptive systems) thinking, 5) Encourage learning and experimentation, 6) Broaden participation, 7) Promote polycentric governance systems.

[858] Camps-Calvet et al. 2015, 430-436; Staeheli et al. 2002.

	Tension of Resilience
1	**Characterisation of urban as a 'complex, multi-scalar system**… [encompassing] governance, material and energy flows, infrastructure and form, and social-economic dynamics'.[859]
2	**'Notion of equilibrium'**, separated into: ● 'Single-state equilibrium' - reverting to a previous state post-disturbance,[860] ● 'Multiple-state equilibrium' - systems with different stable states which may tip from one 'stability domain' to another in the face of a disturbance, and ● 'Dynamic non-equilibrium' - 'systems [that] undergo constant change and have no stable state'.
3	**Resilience as a positive concept.**
4	**Mechanisms of system change**, or 'pathway to resilience' - persistence, transitional, or transformative.
5	Understanding of **adaptation**, separated into: ● 'Specific adaptations to known threats',[861] ● 'General adaptability' - synonymous with adaptive capacity, ● Flexibility necessary for confronting unexpected hazards'.[862]
6	**Timescale of action.**

Table 11: The Six Tensions of Resilience, as per Meerow, Newell, and Stults (2016).

Pompeii can be considered a 'complex, multi-scalar system' (Tension One) due to varied levels of local and Roman state interference in land development and commercial activity in the city, as well as its participation in regional and intra-regional *nundinae*. This participation not only allowed 'material and energy flows', but also enabled the town to grow economically. For this reason, we can consider the town's resilience to be positive (Tension Three). Furthermore, Pompeii's state of 'equilibrium' (Tension Two) can tell us more about the nature of changes made post-shock in a city: Pompeii did not revert to its previous densely populated state in Regions I and II ('single-state equilibrium'), made up of *domus* and

[859] Meerow et al. 2016, 45.
[860] See Holling 1996; Pendall et al. 2007; Pickett et al. 2004.
[861] Meerow et al. 2016, 44.
[862] See Meerow et al. 2016; Folke et al. 2002; Pelling and Manuel-Navarrete 2011.

apartment blocks, nor did it move from one stable state to another after the major earthquake ('multiple-state equilibrium'). As stability is subjective, we cannot assert conclusively whether Pompeii was 'stable' prior to the earthquake, though most of the population were living in positive nutritional and economic conditions. Rather, the state of 'dynamic non-equilibrium', which distances itself from the concept of 'bouncing back', is applicable to Pompeii both before and after the quakes.[863]

The state of 'constant change' that Pompeii's system underwent compliments the aforementioned definition regarding the ability to utilise new opportunities and adapt:[864] Pompeii exhibits a high level of 'general adaptability' (Tension Five) as a result of the diverse responses to shock taken by individuals in creating and cultivating 'new' market gardens. In Regions I and II, this was achieved via a diverse approach to crop cultivation and assorted measures for protecting buildings, common-pool resources (for example, water and food), and income. These actions will be discussed in more detail below.

Finally, observing the 'mechanisms of change' ('transitional' versus 'transformational', Tension Four) and 'timescale of action' (rapid versus incremental, Tension Six) in Regions I and II helps identify which processes of change occurred, and the speed at which this happened. Unlike 'transformational' change, 'transitional change' does not require 'radical, systemic shifts in values and beliefs, patterns of social behaviour, and multilevel governance and management regimes.'[865] Rather, the creation of a more resilient system is fostered by altered rules and decision-making at an individual level, the effects of which we saw briefly in Chapter Five.[866]

An example of transformational change can be seen in modern Cuba where, in 1989, a breakdown of relations with socialist bloc countries saw Cuba cut off from important trade routes. This led to seventy-five percent of food imports to Cuba being halted; the food

[863] Hence *resilire*, see Matyas and Pelling 2014.
[864] Pickett et al. 2004; Lu and Stead 2013; Meerow et al. 2016.

[865] Olsson et al. 2004.

[866] Hordijk et al. 2014.

security of the nation was in peril.[867] Fast-forward to the present day and many Cuban cities are now well-oiled machines of urban and suburban agricultural output. Where once the market garden was viewed as a sign of poverty and desperation, it is now a symbol of community, survival, and resilience, as well as a key source of nutritional income for the local population. So important was horticulture to the survival of the state that legislation was introduced to support such activities. 8,000 new urban and suburban agricultural gardens (*huertas urbanas*) were cultivated in Havana alone between 1989 and 1997, estimated to contribute to over half of the annual weight of fruit and vegetables required to maintain good health in an adult.[868] This figure still stands today.[869]

In comparison to Havana, in Regions I and II, structural developments in the urban centre occurred incrementally (or 'transitionally') and had done since at least the second century BC. As such, the creation of 'new' market gardens, and responses to ongoing challenges within them (for example, the need for a regular water supply), was one portion of the 'long-term, multi-dimensional, and fundamental' *transitional* processes which allowed Pompeii to shift to 'more sustainable modes of production and consumption' at short notice in the mid-first century AD.[870] These transitional changes were sped up in the final years by the challenges and opportunities created by seismic activity and famine.

Pompeii can therefore be considered a resilient city which responded rapidly to major changes to its urban system in its final years. The creation of many new agricultural gardens in the south-eastern corner of the town formed a central part of this process and allowed the town to improve its commercial relevance in a wider Campanian (and Roman) system which was prioritising fresh, local food, wine, and dining experiences. In the next section, I consider the ways in which the population was able to absorb, adapt, and utilise challenges and opportunities in response to shock via a set of transitional and organic changes related to horticulture. The outcomes of this will allow me to conclude whether the phenomenon of new commercial gardens was primarily linked to crisis or opportunity in the town's final years.

[867] Altieri et al. 1999, 131-2.
[868] Campanioni et al. 1996.
[869] El Espectador 2020.
[870] Markard et al. 2012, 956.

6.3 Urban development and property ownership

Individuals with real estate in Pompeii could own anything from one unit to whole or partial *insulae*.[871] In Regions I and II, *insulae* were likely assigned as 'parcels' during the neighbourhood's initial development from the mid-third century BC onwards, later being passed down as hereditary property, or purchased wholly or partially in later years by wealthy individuals.[872] Two advertisements from Pompeii reveal that whole *insulae* were in some cases owned by one individual and rented out as individual apartments or *domus*: one notice from the Estate of Julia Felix (II.4) advertises 'elegant bathing facilities, shops with annexed apartments upstairs and independent apartments on the first floor',[873] while another from *insula* Arriana Poliana (VI.6) promotes 'commercial and residential units with mezzanines, quality upper floor apartments and houses'.[874] Cicero tells us that he drew great profit from inherited *insulae* in nearby Puteoli, which purportedly raised 80,000 – 100,000 *sesterces* per annum.[875] More significant, however, is his letter to Atticus stating that the subdivision of collapsed or damaged properties in an *insula* could be used to generate profit through the creation of additional properties for independent rental.[876] This practice can be observed in Pompeii, predominantly in the creation and blocking off of doorways from neighbouring properties, and extension of others.

The structural alteration and sale of properties was a regular occurrence in Pompeii. Many properties in the city show evidence for their subdivision in the manner described by Cicero, as in the examples at I.1.1/10 and I.1.2. An absence of municipal controls on land use during this period in Italy saw that owners of individual properties had complete jurisdiction

[871] A Roman citizen commonly came to own urban real estate (domestic and/or commercial) via inheritance, a dowry, or purchase. Parkins 1997, 101.
[872] Nappo 1997, 98-9
[873] *CIL* 1136; see Cooley and Cooley 2004, 171-173. It is thought that Julia Felix, a prominent figure in Pompeian society, decided to subdivide and rent out apartments and the luxury bath complex following the earthquake of AD 62 (the latter only intended for the highest members of Pompeian society; see Cooley and Cooley 2004, 171). Making baths available was a smart entrepreneurial decision for many in Pompeii were still undergoing repair at the time of the eruption. In support of the growing demand for dining experiences at this time, and what would have been another smart business decision, a summer triclinium was likely also made available to tenants, day renters, or both (as suggested by its semi-public or accessible position in the complex).
[874] This insula was owned by Gnaeus Alleius Nigidius Maius; see *CIL* 4.138, *CIL* 4.1136; see Pirson 1997. See also *CIL* 1136.
[875] Cic. *Att*. 13.45.2-3, 13.46.3, 13.37.4.
[876] Cic. *Att*. 12.38; 12.33; Laurence 2007, 136.

over them, with no limits on how they built on or modified owned land.[877] Further, a Pompeian law of 82 BC states that those who owned lower floors had authority over the upstairs also.[878] An assessment of other legislation (mentioned in the introduction to this chapter) can go some way to explaining who may have been developing new agricultural gardens in Pompeii, and their motives for doing so.

The *senatus consultum Hosidianum*, introduced by the Senate in AD 47, and the *senatus consultum Volusianum*, introduced in AD 56, were designed to regulate private construction work in the urban centres of Roman Italy.[879] Both reveal official attempts to preserve the condition of townscapes which were, from the Claudian period onwards, considered to be in a 'state of progressive decay and abandonment' across Italy.[880] More broadly, these laws were part of a wider pattern of behaviour among the elite to limit wealth, and by consequence greed and immorality, among both the dominant members of society and rising freedmen.[881] These laws penalised the demolition of private structures for the profitable resale of materials until the Severan period (at the earliest).[882] A record of the *senatus consultum Hosidianum* was discovered on a bronze tablet in Herculaneum's forum around 1600; Barker and Marano have taken this as indication of an official request from Herculaneum's *curia* to the Senate for permission to undertake local construction works following the quakes in the region, which affected the city as they did Pompeii.[883]

Interestingly, an exception to the *Hosidianum* law allowed for derelict or damaged buildings to be demolished and sold on for profit, as practiced by Cicero decades before. For example, the emperor took advantage of this exception when he granted relatives permission to demolish uninhabited and dilapidated buildings at the *Campi Macri* near Modena in northern Italy.[884] This law would have allowed the repurposing of damaged properties, as well as the sale of materials from the land, and ultimately contributed to the original aim of the

[877] Morris 1990, 70-71.
[878] Pirson 1997, 175.
[879] Pesando 2011; Garnsey 1987, 134-6; Buongiorno 2010, 241-3; Rosillo-López 2021.
[880] Pesando 2011; Baker and Marano 2017.
[881] See Chapter Two for a discussion.
[882] Barker and Marano 2017, 841-2; Garnsey 1976, 134.
[883] Galsterer 2006.
[884] Similar rulings were variously introduced later by Vespasian (*Cod. Iust.* 8.10.2), Hadrian (SHA *Hadr.* 18), and Severus Alexander (*Cod. Iust.* 8.10.2). See Marano 2011, 145-7 and Marano 2012, 68-9.

legislation: to improve or preserve the urban landscape of Italian cities. The subdivision of properties damaged in the quakes would have also generated profit for landowners via salvaging, quarrying, and property sale. Pesando and Esposito link the *Hosidianum* and *Volusianum* laws to the increase in agricultural gardens and *hospitia* (inns) in Regions I and II post-AD 62/3, interpreting the timing of these new properties as evidence of this exemption.[885] One example of this is the House of the Ship Europa (I.15.1-3), where evidence of quarrying prior to its conversion into a vineyard and orchard was discovered by excavators. Quarrying for building materials may have been organised to simultaneously cut a terrace into the natural southward slope the garden was located on. Alternatively, the most frequent and economical option of earthmoving may have been employed: the cut and fill approach, using the material from the cut as the fill for soil. Yet to the Roman elite of the Imperial period, owning urban land was generally considered to be more profitable than owning agricultural land due to the high margins earned from urban rent over agricultural rent or produce.[886] The very existence of the exception to the *Hosidianum* law, then, raises the question as to why properties were not rebuilt following seismic damage if they were more profitable.

Demand for, and the profitability of, construction materials may have influenced the decision to demolish, rather than rebuild, many properties in Regions I and II, as might limitations on investment. However, the known robust economic status of the town makes limitations on investment less likely. The more probable reason for demolition and garden construction, then, lies in the zeitgeist of hospitality, and the demand for rustic produce and new dining experiences in the early Imperial period seen in Chapter Five.[887] Such reasons comply with the widespread conversion of damaged or 'abandoned' domestic properties for commercial use by an active and highly specialised artisan and mercantile class after AD 62/3, the effects of which can be seen from the Augustan period in Region VIII.[888] Here, a swathe of workshops were replaced by retail-oriented activities like shops and restaurants.

[885] Resale of the plot is not referenced in either law, though this was likely seen as favourable should the intention be to build.
[886] Gel. *NA* 15.1.1-3; Plin. *Ep*. 9.37.
[887] Esposito 2018.
[888] We cannot, however, be sure that any properties were in fact abandoned, as Nappo (2007, 350) puts it, or in a state of disrepair before planned reparations.

Similar developments began in the preceding century in Regions I and II.[889] Importantly, prior to the construction of these commercial outlets, the land was quarried for construction materials, thus maximising the output of the land.[890]

The phenomenon of commercial development and 'new' agricultural garden construction in the mid-first century AD supports the initial analyses of Jashemski, Pesando, and Esposito, as well as, more broadly, the hypotheses of Flohr. Pompeii was becoming increasingly commercialised at this time, and the urban boundary of the town was shifting to incorporate the countryside more fully.[891] Further, the semi-urban areas of the town, most significantly in Regions I and II, were growing in importance for the function of Pompeii's social and monetary economies.[892] Finally, the incorporation of more agricultural space in the town, alongside residential, commercial, and hospitality properties, fit into wider Roman patterns of an 'increasingly dense urban landscapes of civic memory and identity'; *rusticitas* may be achieved by individuals, either by proxy (landowners) or direct association (gardeners), and for the city as a whole, thus fitting the population in to its traditional characterisation as a city of good farmers and robust character.[893] Furthermore, the benefits of local cash crop cultivation would have been able to offset any potential barriers posed by material and investment availability for rebuilding, making use of land which may otherwise go into disrepair or disuse. Finally, adding to this the profit to be made from quarried or salvaged construction materials, the appeal of cultivating gardens over *domus* and apartment reparations is made clear.

For this reason, it is reasonable to assume that Pompeian property *owners,* not renters, had the greatest control over the extension, demolition, or sale of properties in their ownership, including garden space and were therefore the individuals making the greatest

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[889] First century BC onwards; see Ellis and Devore 2010. For example, excavations carried out between 2010 and 2012 in Region I established that the taverns and restaurants facing onto the Via Stabiana in Insula I.1 had been built in first century AD.
[890] Ellis et al. 2011.
[891] The semi-urban area of Regions I and II were reverting to their previous identity as an agricultural district. Below the AD 79 layer in many properties from these two regions, wells have been discovered. Nappo (2007) takes this as evidence for agricultural properties here prior to the neighbourhood's extensive development in the third century BC.
[892] Flohr 2020, 25.
[893] Flohr 2020, 25. See Cic. *Leg. Agr*. II.31.84: 'a class of men of most excellent character, excellent both as farmers and soldiers… born and brought up in these lands, skilled in tilling the soil…'

steps towards increasing the city's resilience in its final years. Two possibilities for garden development in Regions I and II are therefore raised: first, that the agricultural gardens created in the mid-first century AD were made from the seismic damage caused to portions of the urban estates owned by (wealthy) individuals and intended as a source of rent or produce, and second, that individuals of significant wealth were purchasing neighbouring properties or demolition sites for expansion or redevelopment into agricultural gardens, actions which were allowed under the *senatus consultum Hosidianum.* Both were a possibility at Pompeii and importantly raise the issue of motive for economic opportunity behind the creation of the new agricultural gardens post-AD 62/3. Because of the economic profit to be made in all cases of new agricultural gardens, we can safely state that these changes were transitional (Tension Four) and conducive to creating 'dynamic non-equilibrium' (for the state before and after is ever-changing) in the city (Tension Two). The organic and diverse nature of changes related to horticulture enabled owners, tenants, and gardeners alike to achieve 'general adaptability' (Tension Five). The rapid speed at which these changes occurred (Tension Six) was favourable (Tension Three) not only for landowners, tenants, and gardeners, but also for the city as a whole, because they enabled the city to continue its existence as a complex system of 'governance, material and energy flows, infrastructure and form, and social-economic dynamics', as well as a component of a wider Roman 'urban complex multi-scalar system' (Tension One).

Thus while the 'resilience agenda' of the more powerful stakeholders in Pompeian society was most likely to be an economic motive, the creation of gardens would have nonetheless contributed to the city's capacity for resilience to future shocks, including food shortages, trade-route cut-offs, and a stable income for developers and gardeners.[894] Equipped with an understanding of the individuals and reasons behind the creation of agricultural gardens in the mid-first century AD, I will now commence an examination of the sample 'new' gardens and assess the general adaptations made within, and to construct, 'new' agricultural gardens in the final seventeen years of the city.

6.4 Transitional modifications: 'New' agricultural gardens post-AD 62/3

[894] Cote and Nightingale 2011.

Using a combination of archaeological reports and floorplans, I have identified thirty-two agricultural gardens in Regions I and II, out of a total of forty-two agricultural gardens in all of Pompeii. Twenty-three of these exhibit evidence for having been constructed in the space of fully- or partially-demolished constructions post-AD 62/3 in Regions I and II (Table 12).[895] The nine agricultural gardens pre-AD existing prior to 62/3 appear to be purpose-built garden spaces, either for cultivation in the initial layout of a *domus* (walled gardens, as in, for example, the House of Menander at I.10.4), or with evidence for long-established plantings (for example, the Large Vineyard at II.5).[896]

	Direct Access (DA)	**No Direct Access (NDA)**
Commercial	I.12.9/14	Shop-House Garden (I.20.5)
	House of the Ship Europa (I.15.1-3)	Imperial House (II.1.10)
	House of the Sibyl (II.1.7A/11-12)	House of the Isis Lararium (I.13.12-14)
	II.3.3A-6	House of Lesbianus and Numicia Primigenia (I.13.9)
		Domus of Euxinus (I.11.10-11)
Commercial-Dining	Caupona of Euxinus (I.11.10-11)	House of Medusa (I.12.15)
	I.21.3	I.14.1/11-15
	II.1.7B/8-9	House of the Cylindrical Columns (I.16.1A-2/5-7)
	II.3.7/9	Restaurant (II.8.1)
	House of the Summer Triclinium (II.9.5-6)	Restaurant (II.8.2-3)
	I.14.4/10	Restaurant (II.8.6)
		Flowered Lararium (II.9.3-4)

Table 12: 'New' agricultural gardens likely created post-AD 62/3.

[895] This does not include VI.5.7, a property identified by Jashemski (1977) as a garden which had been converted from demolished properties post-AD 62/3. However, square raised beds in the garden, a sequence of open 'garden' rooms, and a lack of archaeobotanical evidence indicates that this property was in fact used for another purpose, perhaps as a small 'market' square with shops.

[896] It is not possible to establish when the small rustic patch at the House of the Ephebe was established, but we can be certain (due to its context) that it was not an 'agricultural garden' intended for cash crops on a large scale. Instead, the conditions of a fit the description of this garden more appropriately.

At the time of the eruption, the agricultural gardens in Regions I and II far outnumbered those found in the remaining seven regions of Pompeii; an average of eleven gardens per region were located in Regions I and II, while an average of only one 'new' agricultural garden per region was found in Regions III-IX.[897] When plotted (Figure 46), a cluster of 'new' agricultural gardens can be seen in the *insulae* to either side of the Via di Nocera, almost exclusively in the six eastern *insulae* of Region I and three western *insulae* of Region II. Productive gardens in this neighbourhood are often accompanied by at least one other garden in the same insula, thus increasing the likelihood that these were resulting from seismic damage. Significantly, the cluster of 'new' agricultural gardens aligns with the significant level of seismic damage suffered in the same area, perhaps indicating why it is common to find more than one 'new' agricultural garden in the same *insula*.[898] Several architectural and archaeological features were used to identify which of these gardens were likely created post-AD 62/3.

[897] I have identified ten agricultural gardens in Regions III-IX: VI.6.1/12, VII.6-8/11/14, VII.11.1, VII.10.14, VIII.3.14, VIII.6.5, VIII.5.38/16, IX.9.6, IX.9.3-4/9, and IX.14.4. I have discounted the property at VI.5.7, identified by Jashemski as a 'garden' created after the AD 62/3 quakes, due to there being little evidence to suggest that this was cultivated. Instead, it is likely that this was a market space, brothel, or, at the very least, a dining garden/*caupona* due to the small rooms on north and west sides of the garden and possible raised planting beds in the central 'courtyard'.
[898] Nappo 2007.



Figure 46: Map of Regions I and II, Pompeii, showing agricultural gardens existent before and after the earthquakes of AD 62/3.

Table 13 sets out the archaeological features which were used to identify potential 'new' agricultural gardens. As we have seen, archaeobotanical remains can be used to identify a possible agricultural garden, as can other supporting features, such as cisterns, irrigation systems, masonry *triclinia*, and tools.[899] From here, a good starting point for identifying which of these were 'new' to Pompeii after AD 62/3 is the comparison of *insulae* floorplans to the four building schemata established by Hoffman and Nappo.[900] This contrast allows the identification of property alterations which occurred due to the demolition, extension, or repurposing of structures in an *insula* after its initial layout (perhaps also in some cases for division and resale). In addition, demolished walls and blocked doors leading onto, and in association with, agricultural garden spaces can be used to chart the structural development of properties in more detail, and to better understand their commercial use in antiquity; as we

[899] Commercial gardens would have been of a size relative to their output. Therefore, an open space must always be identified before any of the key features mentioned above can be observed. Small areas dedicated to the cultivation of rustic produce in a rear garden, or in walled gardens, are unlikely to have been created after the earthquakes due to their inclusion in the overall layout of each property.
[900] Hoffman 1986; Nappo 2007 (after Nappo 1997, fig. 4).

saw in Chapter Five, charting the access points to a garden can reveal much about their use.[901] Finally, the aforementioned supplementary features, where available, can provide essential information about the function of 'new' agricultural gardens and, in some cases, their age;[902] features such as an outdoor masonry *triclinium*, a treading floor, a cistern, and/or an irrigation system for watering plants can tell us more about the garden use at the time of the eruption. Ramps found in association with an open space are also useful indicators of commercial activity.[903]

Feature	**Location(s) on floorplans**	**Details**	**How to identity**
Building pattern	Diversion in one or multiple *insulae* from building schema laid out from second century BC.	Four schema showing the general building patterns of *insulae* in Pompeii.	See Figure 47.
Blocked doors	Between an open garden space and an existing indoor space, or an open garden space and external street.	Intentionally obstructed during the garden's creation or extension to limit or redirect foot traffic.	Symbol:  (Intersecting a wall).
New or preserved doorways	Leading from an external street directly into an open garden space (direct access).	In some cases, the access points of the original property can be identified using external doorways	Symbol: (Gap in a wall).

[901] When not referenced in excavation reports, blocked doors can be identified in the *Corpus Topographicum Pompeianum* by a short intersecting line through a wall with a circle at each end (see Table 13).
[902]The latter can often be determined with root cavity analysis or, less reliably, the presence of cisterns. Once the species has been identified, root cavities can be used to estimate the age of plants at the time of the eruption, most often according to root cavity diameter. Cisterns can indicate the presence of flowers, vegetables, or in some cases, young plants (for established vines and trees do not require regular watering).
[903] See Poehler 2011 for a list of ramps identified in Pompeii. The identification of supplementary features associated with horticultural use was an approach taken by Jashemski when archaeobotanical information was not available. For example, see excavations in the Large Vineyard (Jashemski 1979), once identified as the Foro Boario (Cattle Market). Damage incurred during earlier excavations, or as a result of modern foliage, can remove evidence of root cavities and furrows, both of which are useful in the analysis of garden space in Pompeii.

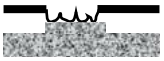
		(in which case they are likely to be preserved doorways).	
Wall remains	Projections from walls (solid lines) or remains of walls collapsed, destroyed, or only partially excavated (dashed lines).	Archaeological remains of walls belonging to a previous construction, destroyed, or demolished in antiquity and now situated in an open garden space.	Symbols:  (Projections or collapsed/destroyed/ partially excavated walls).
Ramps	Evidence for ramps leading into a property including an open garden space.	The ramp often leads into a space sufficient for storing a cart, for example a courtyard.	Symbols:  (Not all are noted on original floorplans).[904]
A storage or processing facility	Adjoined to an open garden space, often converted domestic properties.	Identifiable by industrial material finds (for example, *amphorae*, treading floors or *dolia*).	N/A.
Evidence for food cultivation	In open garden space, raised beds, and *impluvia*.	Root cavity identification, planting layout (e.g., furrows), and archaeobotanical remains.	See summary of archaeobotanical remains provided by Jashemski.[905]

Table 13: Summary of archaeological features useful for identifying 'new' agricultural gardens.

Each of the features listed above can occur alone or in combination with others. As is always the case with archaeological investigation, conclusions drawn about property development in Pompeii are limited to the information preserved or recorded from excavations so far. Further, the conditions for conservation in the modern archaeological site of Pompeii often limit sub-soil excavations which may reveal earlier structures, often limiting us to the archaeological information at the AD 79 eruption level. All these features have been extensively used in archaeological investigations in Pompeii to determine the use and function of properties throughout the town's history. However, no study has yet used these to identify

[904] See Poehler 2011, 200 for a full list of ramps identified in Pompeii.
[905] Jashemski 1979.

and define agricultural gardens, nor to learn more about the nature and timing of their development, or their contribution to the economic, social, and dietary status of the town overall.[906]

6.4.1 Building schemata

Below the AD 79 surface of many of the oldest houses in Regions I and II, wells have been discovered, indicating to Nappo that this was likely an agricultural district made up of crop fields prior to its urbanisation between 300 and 180 BC.[907] In this period, city blocks and houses were constructed according to four general patterns, the variations of which are summarised in Figure 47. In domestic properties with gardens, the outdoor space traditionally took up approximately forty percent of the total surface area of the house. Post-180 BC, once this district had become extensively urbanised, the landscape of Regions I and II underwent significant change during a '[phenomenon] of buying and selling'.[908] Many houses were made larger by the incorporation of neighbouring properties as in, for example, the House of the Marine Venus (II.3.3), the House of the Ephebe (I.7.10-12/19), and the House of the Cylindrical Columns (I.16.2).[909] Where buildings of the AD 79 level differ greatly from the schemata below, and where open areas can be identified, I have taken this as indicative of possible 'new' agricultural gardens made from the space of demolished constructions post-AD 62/3.

[906] Similar studies have used these features to observe patterns of urbanisation and the extension of internal *domus* space in Pompeii; see Nappo 1997; Grahame 2000; Ynnilä 2012; Van Nes 2011a; Van Nes 2014.
[907] Nappo 2007, 348. There is, however, the possibility that these wells were for domestic use (perhaps from previous Samnite houses removed post-80 BC).
[908] Nappo 200, 349-50. After the Roman colonisation of Pompeii in 80 BC, many Samnite houses in the south-eastern corner of the city were removed to make way for the Roman Amphitheatre and Large Palaestra.
[909] Very few instances of upper floors would have existed in this early period; many apartments above the ground floor were added after the earthquakes of AD 62/3, or on top of the walls in the western and southern areas of the town post-80 BC (when security was less of an issue following Roman colonisation).

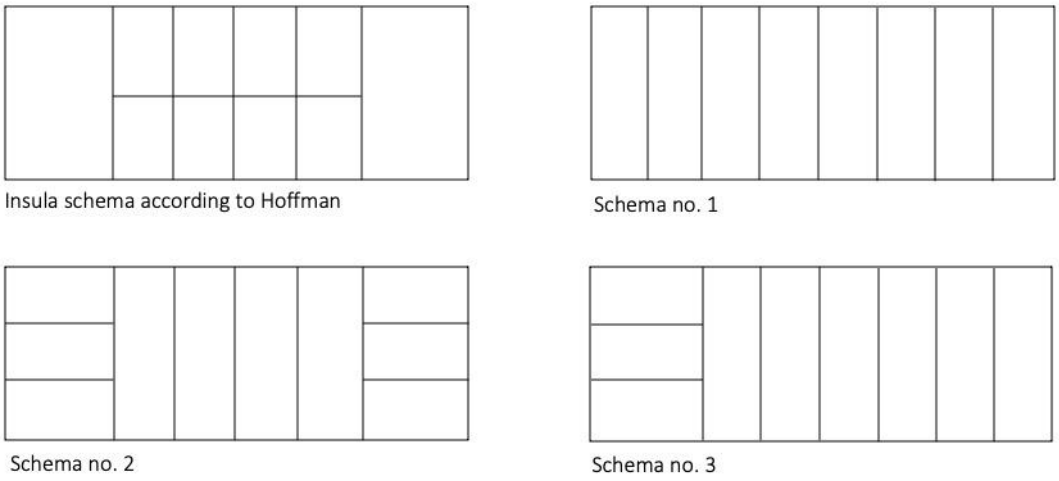


Figure 47: Reconstructions of the schemata for dividing *insulae* in Regions I and II into regular lots. Image: Author's own (per Nappo 1997, 349; Nappo 2009, fig. 4).

A good illustration of such a phenomenon can be seen in the properties at entrances 9 and 14 in *Insula* I.13 (Figure 48). *Insula* I.13 was originally planned to the schema by Hoffman, with properties at the northern and southern ends of the *insula* running north-to-south, and the middle properties in the *insula* planned to run east-to-west. At the southern end of the *insula*, two large properties with rear *horti* appear to have been located, while at the northern end there seems to have been three *domus* originally (though this division may have occurred later). The placement of doors, both open and blocked, around the perimeter of the *insula* suggests that the middle properties were originally placed in a back-to-back arrangement, hence the identification of I.13 as built to Schema no.1 (see Figure 49).



Figure 48: Plan of Insula I.13, showing 'new' agricultural gardens at entrances 9 and 12-14, to the schema by Hoffman. Image: Author's own (per Van der Poel 1986, 25).

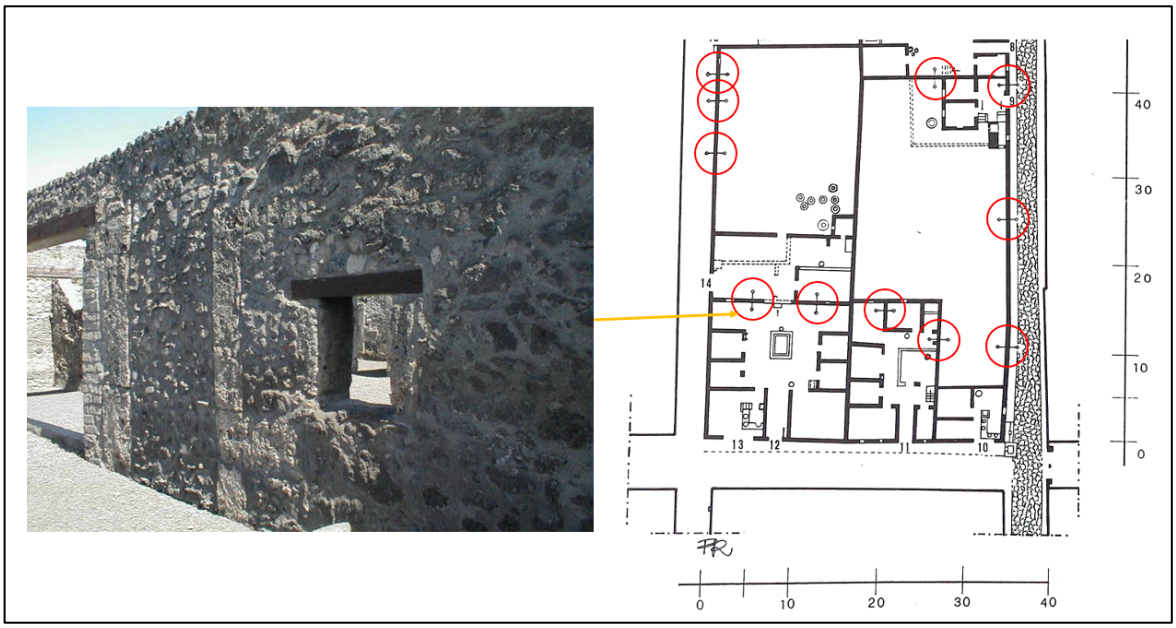


Figure 49: Closed doors in Insula I.13, at properties I.13.9 and I.13.12-14. Images: Pompeiiinpictures/Van der Poel 1986, 25).

At surface level, two large open spaces stand out in an *insula* otherwise densely populated (House of the Larario Isiaco (I.13.12-14) and House of Lesbianus and Numicia Primigenia (I.13.9)). Both show evidence for resilience-building at a macro scale. *Insula* I.13 is located to the north-west of Region I, on the intersection between the Via dell'Abbondanza, the Via di Nocera, the Vicolo del Fuggiaschi, and the Via Castricio, thus providing a good location for gardens for transporting goods out of the gates or into town. Both are located on well-connected streets (see Figure 38). I.13.12-14 was located on a street with faint wheel ruts, consistent with the ramp leading onto this street (Vicolo del Fuggiaschi). In contrast, I.13.9 was located on the Via di Nocera, a very busy road leading to the Porta Nocera and the Via dell'Abbondanza, and thus had neither wheel ruts on the street, nor a wide entrance or ramp.

The extension of these two gardens post-AD 62/3 ate into portions of east-west and north-south facing plots to create larger or new garden spaces for cash crop cultivation; approximately seven properties (originally built to the Hoffman schema) appear to have been demolished or reduced to accommodate new agricultural garden space, and their front entrances blocked to increase crop and accommodation security (as we saw for other properties in Chapter Five).[910] Neither of the two market gardens located here allowed direct access to their garden spaces.[911]

Unlike its commercial garden neighbour, the developer of I.13.12-14 chose to convert and incorporate the domestic property (perhaps for storage) and the *taberna* at the front. The area at entrance 14 appears to have been used as a storage and stable area, due to the trough in

[910] Given the high number of properties repurposed for these gardens, it is likely these changes occurred post-AD 62/3 because of extensive seismic damage to the *insula*.

[911] A well, possibly from one of the original agricultural plots located in this region (see Nappo 2007), was excavated in the garden of I.13.9. Though invading weeds destroyed any evidence of root cavities here, the size of the garden and the presence of the well make it very likely that this area was cultivated. The recovery of a fresco of Venus (Patroness of the garden) in a commercial boat, as well as various religious paraphernalia linked to fertility and gardens, further supports the theory that crops were cultivated here. Looking at the original building pattern, approximately two properties were demolished to create a new garden space. To extend this further, a portion of the property at I.13.10-11, and its garden at the rear (measuring approximately 40 percent of the property, close to Nappo's original estimations) have been amalgamated into one large garden. Blocked doors between the garden and the Via di Nocera to the east show where the entrances of the original properties were.

the north-west corner and the ramp at the entrance.[912] This wide entrance is one of the thirty-six ramps identified by Poehler in the town, a crucial factor which reveals a growing investment in commercial endeavour related to cash crop gardening. As Poehler puts it: 'the decision to invest in transport related services generally (e.g., inns and taverns) and infrastructures specifically (e.g., ramps and stables) shows the importance of this sector on the overall economy and establishes it as a particular driving force in the development of the urban landscape'.[913] The owner of these two properties clearly saw the value in vine cultivation in Pompeii when making the decision not to rebuild damaged residential constructions here after AD 62/3. Once established, vines need little watering, while possible damage to vines would be limited in the case of further quakes.[914]

Original building schema are not always possible to identify, though this does not make the approach less useful. For example, The House of the Cylindrical Columns (I.16.1a/2/5) was modified so extensively that an original building pattern is difficult to establish.[915] Nonetheless, the extensive damage apparently suffered by multiple properties was possible to chart via comparisons with building schemata (Figure 48). This damage appears to have been capitalised on, at the least in the short term, through the cultivation of the peristyle with orderly rows of fruit and nut trees, and the preservation or addition of a masonry *triclinium* in the large rear garden. Due to the irregularity and size of the space (plus lack of evidence for domestic use of the interior area), it is possible to deduce that this garden was unlikely being used for recreational purposes in AD 79. This property therefore represents a commercial garden created in the space of a formerly extensive *domus,* with the benefits of cultivating cash crops over the re-building of domestic properties implied.[916] Furthermore, as seen in Chapter Five, we know that walls were blocked and the fauces of an original *domus* were

[912] Another example of a property with a stable area with a trough and a ramp is I.1.8. See Poehler 2011, 200.
[913] Poehler 2011, 214.
[914] Reports of earthquakes in the wine region Napa, California, reference damage to wine-making equipment, bottles, and barrels, but not to vines. For example, an earthquake of the same magnitude as that which hit Pompeii in AD 62 (between 6 and 7 on the Richter scale) did not affect the vines; grapes at the Trefethen Family Vineyard in Napa were reported to be 'still on the vine' after the disaster (Dougherty et al. 2014).
[915] Like the *Caupona* of the Gladiators (I.20.1), this property also underwent significant structural change pre-AD 62/3, to make one large domestic property, and post-AD 62/3, to create a new agricultural garden from the damaged property.
[916] No traces of decorations were found in the interior of the property by excavators (see Maiuri 1955; Jashemski). The soil in the large garden was too damaged at the time of excavation to recover more than a selection of small root cavities along the west wall; Jashemski 1993, 64.

preserved to provide added security for the upstairs accommodation and garden cellar in the *Caupona* of the Gladiators, located as it was adjacent to the busy Porta Nocera.



Figure 50: Plan of Insula I.20, originally built to Schema no.1, showing new agricultural gardens at entrances 9 and 12-14. Image: Author's own (per Van der Poel 1986, 25).

6.4.2 The conversion of commercial and commercial-dining properties

Using building schema as a foundation, and the categories of commercial and commercial-dining properties as a structure, I will now investigate the conversion of 'new' agricultural gardens through an assessment of jutting demolished walls, blocked doors, and other features, such as irrigation. With these case studies, my description of post-AD 62/3 Pompeii as a resilient city is justified in the following ways. First, the adaptation and development of 'new' commercial garden space was, as found in Chapter Five, often influenced by urban placement; blocked and new doors and direct access reveals who was

accessing the garden, and for what purpose (hospitality, garden maintenance, and so on). Furthermore, evidence for general compliance to the *Hosidianum* law seen above, most especially in relation to its allowance for derelict or damaged buildings to be demolished and sold on for profit, are witnessed; the conversion of many properties into cash-crop properties and commercial-dining gardens demonstrates the engagement of the town in wider commercial trends and local trading opportunities, including the *nundinae*, the *macellum*, and dining rental. Such factors support Pompeii's identity as a 'complex, multi-scalar system' of constantly moving energy flows (in and out of the city), governance, and social-economic dynamics (Tension One).

The case studies of 'new' agricultural gardens in Regions I and II also exhibit the characteristics of 'dynamic non-equilibrium' (Tension Two), transitional change (Tension Four), and general adaptability (Tension Five). Land ownership in the centre of Pompeii varied, from whole *insulae* to individual buildings. The purchase and amalgamation of various properties post-180 BC continued after the earthquake, when many buildings were damaged or destroyed. Garden development was not a state-driven effort of 'transformation' (as it was in Cuba) and as such occurred organically on an individual basis. The transitional processes of garden development post-AD 62/3 thus point to a population concerned with generating a more sustainable living environment through improved adaptability and diversity. These gardens are evidence for 'long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption', in a transitional fashion.[917]

In other words, diverse adaptability was preferable, for garden developers post-AD 62/3, to built-in responses to specific challenges.[918] This is understandable, for the high-risk investment of landowner funds in the reparation or rebuilding of damaged buildings, all of which are prone to further damage due to the high frequency of earthquakes at this time, is mitigated through the creation of alternative revenue streams in working gardens. The fostering of adaptive qualities in all 'new' gardens thus increased Pompeii's overall level of

[917] Markard et al. 2012, 956.
[918] See also Miller et al. 2010; Brown et al. 2012; Burayidi et al. 2019; Wamsler et al. 2019, 71.

resilience. I will now demonstrate how these tensions were played out in the gardens of Pompeii, through an assessment of real examples from the case study above.

6.4.3 Creating a more resilient Pompeii

As discussed throughout this thesis, increasing commercialisation, and growing demand for rustic produce and dining opportunities in the mid-first century AD, influenced the choices made by the individuals developing garden space in Pompeii. One key outcome of this was the growth in cash crop production in the urban centre, not limited to food. Varro and Columella note the profitability of keeping a garden cultivated with flowers close to a city (for garlands), while Pliny the Elder references the growing trade in perfume at this time, much to his distaste.[919] A handful of gardens in Regions I and II show evidence of responding to this economic opportunity. Two of these provide good examples for studying transitional change in horticultural space post-AD 62/3.

The archaeological remains of the House of the Garden of Hercules (II.8.6) (Figure 51), already discussed briefly in Chapter Five, include three jutting demolished walls in the garden space. These walls, in addition to evidence for blocked doors from previous properties, demonstrate that this garden previously held 'four other… houses', all built along the same design (Schema no.1). These four structures were later demolished to accommodate a large commercial flower garden, complete with a masonry *triclinium*; this likely occurred following the quakes, for extensive seismic damage would have justified such extensive change in a short period of time.

[919] Var. *Rust.* 1.16.3; Col. *Rust*. 8.2; Plin. *HN* 13.4. See Jashemski 1963 for details of the flower industry at Pompeii and Jashemski 1979b for the excavation of this garden.

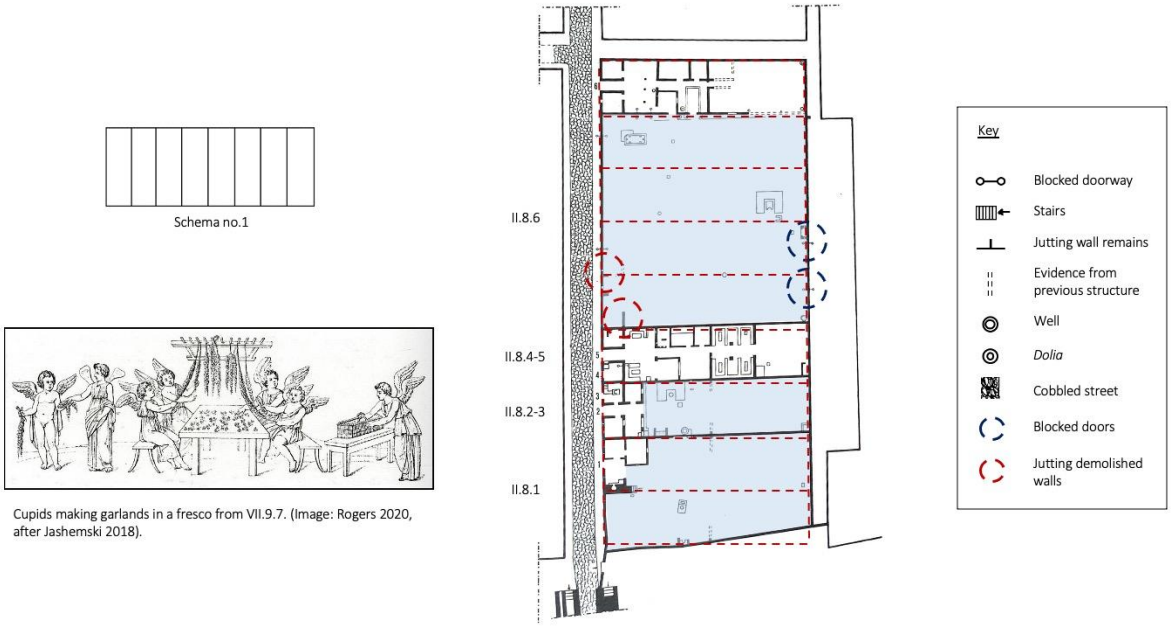


Figure 51: Plan of Insula II.8 showing demolished walls, blocked doors, and other features. Scale 1:500 (scale shown in metres on plan). Images: (Inset) Drawing of a fresco from VII.9.7, showing cupids making garlands. (Right) Original plan from the Van der Poel et al. 1986, 57.

Numerous changes were made here to protect the income of the owner(s) or tenant(s), making this an excellent garden for observing transitional and positive change post-AD 62/3. This garden had numerable income streams: flowers, garlands, perfume, and a masonry *triclinium*. Furthermore, olives produced on site would have reduced the garden's reliance on external sources for the olive oil used in perfume making. The location of this site was also beneficial for increasing income: passers-by on their way to honour the dead would have been enticed to buy perfume and garlands for sacred rituals. Finally, the inclusion of a triclinium in the garden, surrounded by beautiful flowers and smells, would have provided a tranquil, idyllic Thirdspace for customers to escape the realities of city life. It is also likely that this was used by *collegia* or *universi* in the flower business; the gathering of individuals in the same business would have facilitated the exchange of knowledge, thus increasing the city's capability for 'bouncing-back'; a key facet of resilience is the dissemination and sharing of knowledge in communal groups.

This garden is thus an excellent example of a property owner, gardener, or group recognising economic opportunity in cash crop cultivation over rental property, as well as the profit to be made from the passing foot and cart trade entering the city via the necropolis and gate located less than one-hundred metres from the garden's entrance.[920] A similar situation was likely occurring at the House of the Flowered Lararium (II.9.3-4) two doors down, the small garden thought to have been a nursery for trees, flowers, and small plants created via the fusion of two domestic buildings (see above). As we saw in Chapter Five, this property was likely frequented by individuals in the business, hence the presence of the *triclinium* in a place of only moderate access to guests, and an electoral notice on the property. Its close location to the Hercules garden would have presented the owners of this property with similar commercial opportunities.

Shared agricultural knowledge was undoubtedly key in generating the rapid horticultural and structural change in Regions I and II in the final seventeen years of the city's life. Following natural disasters in urban centres such as Christchurch, New Zealand, horticultural collectives were found by researchers to have a positive impact upon community cohesion and resources following a major earthquake.[921] Were similar groups operating in Pompeii? The diverse approach to garden development and management in the case studies, as well as the quarrying of land prior to planting for increased fertility, supports the high level of local agricultural knowledge which Campania was famous for in the late Republican and early Imperial periods;[922] it is at least plausible that many of these individuals were former citizen farmers or employed in agricultural work in the hinterland of Pompeii.

Additionally, local graffiti referring to collectives of specialised individuals, such as *pomarii* (fruit-sellers), raise the possibility of communal groups (perhaps *collegia*) sharing

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[920] Nappo 1997, 103; Jashemski 1979, 405. Varro and Columella note the profitability of keeping a garden cultivated with flowers close to a city (for garlands), while Pliny the Elder separately references the growing trade in perfume at this time, much to his distaste (Var. *Rust.* 1.16.3; Col. *Rust*. 8.2; Plin. *HN* 13.4). In the garden and indoor storage rooms, excavators found a large number of glass vials, indicating that perfume was produced on site; the cherry and olive trees thought to be growing here may have provided ingredients for perfume making. In addition, garlands for religious festivals and dedications would have provided an additional revenue stream. Alongside the production of goods, the large masonry triclinium in the garden, shaded by a vine-covered pergola in antiquity, may have provided yet another source of income for the stakeholder in charge of this property, as a rented dining space for holding *cenas*; See Jashemski (1963) for details of the flower industry at Pompeii and Jashemski 1979b for the excavation of this garden.
[921] Shimpo et al. 2019.
[922] Cic. *Leg*. *Agr*. II.31.84. See also Chapter Two.

knowledge and collectively cultivating market gardens in the city. For example, the religious artefacts and *sacella* found in the House of the Sibyl (II.1.7A/11-12) and a pre-AD 62 garden II.3.3A-6, provide possible starting points for communal horticultural activity, as may the various nurseries so far uncovered in the city. Further research into this area would be fruitful for better understanding the impact of knowledge groups on Pompeii's level of resilience. Until this is achieved, the current findings contribute to the picture of Pompeii in its final years and highlight the similarities between this ancient population and the many others throughout history who have responded resiliently to crisis with urban agriculture.

Food was not the only common-pool resource vulnerable to shortages in the face of future natural disasters. The regular watering of flowers and young plants is crucial in a warm climate and regular irrigation posed a challenge not only in this property, but in many gardens in Regions I and II. Many gardens in Pompeii were not attached to the public water supply and, despite the prevalence of water fountains in Regions I and II, Jashemski tells us that the aqueduct was not supplying water to this area at this time.[923] This meant that water had to be transported to the gardens. Although the complete cut-off of aqueduct water to Pompeii post-AD 62/3 is contested, 'the disconnection of properties in peripheral areas… from the pipe system indicates an attempt to preserve water only for what was regarded by the Pompeian administration as the most important part of the city': Regions I and II.[924] Nonetheless, the temporary return to a use of rain, river, and groundwater supplies for many post-earthquake (though less convenient) did mitigate against crop loss in the face of future water disturbances, even in the case of the supply returning.[925] The ingenious irrigation solutions introduced in many 'new' gardens in this district can therefore be counted as transitional and adaptive actions of resilience.

One third of the samples above include evidence for complex irrigation systems. As in the Garden of Hercules, some of these included openings in exterior walls to allow gardeners to feed water collected at local fountains through to a storage *dolium* (another example can be seen in the Imperial House, II.1.10). Others included pipe systems for watering different sections of the garden (for example, the House of the Ship Europa, I.15.1-3), while many

[923] Jashemski 1979, 405.
[924] Filocamo et al. 2018, 925.
[925] Keenan 2004, 150, 157.

utilised the southern slope and man-made soil contours. In addition, the wells were introduced or uncovered to exhale the pent-up air underground thought responsible for tremors. This, and the introduction of alternative water sources, were considered as mitigating actions against further seismic shock.[926] One third of the 'new' market gardens in this neighbourhood held at least one garden well.[927]

Various approaches to irrigation were adopted in the Garden of Hercules to provide regular water for flowers (regardless of direct or indirect supply).[928] 'Sombrero' planting patterns (a plant in the centre, surrounded by a depression for water) were discovered in several flower beds separated by irrigation channels, each filled with numerous small root cavities. These would have increased the efficiency of watering for young plants. The *dolia* used to store water from the roof, and the pool with a channel for collecting water, would have also been useful in the event of a water cut off at local fountains (for example, due to seismic damage), while the opening in the north wall through which water could be poured enabled the efficient collection of water from the local fountain. A worker would likely have taken, avoiding the main street (Via di Nocera) on his or her way to the spout on the eastern wall of the garden (adjacent to the wall of the Large Palaestra). This distance is approximately 150 metres; this is not a great distance, but the water requirements of this garden would have been high, meaning multiple trips per day and extra measures (such as 'sombreros' to maximise water use and storage). Micro-actions such as increased options for irrigation built resilience on micro- and macro-scales and ensured that the local supply of plants and flowers were maintained, as well as an income for the owners or gardeners.

In the same *insula*, a further three commercial properties (restaurants) were created and modified from their previous structures; walls (located in the same position in properties 1 and 2/3) were demolished to extend the gardens and accommodate space for dining, and the former (probably) domestic structure of non-distributed layouts were preserved for extra security and privacy for diners.[929] While a useful indicator of 'new' garden space, walls are

[926] Ruggieri (2017b) also notes that the preservation of damaged or partially collapsed walls in order to allow the release of 'subterranean vapours' through fissures. For well, see Nappo 2007.
[927] For a full discussion of wells and their role in 'seismic protection' in Pompeii, see Ruggieri 2017a.
[928] Nappo 1997, 103.
[929] Property 1 may have been two *domus* originally, though lack of wall remains or blocked doors can confirm this with certainty. In property I.8.1, pronounced north-south furrows bordered by water channels indicate that

not always possible to detect where excavations below the eruption level cannot be made for reasons of conservation, or where evidence has been destroyed post-excavation alongside inadequate records. In such cases, blocked doors become key for identifying the position of previous constructions prior to the existence of a garden space, as can door placement or access (DA, or Direct Access, as seen in Chapter Five; see Figure 52). The map in Figure 53 shows a clear cluster of these gardens close to well-integrated routes, though their access points are often on foot-traffic only streets.



Figure 52: Direct garden access (signified by red rings), divided into the categories of Commercial Agricultural Gardens (left) and Commercial-Dining Agricultural Gardens (right). Images: *Corpus Topographicum Pompeianum Pars 3A* 1986, 29, 39, 41, 45).

this was likely a vegetable garden. A food bowl and an outdoor hearth were also uncovered in this garden. While root cavities and furrows have not yet been discovered in the neighbouring property (I.8.2/3), there is a strong possibility that it was cultivated in the same manner as other *cauponae* due to the presence of an outdoor *triclinium* with an altar, a cistern, a basin, a garden *lararium* niche, and an outdoor hearth in property 2/3.

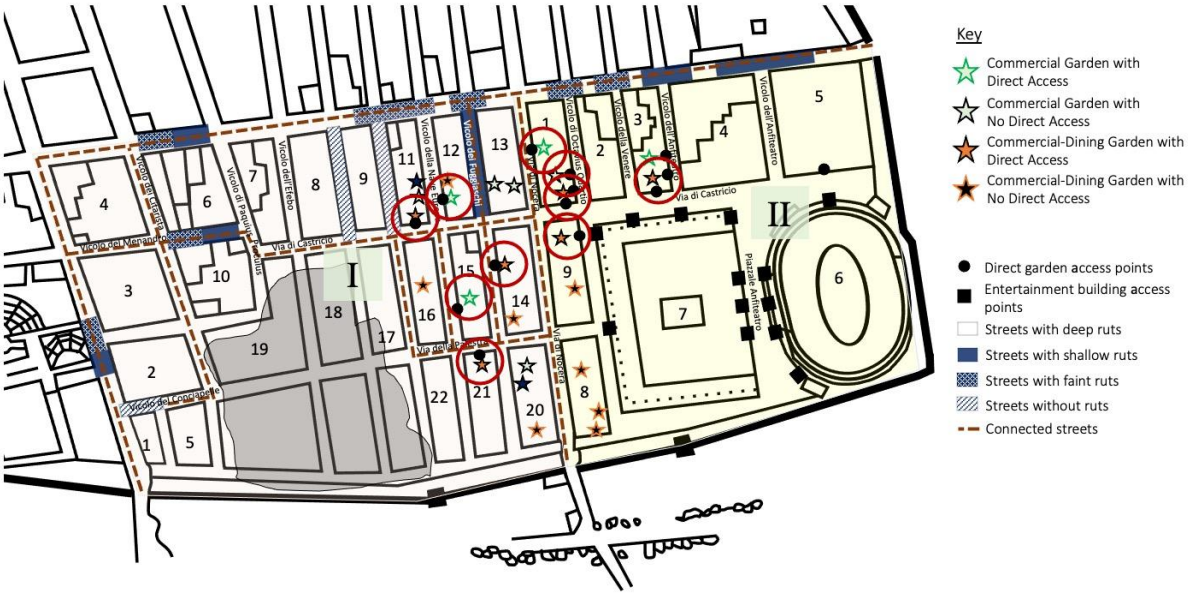


Figure 53: All 'new' or extended commercial and commercial-dining gardens created post-AD 62/3 in Pompeii, highlighting those with direct access (highlighted by red rings).

Material finds can provide additional information regarding the function of agricultural gardens and, more abstractly, possible dates for their establishment prior to the eruption when considered alongside the aforementioned features.[930] One example is the garden at II.1 (Figure 53). This property exhibits demolished walls, a blocked door between the garden and the interior, two direct access points (7B and 8), a large masonry *triclinium* with an altar, an outdoor serving table, a well, a kitchen adjoined to the garden, a treading floor, and a garden cultivated with vines. Accommodation, likely for resident workers, may have been accessed via an internal staircase.[931]

The original building schema of the *insula* (Schema no.3) and the irregularity of the space indicate that a property was demolished to make way for the garden space. This garden can be considered opportunistic, or created for economic profit, due to its high level of accessibility to non-household members, as we have can see in other market-dining gardens

[930] Using, for example, the age of root cavities as a possible means for estimating a garden's age; see Jashemski esp. 1993 for various uses of this approach.
[931] The size of the outdoor space far outweighed indoor living space, while the first floor would not have extended into the adjoining property to the north due to another garden being positioned here.

(as at, for example, the *Caupona* and *Domus* of Euxinus (I.11.10-12), and the properties at II.3.6, II.3.7-9, II.8.1). This triclinium was likely also used as an alternative revenue stream for the owners or gardeners, making this property an example of multiple commercial opportunities coming out of a converted commercial-dining property post-AD 62/3, thus contributing to resilience levels at both an individual and city-wide level.

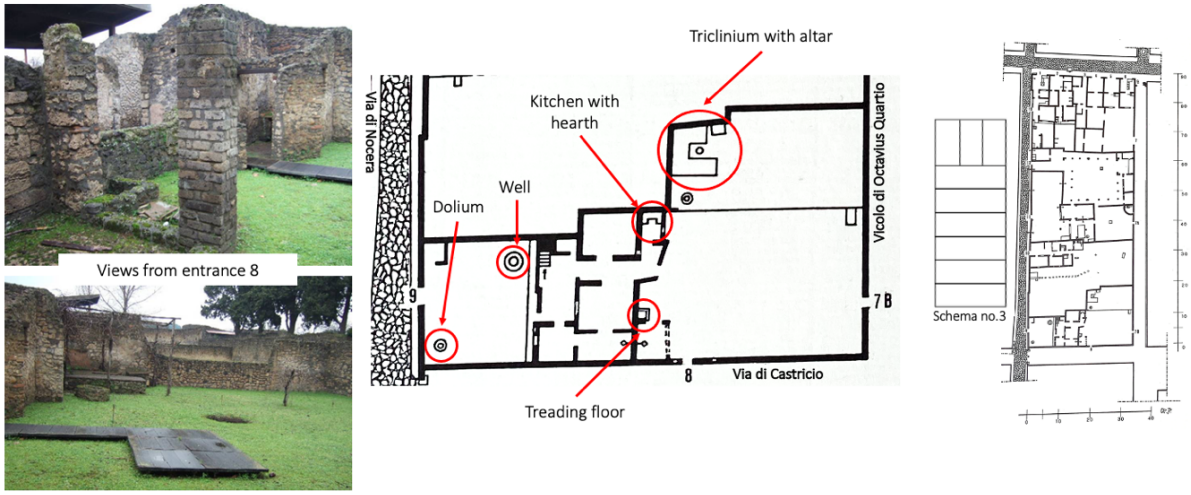


Figure 54: Other identifying features and direct access in II.1.7B/8-9. Images: Pompeiiinpictures 2022.

An example of multiple opportunities in a large commercial garden (without a *triclinium*) can be seen in the House of the Ship Europa (I.15.1-3), a garden which takes up an entire *insula* (Figure 55). Here, two *domus* were combined to create one large processing building, while an unknown number of properties at the rear were demolished to create a large commercial garden.[932] The development of this garden may have been modelled on *Insulae* I.21 and I.22, both of which have large rear gardens of a similar size (but apparently purpose-built as commercial gardens due to a lack of evidence for conversion or any demolition).[933]

[932] Rear rooms in the garden at I.15, likely used for processing and storage, were preserved at the bottom of the garden, demonstrating that this property was at one time developed before being reorganised for the cultivation of cash crops.
[933] The gardens at I.21 and I.22 were discounted from the 'new' agricultural gardens sample as they appear to have been continuously cultivated according to their original agricultural purposes; no evidence for any development or demolition has been discovered in these gardens.

Following the clearing of this space, the opportunity to quarry for building materials, in short supply post-AD 62/3, was taken. This complements the pattern of quarrying in the southern part of Pompeii from at least the early first century BC, and demonstrates that at least one of the four earth-moving strategies suggested by Gleason and Palmer was being employed during the construction of this garden.[934] As mentioned above, planners (including skilled landscapers and architects) were likely employing either the cut and fill approach, where ground is cut out and used as fill to make a flat surface, or terrace, or the terrace in cut method, where soil is removed to create a flat surface as a lower terrace on a slope. Any soil cut during terracing would either serve as infill or be transported away, requiring yet more planning and man/animal power.

With regards to soil preparation, the frequent traffic during construction in any garden would compact the ground, making it unsuitable for cultivation.[935] As such, the surface-level soil would either need to be turned over and buried or removed from the garden. Alternatively, this low-quality soil may have served as well-draining soil at the subgrade level, the layer which sits below the 'finished surface'. A higher quality soil (topsoil) suitable for cultivation would then be laid on top.[936] We know that many different plants were being cultivated in this garden successfully, meaning that the soil was likely prepared in this way by individuals with substantial agricultural knowledge and organisational acumen.[937]

Evidence of earth-moving on a smaller scale can be witnessed in other gardens in Regions I and II, the tracing of which helps to better understand the processes of change here post-AD 62/3. One such example can be found in the Shop-House Garden, where Jashemski and her team uncovered foundation walls one metre deep below the post AD 62/3 garden.[938] This archaeological material indicates that earth-moving strategies appear to have been employed here post-AD 62/3 and prior to the AD 79-level cultivation in order to create a level

[934] Gleason and Palmer 2018, 386-90.
[935] Gleason and Palmer 2018, 387-88.
[936] It is worth noting that Gleason and Palmer (2018) have found little difference between subgrade and finished surface soil in the Vesuvian area, due to the overall high quality of soil found here.
[937] Overseeing the planning and construction of this garden would have implied the owner's *oikonomia,* or 'the efficient management of resources and site, and the frugal, principled supervision of working expenses' (Gleason and Palmer 2018, 383, quoting Vitruvius (1.2.2).
[938] Jashemski 1979, 189.

garden space suitable for cultivation.[939] The relatively small size of this garden was not significant enough to warrant terracing,[940] though similar methods of earth-moving would have been employed to improve conditions for cultivation. For example, one possibility is that soil was introduced from outside of the garden to facilitate cultivation. If so, it was likely done for two reasons: first, to cover the remains of previous constructions (as we saw in Jashemski's excavation report), and second, to make the new (or extended) garden suitable for cultivation. Fine grading, or the 'final shaping' that marks out areas of cultivation, irrigation, and garden fixtures (for example, cisterns), would have taken place as the final stage of construction, prior to the introduction of new plants.

Along a similar vein, the high number of demolished wall remains observed in the 'new' gardens of Regions I and II indicate that earth-moving was a widespread practice in Pompeii. As mentioned, this would have included the importation of soil from outside of the garden or town. For example, in the Large Orchard (I.22) three piles of soil were in the garden at the time of the Vesuvian eruption, while in the standalone olive nursery at I.21.3, a large pile of topsoil was excavated close to the entrance of the garden.[941] One possibility is that these piles were left over from each garden's conversion and were now being used for other horticultural purposes on site. The soil may also have been transported to each garden for maintaining the young trees now being grown there.[942] Notably, gardeners and/or developers had introduced complex irrigation systems to the soil in both of these gardens, and many others like them in Regions I and II, with water channels between beds and soil contours and openings in walls for passing water through from the street (for example, see the Garden of Hercules (II.8.6) in this chapter).[943]

To warrant the importation of soil, gardens would have either been lacking in the volume or quality of soil (or both). Once again, the knowledge, organisation, and manpower

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[939] Though she does not state the possibility of infill soil being introduced instead states that the foundations 'could easily have been grubbed out to plant a destroyed area', though the developers and gardeners of this garden appear to have found this unnecessary, preferring instead to fill over the wall remains.
[940] Regions I and II are on a natural south-facing slope.
[941] Foss analysed the pile of soil in the olive nursery (I.21.3) and discovered that it was topsoil, though did not elaborate upon whether this was from the town, the local area, or further afield still; see Jashemski 1993, 71.
[942] Soil analysis of the sample would have made this clear, though no records exist to suggest that this sample was analysed by excavators.
[943] Jashemski 1979, 279-88; Jashemski 1993, 71-24. For the Garden of Hercules, see pages 233-4 and 274-6.

going into the conversion and maintenance of these gardens is made clear. Further soil studies are ongoing in Pompeii and should shed further light about the types of soil being imported into each garden, and where they were being imported from.[944]

While the construction activities in this garden do not comply with the *senatus consultum Hosidianum* and *Volusianum* laws, which penalised the demolition of private structures for the profitable resale of materials, an exception to the former law allowed damaged buildings to be demolished and sold for profit; concessions were therefore likely made for quarrying on such properties. This further supports my conclusions relating to the dating of this activity here, and in other gardens. During the process of quarrying, the fertility of the ground would have been increased by the grinding down of building materials and pumice (used for subgrade). This process created an ideal environment for the vines, trees, and vegetables patches established in this garden in the final two years before the eruption, adding to the already established trees from the former domestic property in the upper terrace.[945]

[944] For example, the study by Vignola et al. 2022 uses soil to reconstruct the plant landscape of the Sarno plain. I was notified of the number of upcoming pollen studies in Pompeii's gardens and suburban areas that we can expect in the coming years during personal correspondence with Gleason (2022).
[945] Roberts and Robinson 2019; Jashemski 1974, 1979; Esposito 2018. Robinson (personal correspondence, 2020) suggests that quarrying continued after the quakes of AD 62/3 and that any gardens here post-quarrying were temporary fixtures.

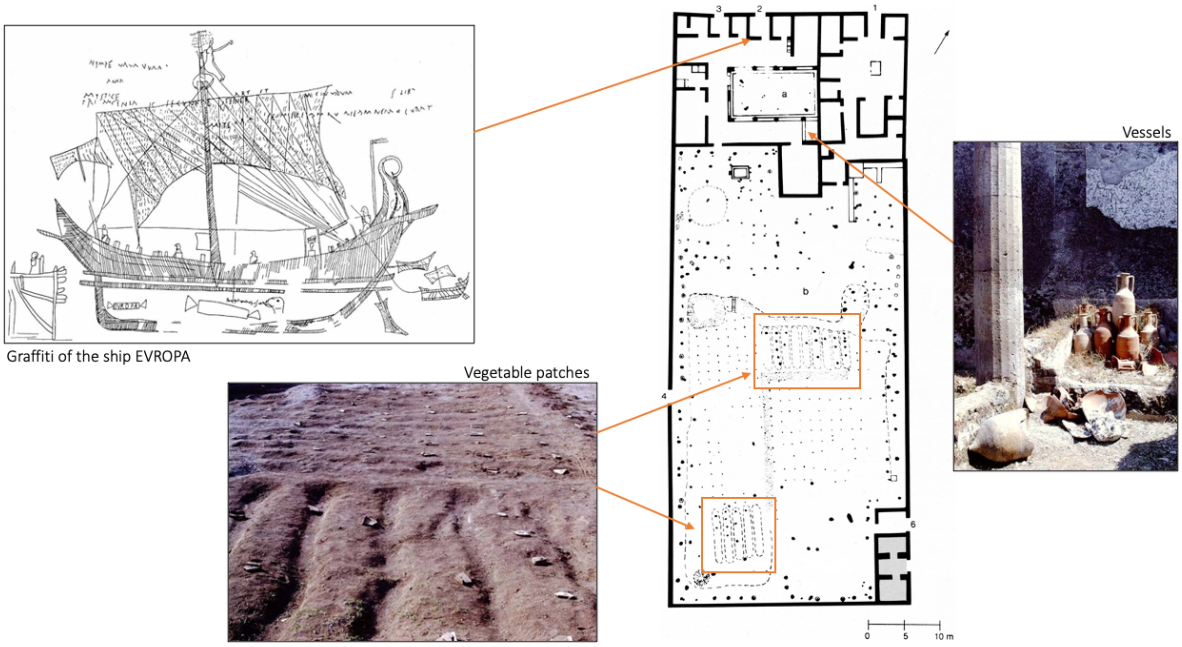


Figure 55: Plan of Insula I.15, including the House of the Ship Europa (entrances 1-3), with locations of root cavities, pits, and vegetable plots). Image: (plan with cavities) Jashemski (1974); Pompeiiinpictures 2022/Stanley D. Jashemski.

The excavation of 416 root cavities in this garden colour information about post-AD 62/3 structural alterations and confirm the use of this space for an extensive vineyard, inter-cultivated with vegetables and fruit trees.[946] The young age of the vines on the lower terrace (not yet two years old) suggest that this conversion occurred within a couple of years of the eruption.[947] Two cisterns, a drainage channel for water, twenty-eight embedded terracotta pots, more than one *dolium*, a large number of *amphorae* in the south-eastern corner of the portico, and the large graffito of the ship 'EVROPA' on the northern wall of the peristyle provide further evidence for the commercial conversion of this domestic property.[948]

As in other gardens, the developers made further provisions for sustainability. This includes water sourcing, with complex irrigation and water storage methods (including roof

[946] Jashemski 1974, 396.
[947] Jashemski 1979.
[948] See Jashemski (1974, 397) for cavity sizes and their comparison to the established 'Large Vineyard' at II.5. Jashemski (1974, 398-9) also refers to the cistern as a reason to believe that young plants were being cultivated here, though a lot of water would have been needed for the vegetable gardens here too.

run off) and polyculture; archaeobotanical evidence suggests that beans were inter-cultivated with vines to fix nitrogen in the soil, thereby improving its quality.[949] Furthermore, the sheer size of the two vegetable gardens, thought to be producing high volumes of vegetables throughout the year (see the yield estimates in Chapter 3, Table 8), further increased the number of revenue streams. Such a diverse and specialised approach to this garden's development not only increased its overall profitability, but also reduced the possibility of income loss through the improvement of soil quality, the cultivation of various types of crops, and a diverse approach to water sourcing.

As mentioned in Chapter Three, animal remains without cut marks were found in the lower terrace of this garden and may suggest the practice of biodynamic farming. Sheep kept amongst the vines would have helped to clear weeds and would have provided valuable manure for the soil. The cows found here may have been used to transport produce by cart, or else may have been stored here for auction or transportation back to the countryside. It is also important to note that the varied approaches to sustainable agriculture in this garden would have naturally improved the local ecosystem, namely through the introduction of new pollinators and the recycling of waste (via composting, for example). This is not to mention the significant contribution of this garden to local food security. The clustering of many similar gardens in Regions I and II would have expounded these effects.

Measures to mitigate future possible threats to essential resources and income were not the only adaptations occurring at an individual level. Specialised agricultural knowledge, perhaps shared in local groups, was significant in creating a sustainable garden here and at other sites. The incremental, dynamic, and self-motivated changes found within this garden compliment the general pattern of increased investment in agriculture in the urban centre of Pompeii, as well as the contribution of these actions to the city's growing level of resilience in its final phase. In all, the case studies observed, the varied material, architectural, archaeobotanical, and even zooarchaeological remains have created a better impression of 'living' spaces than static archaeological floorplans ever could.

[949] Being mostly new and planted in the final decade before the eruption, many of the plants growing here would have still required regular watering, most especially in the vegetable plots. In total, 240 trees were uncovered in this garden. A number of carbonised specimens were recovered in this garden, including filbert shell, grapes and a grape seed, a partial date seed, a fragment of an almond, and broad beans.

6.5 Conclusions

This chapter has explored the phenomenon of twenty-three new agricultural gardens created in Regions I and II in the years proceeding a famine and the earthquakes of AD 62/3, and linked these changes to the growing commercialisation of Pompeii in the mid-first century AD. Through the appraisal of archaeological and archaeobotanical finds, I provided the first quantification and mapping of twenty-three (out of a possible thirty-two) 'new' agricultural gardens created or extended in the final phase of the city. The application of resilience theory to this sample revealed that this rapid rise was the result of diverse micro-actions implemented transitionally by landowners and gardeners (rather than by the state), which were often driven by economic motive. These actions perhaps inadvertently cultivated a city more resilient to future challenges and had positive implications for local food security, employment, income, local ecosystems, and infrastructure.

The dynamic adaptation of agricultural garden space by many different stakeholders in the city embraced diverse adaptability and, though sustainability was not a 'normative and goal-oriented perspective' of the city, the transitional changes observed reveal a shift in Pompeii's social-economic system to a more 'sustainable mode of production and consumption'.[950] While Pompeians may not have been directly aware of the effect, the cultivation of natural areas (including flower gardens) close to agricultural sites would have improved crop production through the introduction of pollinators to the area.[951] Furthermore, high nutrition levels in Pompeii, reflected in the 'robust immune systems' and long-life spans of a sample of the living population in AD 79 (Chapter Three), provide verifiable evidence of the positive impact of diverse food sources upon the local population at this time.[952] The positive impact of resilience-building actions would likely have continued had the eruption not destroyed the city in AD 79, yet further investigations of sewage deposits and human remains will be able to tell us more about food security in the final years of Pompeii.

[950] Geels 2010, 39; Markard et al. 2012, 956.
[951] Langellotto et al. 2018

[952] Henneberg and Henneberg 2002; Murphy et al. 2013; Lazer 2016; Rowan 2016.

One key area worthy of further investigation arose in the above discussion: the dissemination and sharing of knowledge in communal groups as a facet of resilience. As seen above, modern horticultural collectives have been found to have a positive impact upon community cohesion and resources following a major natural disaster.[953] While I found evidence for similar groups operating in Pompeii, further investigations into horticultural *collegia* or *universi* would create a more rounded impression of the central role of garden space in daily life, and their impact on the city's resilience levels in its final years. However, until this is achieved, the current findings contribute significantly to the picture of Pompeii in its final years and highlights the similarities between this ancient population and the many others throughout history who have responded resiliently to crisis with urban agriculture.

[953] Shimpo et al. 2019.

CHAPTER SEVEN: Conclusion

This thesis has demonstrated that the Pompeian agricultural *hortus* was a versatile and powerful symbol of collective Roman identity and history, a key source of essential nutrition, a commercial opportunity, and a vital social tool, frequently combining both utilitarian and recreational function. Within this humble space, the livelihoods, characters, and resilience of a population were cultivated. At the start of this thesis, I set out to demonstrate the academic value of agricultural *hortus* space, an area which has thus far been significantly understudied. Via an interdisciplinary examination of the economic, nutritional, and social contributions that this space and its produce made to Pompeian society, I have demonstrated that the agricultural *hortus*, once the 'poor man's market', did indeed sit at the centre of the Pompeian psyche, economy, diet, and social life. To come to this conclusion, I utilised literary accounts of *horti,* rustic or otherwise, pictorial depictions of rustic produce, and archaeological sites and remains from the town, all of which allowed me to reconstruct the Pompeian experience of urban agricultural space at a key moment in wider Roman history. The data accumulated and assessed in this thesis offer distinctive and novel angles from which to reconstruct developments in the town's urban landscape and the daily life of its inhabitants in research going forward.

At the start of this thesis, I highlighted the three areas deemed by Flohr to be requiring more attention in ancient Roman urban development (p.12). All three areas placed a strong emphasis on historical and economic contextualisation, which Flohr found to be generally lacking in the existing scholarship. As the main aim of this thesis was to investigate the economic, social, and nutritional impact of the *hortus* and its produce, I employed Flohr's three areas as structural markers around which to frame my enquiries to ensure that my enquiries into urban space progressed beyond that already established in Pompeii. Within the boundaries of these parameters, the main findings of my thesis were as follows: In the first century AD, the *hortus* stepped up to the mark in response to a need for preserving and perpetuating virtuous identity in the population and provided a direct connection to *maiores nostri* by horticultural association, amongst wealthy property owners, the 'middling classes', tenants, restaurant-goers, and even the gardeners themselves. The rapid growth in the number of *horti*, fixed food outlets, and continued participation in the town's *nundinae* into its final

years, underlined by the growing commercialisation of the town, was found to be a direct response to growing demand for rustic produce and dining opportunities. *Hortus* produce was directly contributing to the proven high levels of nutrition and health across all socio-economic levels in Pompeian society at this time, much as the produce and spaces alike were contributing to the even distribution of wealth seen by other researchers (for example, Flohr and Wilson) in Pompeii.

In many cases, the methodologies applied in this thesis were the first of their kind to be applied to the agricultural *hortus*. Their application has enriched our pre-existing knowledge of Pompeii, most especially in the areas of archaeobotanical research, spatial theory, and urban development in the town's final years. Charting changes in garden development and use, and more widely alterations to the wider Pompeian urban landscape, I was able to confirm the town's rapid response to crisis post-AD 62/3. Furthermore, by plotting the growth of agricultural plots in Regions I and II, including more opportunities for rustic dining, and examining evidence related to the of the social 'display' of *hortus* space and produce (for example, in *xenia* paintings and *viridiaria* paintings and space), I was able to demonstrate the town's significant participation in early Imperial consumer trends and reveal how far this was impacting upon local diets, incomes, social habits, and the urban landscape. In studying both domestic and commercial *hortus* space, I was also able to draw attention to the growing permeation of boundaries between *rus* and *urbs* in Pompeii from the Late Republican period, and as such confirm Flohr's hypothesis, exclusively in relation to this town.

My research on material relating to urban development and increasing commercialisation in Pompeii allowed me to agree with recent economic studies in stating that the town was not incompatible with the consumer-city model, but that this model did not fully describe its economic potential or functioning. Instead, evidence for an increase in specialised manufacturing within the city (here including commercial horticultural activity), including growing investment in the production and sale of rustic goods, contributed to the more even distribution of wealth in Pompeii and Herculaneum. Furthermore, by combining this image of a commercially interconnected city with the monetary and nutritional values of rustic produce values, I was able to answer another of my research questions: while the town

may well have been able to survive off its hinterland ('*Campania Felix*'), it would not have been able to survive off the agricultural gardens in the town centre alone. As such, the town was reliant upon the wide nundinal network operating in and beyond Campania, at the same time as putting preventative measures in place to waylay any negative consequences for the town should important food or water sources be cut off (as seen, for example, in the Garden of Hercules and the Shop-House Garden). One such measure was the creation of twenty-three new agricultural gardens in an exceptionally short period of time, despite repair of the town's infrastructure not being prioritised as much as might be expected in a town following a major natural event, such as an earthquake. I have gone some way to explaining why this was, though further studies investigating the gap between investments into repair over new, agricultural developments, would make positive contributions to our understanding of political, economic, and even social priorities at this time.

This thesis demonstrated the ongoing value of utilising archaeobotanical data from Campania to confirm hypotheses related to produce cultivation, display, and consumption, as well as trade and land use, as such having important repercussions for future researchers as knowledge of Pompeii expands. One example is my calculation of garden yields in three case studies. For example, while exploring the potential yield of the House of the Ship Europa, my approach built on, but also developed, Jashemski's methods when she estimated the output of the Large Vineyard (II.5). Although I too was limited by my uncertainty about the types of vegetables and trees grown in the garden, I was nonetheless able to produce the first yield estimate for a multi-crop commercial agricultural garden in Pompeii. While the estimates produced cannot be deemed accurate due to the uncertainties related to the available data, they nonetheless demonstrate the possibilities associated with such an exercise.

The data used, when combined with the social and economic contexts of other chapters, allowed me to undertake novel explorations of ancient garden space and develop an original contribution to Pompeian and ancient economic theory. The conclusions developed also offer scope for future research in the novel demonstration that Pompeii's agricultural gardens were positively contributing to the local nutritional and economic standard of landowners, as well as local consumers. The archaeological data utilised extended beyond architectural space into material culture, with my discussion of pictorial and epigraphic

remains from Campania contributing much to wider ancient art and numismatic debates. For example, Chapter Four built upon debates around *xenia* paintings and *pinocotheca*, which formerly had not fully explored the social implications of the *subject* of ancient art, nor their original contexts.

New advances were also made around diet and nutrition when I made the first quantification of all known archaeobotanical remains from Campania to assess consumption patterns and shares. While the data was found to be generally consistent with the hypotheses of previous archaeobotanical studies, namely relating to a robust level of health and nutrition among the general population regardless of socio-economic status and a wide variety of food items being consumed,[954] several limitations with the data became clear and, until more accurate data can be obtained, represent a barrier to creating a more precise picture of the complex Pompeian diet in future studies. One such example is the incomplete records provided by previous archaeobotanical studies in the town which did not always allow accurate numbers of finds.[955] The final dataset produced was therefore only illustrative of the potential shares of rustic produce being consumed in the town, demonstrating the importance of recording, and making available, complete data for research going forward.

Nonetheless, the overall picture painted in Chapter Three did conform both to the image created by Rowan in her 2016 study and the growing demand for rustic produce attested in ancient literature, proving with certainty that rustic produce was a central part of the Pompeian diet for the majority. The comparison of these goods with their nutritional and monetary values only served to support these conclusions further. Such finds have positive implications for garden archaeology and contribute to the efforts made by Malek and Gleason, among others, to promote the importance of funding this area; often, archaeologists have not been supported with the funding, training, or storage to support the collection of all organic remains, regardless of their apparent irrelevance at the time of excavation. The outcomes of studies such as this demonstrate why it is of crucial importance that organic material is prioritised as much as objects in future Campanian excavations.

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[954] Rowan 2016.

[955] For example, Murphy, Thompson and Fuller (2013) did not provide accurate numbers of finds for the archaeobotanical remains she lists in Region VI.

Certain areas of research proved an interesting challenge in the process of this study, either due to limited data, the necessity for limiting the scope of the research, or the barriers to information created by the coronavirus pandemic. One such example was my attempt to establish the value of goods at the time of the eruption, caused by gaps in epigraphic and literary data from the town. However, by applying Bailey's approach to familiar portion sizes helped, as this provided a basis from which to match epigraphic, pictorial, and archaeobotanical records from Pompeii to literary data. Future studies would benefit from matching the same and any future records up with data from other provinces, major cities, and their ports in the Roman Empire, with the intention to better understand Imperial Roman trade operation, the increasing commercialisation of Roman centres, and the perceived commercial value of goods by geographical region across the Empire in the early Imperial period.

Where data was difficult to obtain, an added element of resourcefulness and originality was required in my approach to the available data. One area where this was especially clear was in the mapping and analysis of forty-two agricultural gardens in Pompeii (including thirty-two in Regions I and II alone), and in the application of spatial syntax analysis to agricultural garden space for the first time. Both were conducted using pre-existing cartographic and archaeological records and limited on-site research. However, the mapping and quantification of utilitarian gardens using pre-existing data led to important discoveries, including the detection of a relationship between rustic garden placement and contents (both within buildings and the urban landscape). This approach was the first of its kind in Pompeii, and contributed to ancient spatial study more widely; in highlighting that the deeper a house guest moved into a *domus*, and into the 'humble' space of the garden, I demonstrated that the higher up the scale of privilege or social standing they were deemed to be.[956] In other words, the rustic garden was a central part of domestic social customs and habits in early Imperial Pompeii. Not only this, but the outcomes of my spatial analyses supported the findings of Wallace-Hadrill, Grahame, and von Stackelberg in showing that the rustic *hortus* could simultaneously act as: a *lieux de memoire* of Roman identity, a 'private' utilitarian space used to support the household in the style of *maiores nostri*, a Thirdspace in which to dine with friends (either via renting or owning dining garden space), and as a 'humble' yet 'public' space in the *domus*.

[956] Hales 2003, 5.

In the process of mapping Pompeii's agricultural gardens, I also found that many more gardens than originally identified by Jashemski, Pesando, and Esposito were likely created after the earthquakes of AD 62/3. This led to the development of a new methodology for exploring this phenomenon in Chapter Six.[957] The aim was as such: if I could demonstrate that the majority of the gardens in Regions I and II were recent additions in the town's history, I would be able to confirm the ongoing, or growing, relevance of agricultural *horti* to the city's functioning and identity. This approach enabled me to develop upon the initial suspicions of former scholars and link the creation of new agricultural gardens in post-AD 62/3 Pompeii to a prolonged period of crisis in the city, at the same time confirming that commercial opportunities in this period made such changes both possible and successful.

Through the synthesis and presentation of two conference papers, the benefit of viewing such significant and rapid urban change as an act of resilience, rather than opportunity, became clear. Thus, the application of resilience theory to Pompeii's urban development resulted in two important outcomes: a clearly articulated demonstration of the centrality of agriculture to the urban population of Pompeii and a worked-through illustration of the major impact of green space on the landscape of the city in its final years. Neither of these conclusions had previously been drawn by any other scholars in Pompeii, and such discoveries allowed the threads of preceding discussions to be brought together to produce a newly holistic understanding of the significance of agricultural *horti* and their produce for the social, economic, and nutritional functioning of the Pompeian population. Only time would have told if the trends revealed in this thesis would have continued had the town not met its dark end in AD 79. For now, we must be content with visiting the Thirdspace of the rustic Pompeian *hortus* and endeavour to learn from afar lessons of sustainability, resourcefulness, and simple living from the Pompeians who owned, developed, cultivated, and harvested their identity and livelihoods in these spaces some 2,000 years ago.

Future study around urban agriculture in Pompeii or other cities would benefit from the application of archaeological technology, such as isovist software for more accurately spatial integration and the views of individuals in space. This would aid further analyses into

[957] Jashemski ; Pesando ; Esposito .

the visibility of *triclinia* and commercial gardens to 'strangers', as well as guests to houses with a rustic garden or gardens, allowing wider testing of my conclusions, and the diversification of the experimental data. The use of 3D technology would also help researchers to 'experience' and compare rustic and commercial garden space from the point of view of gardeners (on paths, bent over, using irrigation, on ladders, and assessing security), as well as visitors to these gardens, as *domus* guests or *triclinium* users. How did these individuals experience space? Did it differ according to who you were? What was the view of these spaces from the street? How green were Regions I and II, or were the walls too high to give the impression of a 'green' district? What impact, from the ground, did the new agricultural gardens make in comparison to the regions prior to the earthquakes of AD 62/3? Furthermore, software which allows the movement of the sun to be imprinted onto 3D space would allow gardens to be reconstructed with more accuracy, in terms of plot orientation, tree, vine, and vegetable placement, and even the workmen's walking and rest areas for shade. In this way, we may better understand how trees, buildings, and walls impacted the choices made about where crops, and more widely, gardens were planted, and determine whether yield or aesthetics were the primary motivation for planting schema.

BIBLIOGRAPHY

Ancient Sources

Aetna, Calpurnius Siculus, Publilius Syrus, Laus Pisonis, Grattius. *Minor Latin Poets, Volume I: Publilius Syrus. Elegies on Maecenas. Grattius. Calpurnius Siculus. Laus Pisonis. Einsiedeln Eclogues. Aetna.* Translated by J. Wight Duff, Arnold M. Duff. Loeb Classical Library 284. Cambridge, MA: Harvard University Press, 1934.

Anacreon. *Greek Lyric, Volume II: Anacreon, Anacreontea, Choral Lyric from Olympus to Alcman.* Edited and translated by David A. Campbell. Loeb Classical Library 143. Cambridge, MA: Harvard University Press, 1988.

Apicius. *De Re Coquinaria.* Bibliotheca Augustana. Available at: https://www.hs-augsburg.de/~harsch/Chronologia/Lspost04/Apicius/api_re00.html

Appian. Roman History, Volume IV: Civil Wars, Books 1–2. Edited and translated by Brian McGing. Loeb Classical Library 5. Cambridge, MA: Harvard University Press, 2020.

Apuleius. *Metamorphoses (The Golden Ass), Volume I: Books 1-6.* Edited and translated by J. Arthur Hanson. Loeb Classical Library 44. Cambridge, MA: Harvard University Press, 1996.

Aristotle. *Parts of Animals. Movement of Animals. Progression of Animals.* Translated by A. L. Peck, E. S. Forster. Loeb Classical Library 323. Cambridge, MA: Harvard University Press, 1937.

Arrian. *Epicteti dissertationes.* Latin & Greek. 1799.

Aristophanes. *Clouds. Wasps. Peace.* Edited and translated by Jeffrey Henderson. Loeb Classical Library 488. Cambridge, MA: Harvard University Press, 1998.

Athenaeus. *The Learned Banqueters, Volume I: Books 1-3.106e.* Edited and translated by S. Douglas Olson. Loeb Classical Library 204. Cambridge, MA: Harvard University Press, 2007.

C. Codicus – "Justinian's Code."

Cato, Varro. *On Agriculture.* Translated by W. D. Hooper, Harrison Boyd Ash. Loeb Classical Library 283. Cambridge, MA: Harvard University Press, 1934.

Catullus, Tibullus. *Pervigilium Veneris.* Translated by F. W. Cornish, J. P. Postgate, J. W. Mackail. Revised by G. P. Goold. Loeb Classical Library 6. Cambridge, MA: Harvard University Press, 1913.

Cicero. *Brutus. Orator.* Translated by G. L. Hendrickson, H. M. Hubbell. Loeb Classical Library 342. Cambridge, MA: Harvard University Press, 1939.

Cicero. *Letters to Friends*, Volume II: Letters 114-280. Edited and translated by D. R. Shackleton Bailey. Loeb Classical Library 216. Cambridge, MA: Harvard University Press, 2001.

Cicero. *Letters to Atticus, Volume I.* Translated by D. R. Shackleton Bailey. Loeb Classical Library 7. Cambridge, MA: Harvard University Press, 1999.

Cicero. *Letters to Quintus and Brutus. Letter Fragments. Letter to Octavian. Invectives. Handbook of Electioneering.* Edited and translated by D. R. Shackleton Bailey. Loeb Classical Library 462. Cambridge, MA: Harvard University Press, 2002.

Cicero. *On the Agrarian Law.* Translated by J. H. Freese. Loeb Classical Library 240. Cambridge, MA: Harvard University Press, 1930.

Cicero. *On Invention. The Best Kind of Orator. Topics.* Translated by H. M. Hubbell. Loeb Classical Library 386. Cambridge, MA: Harvard University Press, 1949.

Cicero. *On Old Age. On Friendship. On Divination.* Translated by W. A. Falconer. Loeb Classical Library 154. Cambridge, MA: Harvard University Press, 1923.

Cicero. *Philippics 1-6.* Edited and translated by D. R. Shackleton Bailey. Revised by John T. Ramsey, Gesine Manuwald. Loeb Classical Library 189. Cambridge, MA: Harvard University Press, 2010.

Cicero. *Philippics 7-14.* Edited and translated by D. R. Shackleton Bailey. Revised by John T. Ramsey, Gesine Manuwald. Loeb Classical Library 507. Cambridge, MA: Harvard University Press, 2010.

Cicero. *Pro Milone. In Pisonem. Pro Scauro. Pro Fonteio. Pro Rabirio Postumo. Pro Marcello. Pro Ligario. Pro Rege Deiotaro.* Translated by N. H. Watts. Loeb Classical Library 252. Cambridge, MA: Harvard University Press, 1931.

Cicero. *Pro Quinctio. Pro Roscio Amerino. Pro Roscio Comoedo. On the Agrarian Law.* Translated by J. H. Freese. Loeb Classical Library 240. Cambridge, MA: Harvard University Press, 1930.

Columella. *On Agriculture, Volume I: Books 1-4.* Translated by Harrison Boyd Ash. Loeb Classical Library 361. Cambridge, MA: Harvard University Press, 1941.

Cicero. *The Verrine Orations, Volume I: Against Caecilius. Against Verres, Part 1; Part 2, Books 1-2.* Translated by L. H. G. Greenwood. Loeb Classical Library 221. Cambridge, MA: Harvard University Press, 1928.

Cornelius Nepos. *On Great Generals. On Historians.* Translated by J. C. Rolfe. Loeb Classical Library 467. Cambridge, MA: Harvard University Press, 1929.

Dionysius of Halicarnassus. *Roman Antiquities, Volume I: Books 1-2.* Translated by Earnest Cary. Loeb Classical Library 319. Cambridge, MA: Harvard University Press, 1937.

Gellius. *Attic Nights, Volume I: Books 1-5.* Translated by J. C. Rolfe. Loeb Classical Library 195. Cambridge, MA: Harvard University Press, 1927.

Herodotus. *The Persian Wars, Volume I: Books 1-2.* Translated by A. D. Godley. Loeb Classical Library 117. Cambridge, MA: Harvard University Press, 1920.

Historia Augusta, *Volume I: Hadrian. Aelius. Antoninus Pius. Marcus Aurelius. L. Verus. Avidius Cassius. Commodus. Pertinax. Didius Julianus. Septimius Severus. Pescennius Niger. Clodius Albinus.* Translated by David Magie. Loeb Classical Library 139. Cambridge, MA: Harvard University Press, 1921.

Homer. *Iliad, Volume I: Books 1-12.* Translated by A. T. Murray. Revised by William F. Wyatt. Loeb Classical Library 170. Cambridge, MA: Harvard University Press, 1924.

Homer. *Odyssey, Volume I: Books 1-12.* Translated by A. T. Murray. Revised by George E. Dimock. Loeb Classical Library 104. Cambridge, MA: Harvard University Press, 1919.

Horace. *Odes and Epodes.* Edited and translated by Niall Rudd. Loeb Classical Library 33. Cambridge, MA: Harvard University Press, 2004.

Horace. *Satires. Epistles. The Art of Poetry.* Translated by H. Rushton Fairclough. Loeb Classical Library 194. Cambridge, MA: Harvard University Press, 1926.

Juvenal. *Juvenal and Persius.* Edited and translated by Susanna Morton Braund. Loeb Classical Library 91. Cambridge, MA: Harvard University Press, 2004.

Livy. *History of Rome, Volume III: Books 5-7.* Translated by B. O. Foster. Loeb Classical Library 172. Cambridge, MA: Harvard University Press, 1924.

Livy. *History of Rome, Volume IV: Books 8-10.* Translated by B. O. Foster. Loeb Classical Library 191. Cambridge, MA: Harvard University Press, 1926.

Livy. *History of Rome, Volume IX: Books 31–34.* Edited and translated by J. C. Yardley. Introduction by Dexter Hoyos. Loeb Classical Library 295. Cambridge, MA: Harvard University Press, 2017.

Lucilius. *Remains of Old Latin, Volume III: Lucilius. The Twelve Tables.* Translated by E. H. Warmington. Loeb Classical Library 329. Cambridge, MA: Harvard University Press, 1938.

Lucretius. *On the Nature of Things.* Translated by W. H. D. Rouse. Revised by Martin F. Smith. Loeb Classical Library 181. Cambridge, MA: Harvard University Press, 1924.

Macrobius. *Saturnalia, Volume I: Books 1-2.* Edited and translated by Robert A. Kaster. Loeb Classical Library 510. Cambridge, MA: Harvard University Press, 2011.

Martial. *Epigrams, Volume I: Spectacles, Books 1-5.* Edited and translated by D. R. Shackleton Bailey. Loeb Classical Library 94. Cambridge, MA: Harvard University Press, 1993.

Ovid. *Fasti.* Translated by James G. Frazer. Revised by G. P. Goold. Loeb Classical Library 253. Cambridge, MA: Harvard University Press, 1931.

Petronius, Seneca. *Satyricon. Apocolocyntosis.* Edited and translated by Gareth Schmeling. Loeb Classical Library 15. Cambridge, MA: Harvard University Press, 2020.

Plato. *Timaeus. Critias. Cleitophon. Menexenus. Epistles.* Translated by R. G. Bury. Loeb Classical Library 234. Cambridge, MA: Harvard University Press, 1929.

Plautus. *Amphitryon. The Comedy of Asses. The Pot of Gold. The Two Bacchises. The Captives.* Edited and translated by Wolfgang de Melo. Loeb Classical Library 60. Cambridge, MA: Harvard University Press, 2011.

Plautus. *Casina. The Casket Comedy. Curculio. Epidicus. The Two Menaechmuses.* Edited and translated by Wolfgang de Melo. Loeb Classical Library 61. Cambridge, MA: Harvard University Press, 2011.

Pliny the Elder. *Natural History,* Volume V: Books 17-19. Translated by H. Rackham. Loeb Classical Library 371. Cambridge, MA: Harvard University Press, 1950.

Pliny the Younger. *Letters, Volume I: Books 1-7.* Translated by Betty Radice. Loeb Classical Library 55. Cambridge, MA: Harvard University Press, 1969.

Pliny the Younger. *Letters, Volume II: Books 8-10.* Panegyricus. Translated by Betty Radice. Loeb Classical Library 59. Cambridge, MA: Harvard University Press, 1969.

Plutarch. *Lives, Volume II: Themistocles and Camillus. Aristides and Cato Major. Cimon and Lucullus.* Translated by Bernadotte Perrin. Loeb Classical Library 47. Cambridge, MA: Harvard University Press, 1914.

Plutarch. *Lives, Volume IV: Alcibiades and Coriolanus. Lysander and Sulla.* Translated by Bernadotte Perrin. Loeb Classical Library 80. Cambridge, MA: Harvard University Press, 1916.

Plutarch. *Lives, Volume VI: Dion and Brutus. Timoleon and Aemilius Paulus.* Translated by Bernadotte Perrin. Loeb Classical Library 98. Cambridge, MA: Harvard University Press, 1918.

Plutarch. *Lives, Volume VIII: Sertorius and Eumenes. Phocion and Cato the Younger.* Translated by Bernadotte Perrin. Loeb Classical Library 100. Cambridge, MA: Harvard University Press, 1919.

Plutarch. *Lives, Volume X: Agis and Cleomenes. Tiberius and Gaius Gracchus. Philopoemen and Flamininus.* Translated by Bernadotte Perrin. Loeb Classical Library 102. Cambridge, MA: Harvard University Press, 1921.

Polybius. *The Histories, Volume I: Books 1-2.* Translated by W. R. Paton. Revised by F. W. Walbank, Christian Habicht. Loeb Classical Library 128. Cambridge, MA: Harvard University Press, 2010.

Quintilian. *The Orator's Education, Volume I: Books 1-2.* Edited and translated by Donald A. Russell. Loeb Classical Library 124. Cambridge, MA: Harvard University Press, 2002.

Seneca the Elder. *Declamations, Volume I: Controversiae, Books 1-6.* Translated by Michael Winterbottom. Loeb Classical Library 463. Cambridge, MA: Harvard University Press, 1974.

Seneca the Younger. *Moral Essays, Volume I: De Providentia. De Constantia. De Ira. De Clementia.* Translated by John W. Basore. Loeb Classical Library 214. Cambridge, MA: Harvard University Press, 1928.

Seneca the Younger. *Moral Essays, Volume III: De Beneficiis.* Translated by John W. Basore. Loeb Classical Library 310. Cambridge, MA: Harvard University Press, 1935.

Seneca the Younger. *Moral Essays, Volume I: De Providentia. De Constantia. De Ira. De Clementia.* Translated by John W. Basore. Loeb Classical Library 214. Cambridge, MA: Harvard University Press, 1928.

Seneca the Younger. *Natural Questions, Volume I: Books 1-3.* Translated by Thomas H. Corcoran. Loeb Classical Library 450. Cambridge, MA: Harvard University Press, 1971.

Strabo. *Geography, Volume I: Books 1-2.* Translated by Horace Leonard Jones. Loeb Classical Library 49. Cambridge, MA: Harvard University Press, 1917.

Suetonius. *Lives of the Caesars, Volume II: Claudius. Nero. Galba, Otho, and Vitellius. Vespasian. Titus, Domitian. Lives of Illustrious Men: Grammarians and Rhetoricians. Poets (Terence. Virgil. Horace. Tibullus. Persius. Lucan). Lives of Pliny the Elder and Passienus Crispus.* Translated by J. C. Rolfe. Loeb Classical Library 38. Cambridge, MA: Harvard University Press, 1914.

Tacitus. *Histories: Books 4-5. Annals: Books 1-3.* Translated by Clifford H. Moore, John Jackson. Loeb Classical Library 249. Cambridge, MA: Harvard University Press, 1931.

Terence. *The Woman of Andros. The Self-Tormentor. The Eunuch.* Edited and translated by John Barsby. Loeb Classical Library 22. Cambridge, MA: Harvard University Press, 2001.

Theocritus, Moschus, Bion. *Theocritus. Moschus. Bion.* Edited and translated by Neil Hopkinson. Loeb Classical Library 28. Cambridge, MA: Harvard University Press, 2015.

Theophrastus. *De Causis Plantarum, Volume I: Books 1-2.* Translated by Benedict Einarson, George K. K. Link. Loeb Classical Library 471. Cambridge, MA: Harvard University Press, 1976.

Theophrastus, Herodas, Sophron. *Characters. Herodas: Mimes. Sophron and Other Mime Fragments.* Edited and translated by Jeffrey Rusten, I. C. Cunningham. Loeb Classical Library 225. Cambridge, MA: Harvard University Press, 2003.

Valerius Maximus. *Memorable Doings and Sayings, Volume I: Books 1-5.* Edited and translated by D. R. Shackleton Bailey. Loeb Classical Library 492. Cambridge, MA: Harvard University Press, 2000.

Varro. *On the Latin Language, Volume I: Books 5-7.* Translated by Roland G. Kent. Loeb Classical Library 333. Cambridge, MA: Harvard University Press, 1938.

Varro. *On Agriculture*. Translated by W. D. Hooper, Harrison Boyd Ash. Loeb Classical Library 283. Cambridge, MA: Harvard University Press, 1934.

Vergil. *Aeneid: Books 7-12. Appendix Vergiliana.* Translated by H. Rushton Fairclough. Revised by G. P. Goold. Loeb Classical Library 64. Cambridge, MA: Harvard University Press, 1918.
Vergil. *Eclogues*. *Georgics*. Aeneid: Books 1-6. Translated by H. Rushton Fairclough. Revised by G. P. Goold. Loeb Classical Library 63. Cambridge, MA: Harvard University Press, 1916.
Vitruvius. *On Architecture*, Volume I: Books 1-5. Translated by Frank Granger. Loeb Classical Library 251. Cambridge, MA: Harvard University Press, 1931.
Xenophon. *Memorabilia. Oeconomicus. Symposium. Apology.* Translated by E. C. Marchant, O. J. Todd. Revised by Jeffrey Henderson. Loeb Classical Library 168. Cambridge, MA: Harvard University Press, 2013.

Modern Sources

(2021) Self-sufficient. *Cambridge Dictionary*. Cambridge.
Abo-El-Ez, A., et al. (2013) Growth and Productivity of Three Fig (Ficus carica L.) Cultivars Grown Under Upper Egypt Conditions. *Australian Journal of Basic and Applied Sciences*.
Agrifarming (2020) *Hazelnut Farming, Cultivation, and Production*. Available at: https://www.agrifarming.in/hazelnut-farming-cultivation-and-production.
Aicher, P. (2004) *Rome Alive: A Source Guide to the Ancient City*. Bolchazy-Carducci.
Alfrey, P. (2019) *Everything you Need to Know about Growing Grapes*. Available at: https://www.permaculture.co.uk/articles/everything-you-need-know-about-growing-grapes.
Allevato, E., et al. (2010) Pollen-wood analysis at the Neapolis harbour site (1st–3rd century AD, southern Italy) and its archaeobotanical implications. *Journal of Archaeological Science* 37(9): 2365-2375.
Allison, P.M. (2008) *Pompeian Households: An Analysis of Material Culture*. London: Cotsen Institute of Archaeology Press.
Alston, R. (2008) History and Memory in the Construction of Identity in Early Second-Century Rome. *Memoirs of the American Academy in Rome. Supplementary Volumes* 7: 147-159.
Altieri, M., et al. (1999) The Greening of the 'Barrios': Urban Agriculture for Food Security in Cuba. *Agriculture and Human Values* 16(2): 131-140.
Anderson, M. (2011) Disruption or continuity? The spatio-visual evidence of post earthquake Pompeii. In: Poehler E, Flohr M and Cole K (eds) *Pompeii: art, industry and infrastructure*. Oxford: Oxbow Books, pp.74-87.
Andreau, J. (2000) Les marchés hebdomaires du Latium et de Campanie au 1er siècle ap. J.-C. *Lo Cascio*. 69-91.
Assman, A. (1995) Collective Memory and Cultural Identity. *New German Critique* 65: 125-133.
Assman, A. (2006) Memory, Individual and Collective. In: Goodin RE and Tilly C (eds) *The Oxford Handbook of Contextual Political Analysis*. Oxford: Oxford Handbooks Online.
Assman, J. (1997) *Moses the Egyptian. The Memory of Egypt in Western Monotheism*. Cambridge: Harvard University Press.

Assmann, J. (1999) *Cultural Memory & Western Civilisation: Functions, Media, Archives*. Cambridge: Cambridge University Press.

Assmann, J. (2003) Cultural Memory: Script, Recollection, and Political Identity in Early Civilizations. *Historiography East and West* 1(2): 154-177.

Assmann, J. and Czaplicka, J. (1995) Collective Memory and Cultural Identity. *New German Critique* 65: 125-133.

Austen-Perry, V. (2019) '*(Re)Framing the Hortus: An Analysis of the Boundaries of the Roman Garden in the Late Republic and Early Empire*', PhD Thesis, King's College London, London.

Baadsgaard, A., et al. (2011) Breathing new life into the evidence of death. *Contemporary approaches to bioarchaeology*.

Bagnall, R.S. (1993) *Egypt in Late Antiquity*. Princeton: Princeton University Press.

Bagnall, R.S. (2001) A Heavy Artaba and its Ninety-Six Loaves. *Alexandrian Studies II, in honour of Mostafa el Abbadi*.

Baker, P. (2018) Identifying the connection between Roman conceptions of 'Pure Air' and physical and mental health in Pompeian gardens (c.150 BC–AD 79): a multi-sensory approach to ancient medicine. *World Archaeology* 50(3): 404-417.

Baker, S. and Marano, Y.A. (2017) Demolition Laws in an Archaeological Context. Legislation and Architectural Re-Use in the Roman Building Industry. In: P. Pensabene MM, F. Caprioli (ed) *Decor. Decorazione e architettura nel mondo romano*. Roma: Thiasos Monografie, 833-850.

Bannon, C. (2009) *Gardens and Neighbors: Private Water Rights in Roman Italy*. New Haven: University of Michigan Press.

Barthel, S. and Isendahl, C. (2013) Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. *Ecological Economics* 86: 224-234.

Beard, M. (2008) *Pompeii: The Life of a Roman Town*. London: Profile Books.

Becker, W.A. (2010) *Gallus or, Roman Scenes of the Time of Augustus*. Cambridge University Press.

Beerden, K. (2018) Textual evidence: Roman reflections of realities. *The Routledge Handbook of Diet and Nutrition in the Roman World*. London: Routledge, pp.17-25.

Berardi, J. and Heroux, M. (2021) *The Encyclopedia of Food*. Available at: https://www.precisionnutrition.com/encyclopedia/food/olives.

Bergmann, B. (1994) The Roman House as Memory Theater: The House of the Tragic Poet in Pompeii. *The Art Bulletin* 76(2): 225-256.

Bergmann, B. (2018) Frescoes in Roman Gardens. *Gardens of the Roman Empire*. pp.278-316.

Berry, J. (2007) *The Complete Pompeii*. London: Thames and Hudson Ltd.

Betts, E. (2011) Towards a multisensory experience of movement in the City of Rome. In: Newsome D (ed) *Rome, Ostia and Pompeii: Movement and Space*. Oxford: OUP, pp.118-132.

Betts, E. (2017a) Introduction: Senses of empire. In: Betts E (ed) *Senses of the Empire : Multisensory Approaches to Roman Culture*. London: Taylor & Francis Group.

Betts, E. (2017b) The multivalency of sensory artefacts in the city of Rome. In: Betts E (ed) *Senses of the Empire: Multisensory Approaches to Roman Culture*. London: Taylor & Francis Group, pp.23-38.

Betts, E. (2017c) *Senses of the Empire: Multisensory Approaches to Roman Culture*. London: Routledge.

Biggs, R., et al. (2015) *Principles for building resilience: Sustaining ecosystem services in social-ecological systems*. Cambridge: Cambridge University Press.
Bird, J. (2004) Incense in Mithraic ritual: the evidence of the finds. In: Martens M and Boe GD (eds) *Roman Mithraism, the Evidence of the Small Finds*. Brussels: Museum Het Toreke, pp.191-199.
Bisel, S. (1988) Nutrition in First Century Herculaneum. *Anthropologie (Brno)* 26(1): 61-66.
Bisel, S. and Bisel, J. (2002) Health and nutrition at Herculaneum : an examination of human skeletal remains. *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Bodel, J. (2017) Roman Tomb Gardens. *Gardens of the Roman Empire*. pp.199-242.
Borgongino, M. (2006) Archeobotanica. Reperti Vegetali da Pompei e dal territorio vesuviano. *Studi della Soprintendenza Archeologica di Pompei*.(16): 232.
Bourbou, C. (2018) The Bioarchaeology of Roman Diet. *The Routledge Handbook of Diet and Nutrition in the Roman World*. London: Routledge, pp.77-90.
Bourbou, C., et al. (2019) Babes, bones, and isotopes: A stable isotope investigation on nonadults from Aventicum, Roman Switzerland (first–third century CE). *International Journal of Osteoarchaeology* 29(6): 974-985.
Bourdieu, P. (1990) *The Logic of Practice*. Cambridge: Polity.
Bowe, P. (2004) *Gardens of the Roman World*. Los Angeles: Getty Publications.
Bowe, P. (2010) The evolution of the ancient Greek garden. *Studies in the History of Gardens & Designed Landscapes* 30(3): 208-223.
Bowman, A. and Wilson, A. (2009) *Quantifying the Roman Economy: Methods and Problems*. Oxford: Oxford University Press.
Brown, A., et al. (2012) From practice to theory: Emerging lessons from Asia for building climate change resilience. *Environment and Urbanisation* 24(2): 531–556.
Brown, K. (2012) Policy discourses of resilience. In: Pelling M, Manuel-Navarrete D and Redclift M (eds) *Climate Change and the Crisis of Capitalism*. Abingdon: Routledge, pp.37–50.
Brundrett, N. (2011) Roman Tomb Gardens: The Construction of Sacred Commemorative Landscapes. *The Brock Review* 11(2): 51-69.
Brunt, P. (1988) *Amicitia in the late Roman Republic. In The fall of the Roman Republic and related essays*. Oxford: Oxford University Press.
Bryson, N. (1990) *Looking at the Overlooked: Four Essays on Still Life Painting*. London: Reaktion Books.
Bui Thi Mai, G. (2014) Citrus (Rutaceae) was present in the Western Mediterranean in antiquity. In: Chevalier A, Marinova E and Peña-Chocarro L (eds) *Plants and people: Choices and diversity through time*. Oxford: Oxford University Press, 170-174.
Buikstra, J.E. and Beck, L.A. (2009) *Bioarchaeology. The Contextual Analysis of Human Remains*. London: Routledge.
Bullock, J.M., et al. (2017) Resilience and food security: rethinking an ecological concept. *Journal of Ecology* 105(4): 880-884.
Buongiorno, P. (2010) CIL X 1401 e il senatus consultum 'Osidiano. *Iura. Rivista Internazionale di Diritto Romano e Antico* 58: 234-251.
Burayidi, M.A., et al. (2019) The Routledge Handbook of Urban Resilience. London: Routledge.
Burton, P.J. (2011) *Friendship and empire: Roman diplomacy and imperialism in the middle republic (353–146 BC)*. Cambridge: Cambridge University Press.

Campanioni, N., et al. (1996) La Agricultura Urbana en Cuba: su participación en la seguridad alimentaria. *Proceedings III Encuentro Nacional de Agricultura Organica*.
Campbell, V. (2008) Stopping to Smell the Roses: Garden Tombs in Roman Italy. *Arctos* 42: 31-44.
Campbell, V.L. (2010) The epitaph of Aulus Umbricius Scaurus (CIL X 1024): a reconsideration. *Zeitschrift für Papyrologie und Epigraphik* 174: 229-236.
Camps-Calvet, M., et al. (2015) Sowing Resilience and Contestation in Times of Crises: The Case of Urban Gardening Movements in Barcelona. *The Open Journal of Sociopolitical Studies* 8(2): 417–442.
Capasso, L. (2001) *I Fuggiaschi di Ercolano: Paleobiologia della Vittime dell'Eruzione Vesuviana del 79 d.C*. Roma: L'Erma di Bretscheider.
Carandini, A. (1988) Domus e insulae sulla pendice settentrionale del Palatino. *L'Erma di Bretschneider*. pp.263-278.
Carlà, F. and Gori, M. (2014) Gift Giving and the 'Embedded' Economy in the Ancient World. *Akademiekonferenzen*. Heidelberg: Universitätsverlag Winter.
Carpenter, S., et al. (2001) From Metaphor to Measurement: Resilience of What to What? *Ecosystems* 4: 765–781.
Carpenter, S.R. and Folke, C. (2006) Ecology for transformation. *Trends in Ecology and Evolution* 21(6): 309-315.
Casson, L. (1980) The Role of the State in Rome's Grain Trade. *Memoirs of the American Academy in Rome. Supplementary Volumes* 36: 21-33.
Celant, A. and Fiorentino, G. (2017) Macroremains of citrus fruit in Italy. *Agrumed: Archaeology and History of Citrus Fruit in the Mediterranean*. 205-211.
Christaller, W. (1933) *Die zentralen Orte in Süddeutschland*. Fischer, Jena.
Christaller, W. (1950) Das Grundgerüst der räumlichen Ordnung in Europa: Die Systeme der europäischen zentralen Orte. *Frankfurter Geographische Hefte* 24(1).
Ciaraldi, M. (2007) *People & Plants in Ancient Pompeii: A New Approach to Urbanism from the Microscope Room (The Use of Plant Resources at Pompeii and in the Pompeian area from the 6th Century BC to AD 79)*. London: Accordia Research Institute.
Ciaraldi, M. (2008) *People and Plants in Ancient Pompeii: A New Approach to Urbanism from the Microscope Room*. London: Accordia Research Institute.
Ciaraldi, M. and Richardson, J. (2000) Food, Ritual and Rubbish in the Making on Pompeii. *Theoretical Roman Archaeology Journal* 0(1999).
Ciarallo, A. (2004) *Flora pompeiana*. Roma: L'Erma di Bretschneider.
Ciarallo, A. (2013) *The Ancient Gardens of Pompeii*. London: Artstur.
Ciarallo, A. and Carolis, E.D. (2001) *La casa di Giulio Polibio: Studi interdisciplinari*. Centro Studi Arti Figurative, Universita di Tokio.
Cicirelli, C. and Livadie, V.A. (2012) *L'Abitato Protostorico Di Poggiomarino: Localita Longola Campagne Di Scavo 2000-2004: 32 (Studi Della Soprintendenza Archeologica Di Pompei)*. L'Erma Di Bretschneider.
Cima, M. and Rocca, E.L. (1998a) *Horti Romani*. L'Erma di Bretschneider.
Cima, M. and Rocca, E.L. (1998b) *Horti Romani: Atti del Convegno. Roma 1995*. Roma: L'Erma Di Bretschneider.
Clarke, J.R. (2003) *Art in the Lives of Ordinary Romans: Visual Representation and Non-Elite Viewers in Italy, 100 B.C.-A.D. 315*. Berkeley: University of California Press.
Clarke, J.R. and Muntasser, N.K. (2019) *Oplontis: Villa A ("of Poppaea") at Torre Annunziata, Italy. Volume 2. The Decorations: Painting, Stucco, Pavements, Sculptures*. New York: The Oplontis Project.

Clements, P. and Clements, M. (n.d.) *Map of Herculaneum*.
Confino, A. (1997) Collective Memory and Cultural History: Problems of Method. *The American Historical Review* 102(5).
Connerton, P. (1989) *How Societies Remember*. Cambridge: Cambridge University Press.
Connerton, P. (2006) Cultural memory. *Handbook of Material Culture*. London: SAGE Publications, pp.315-324.
Cook, K.D. and Foulk, R. (2013) Gardens and the Larger Landscape. In: Gleason K (ed) *A Cultural History of Gardens in Antiquity*. London: Bloomsbury.
Cooley, A.E. and Cooley, M.G.L. (2004) *Pompeii: A Sourcebook*. London: Routledge.
Cooper, K. (2007) Visibility, Exposure and Private Power in the Roman "Domus". *Past & Present* 197: 3-33.
Cote, M. and Nightingale, A.J. (2011) Resilience thinking meets social theory: Situating social change in socio-ecological systems (SES) research. *Progress in Human Geography* 36(4): 475–489.
Coubray, S., et al. (2010) The earliest remains of a Citrus fruit from a western Mediterranean archaeological context? A microtomographic-based re-assessment. *Comptes Rendus Palevol* 9(6-7): 277-282.
Croisille, J.-M. (1965) Les Natures Mortes Campaniennes. *Latomus*.
Croisille, J.-M. (2015) *Natures Mortes dans la Rome Antique*. Paris: Picard.
Crook, Z.A. (2013) Fictive Giftship and Fictive Friendship in Greco-Roman Society. In: Satlow M (ed) *The Gift in Antiquity*. Chichester, West Sussex: John Wiley & Sons Ltd. , pp.61-76.
Crummy, N. (2010) Bears and coins: the iconography of protection in Late Roman infant burials. *Britannia* 41: 37-93.
Curtis, R. (1979) The garum shop of Pompeii. *Cronache Pompeiane* 31: 5-23.
Curtis, R.I. (1984) A Personalized Floor Mosaic from Pompeii. *American Journal of Archaeology* 88: 557-566.
Curtis, R.I. (1988) Spanish trade in salted fish products in the 1st and 2nd centuries AD. *International Journal of Nautical Archaeology* 17(3): 205-210.
Curtis, R.I. (1991) *Garum and Salsamenta: Production and Commerce in Materia Medica*. Brill.
D'Arms, J. (1979) *Romans on the Bay of Naples: A Social and Cultural Study of the Villas and Their Owners from 150 B.C. to A.D. 400*. Harvard: Harvard University Press.
D'Arms, J. (1990) The Roman Convivium and the Idea of Equality. In: Murray O (ed) *Sympotica: A Symposium on the Symposion*. Oxford: Oxford University Press, pp.308-320.
Dalley, S. (1993) Ancient Mesopotamian Gardens and the Identification of the Hanging Gardens of
Babylon Resolved. *Garden History* 21(1): 1-13.
Dang, K. (2010) Rome and the Sabine 'Farm': Aestheticism, Topography, and the Landscape of Production. *Phoenix* 64: 102-127.
Davies, P.J.E. (2012) Pollution, propriety and urbanism in Republican Rome. In: Bradley M and Stow K (eds) *Rome, Pollution and Propriety: Dirt, Disease and Hygiene in the Eternal City from Antiquity to Modernity*. Cambridge: Cambridge University Press, pp.67-80.
Davis, M. (1990) *City of Quartz: Excavating the Future in Los Angeles* Verso Books.
Davis, W. (1998) *Ancient History Sourcebook: The Manner of Roman Charity*. New York: Fordham University.

De Angelis, F., et al. (2020) Food at the heart of the Empire: dietary reconstruction for Imperial Rome inhabitants. *Archaeological and Anthropological Sciences* 12.
De Caro, S. (1999) *Still Lifes from Pompeii*. Naples.
de Certeau, M. (1984) *The Practice of Everyday Life*. Berkeley: University of California Press.
De Ligt, L. (1993) *Fairs and Markets in the Roman Empire. Economic and Social Aspects of Periodic Trade in Pre-Industrial Society*. Amsterdam: Gieben.
de Ligt, L. and de Neeve, P. (1988) Ancient periodic markets: festivals and fairs. *Athenaeum* 76.
De Sena, E.C. and Ikäheimo, J.P. (2003) The Supply of Amphora-Borne Commodities and Domestic Pottery in Pompeii 150 BC-AD 79: Preliminary Evidence from the House of the Vestals. *European Journal of Archaeology* 6(3): 301-321.
De Simone, G.F. (2016) The Agricultural Economy of Pompeii
. *The Economy of Pompeii*. Oxford: Oxford University Press, pp.23-49.
della Corte, M. (1965) *Case ed abitanti di Pompei*. Napoli: Faustino Fiorentino.
Desouza, K. and Flanery, T. (2013) Designing, planning, and managing resilient cities: A conceptual framework. *Cities* 35: 89-99.
Dianigo (2020) *Place Settings at the Last Supper in the Gospel of John*. Available at: https://blog.dianoigo.com/2020/05/.
Dictionary, C. (2022) *'Public'*. (accessed 3 January 2022).
Dimbleby, G.W. and Grüger, E. (2002) Pollen analysis of soil samples from the AD 79 level : Pompeii, Oplontis, and Boscoreale. In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Dobbins, J.J. (2007) The Forum and its Dependencies. In: Dobbins JJ and Foss P (eds) *The World of Pompeii*. London: Routledge.
Donahue, J.F. (2003) Toward a Typology of Roman Public Feasting. *The American Journal of Philology* 124(3): 423-441.
Donahue, J.F. (2015) *Food and Drink in Antiquity: A Sourcebook: Readings from the Graeco-Roman World*. London: Bloomsbury Academic.
Donahue, J.F. (2016) Culinary and Medicinal Uses of Wine and Olive Oil. *A Companion to Science, Technology, and Medicine in Ancient Greece and Rome*. John Wiley & Sons, Inc.
Doody, A. (2007) Virgil the Farmer? Critiques of the Georgics in Columella and Pliny. *Classical Philology* 102(2): 180-197.
Dougherty, C., et al. (2014) Napa Mops Up Wine and Tallies Its Losses After Quake. *The New York Times*.
Drogula, F.K. (2012) Heredium. *The Encyclopedia of Ancient History*.
Dunbabin, K.M.D. (2003) *The Roman Banquet: Images of Conviviality*. Cambridge: Cambridge University Press.
Duncan-Jones, R. (1974) *The Economy of the Roman Empire: Quantitative Studies*. New York: Cambridge University Press.
Duncan-Jones, R. (2008) Payment of Dinner-Guests at Rome. *Latomus* 67(1): 138-148.
Duncan-Jones, R. (2016) *Power and Privilege in Roman Society*. Cambridge: Cambridge University Press.
Dwyer, E. (2010) *Pompeii's Living Statues*. Ann Arbor: University of Michigan Press.
Edwards, C. (1994) *The Politics of Immorality in Ancient Rome*. Cambridge: Cambridge University Press.

Eighmy, T.H. (1972) Rural Periodic Markets and the Extension of an Urban System: A Western Nigeria Example. *Economic Geography* 48(3): 299-315.
Ellis, S. (2004) The Pompeian bar: archaeology and the role of food and drink outlets in an ancient community. *Food and History* 2(1): 41-58.
Ellis, S. (2018) *The Roman Retail Revolution: The Socio-Economic World of the Taberna*. Oxford: OUP.
Ellis, S., et al. (2011a) The 2010 Field Season at I.1.1-10, Pompeii: Preliminary report on the excavations. *The Journal of FASTI Online*.
Ellis, S., et al. (2011b) The 2010 field season at I.1.1-10, Pompeii: preliminary report on the excavations" in Fasti On Line Documents & Research. *Fasti On Line Documents & Research* 220.
Ellis, S. and Pardini, G. (2015) Pompei. Lo scavo delle Regiones VIII.7.1-15 e I.1. *Notiziario del Portale Numismatico dello Stato* 7.
Elsner, J. (1995) *Art and the Roman viewer: the transformation of art from the pagan world to Christianity*. Cambridge: Cambridge University Press.
Elsner, J. (2006) Classicism in Roman Art. In: Porter JI (ed) *Classical Pasts: The Classical Traditions of Greece and Rome*. Princeton and Oxford: Princeton University Press.
Elsner, J. and Meyer, M. (2014) Art and Rhetoric in Roman Culture. Cambridge: Cambridge Univeristy Press.
Elsner, J. and Squire, M. (2015) Sight and Memory: The visual art of Roman mnemonics. *Sight and the Ancient Senses*. London: Taylor & Francis Group.
Erdkamp, P. (2001) Beyond the Limits of the'Consumer City'. A Model of the Urban and Rural Economy in the Roman World. *Historia: Zeitschrift fur Alte Geschichte* 50(3): 332-356.
Erdkamp, P. (2005) *The grain market in the Roman Empire: A social, political and economic study*. Cambridge: Cambridge University Press.
Erdkamp, P. (2012) Urbanism. In: Scheidel W (ed) *The Cambridge Companion to the Roman Economy*. Cambridge: Cambridge University Press.
Ermolli, E.R., et al. (2022) The pollen record from Grotta Romanelli (Apulia, Italy): New insight for the Late Pleistocene Mediterranean vegetation and plant use. *Review of Palaeobotany and Palynology* 297.
Ermolli, E.R., et al. (2014a) Evidence of human-induced morphodynamic changes along the Campania coastal areas (southern Italy) since the 3rd-4th cent. AD. *EGU General Assembly Conference Abstracts*. 473.
Ermolli, E.R., et al. (2014b) The natural and cultural landscape of Naples (southern Italy) during the Graeco-Roman and Late Antique periods. *Journal of Archaeological Science* 42: 399-411.
Eschebach, H. (1970) Stadtplan von Pompeji. Kerle: Heidelberg.
Espectador, E. (2020) *Huertas urbanas, alternativa para cosechar en medio de la ciudad*. Available at: https://www.elespectador.com/noticias/medio-ambiente/huertas-urbanas-alternativa-para-cosechar-en-medio-de-la-ciudad-articulo-919338/ (accessed 14 May 2020).
Esposito, D. (2018) La polvere sotto il tappeto. Considerazioni sul problema dello smaltimento dei rifiuti a Pompei. In: Bosso R and Nuzzo E (eds) *Symplegmata: Studi di archeologia dedicati a Simona Minichino*. Naples: Giannini Editore, pp.191-234.
Evans, R. (2003) Searching for Paradise: Landscape, Utopia, and Rome. *Arethusa* 36(3): 285-307.

Fabre, C. (2017) Humanitarian Development Coherence. *OECD: World Humanitarian Summit, Putting Policy into Practice*.
Fagan, G.G. (2002) *Bathing in Public in the Roman World*. Michigan: University of Michigan Press.
Falkner, T.M. and de Luce, J. (1989) *Old Age in Greek and Latin Literature*. Albany: State University of New York Press.
FAO (2004) *Energy Requirements of Adults*. Available at: https://www.fao.org/3/y5686e/y5686e07.htm.
Farrar, L. (1998) *Ancient Roman Gardens*. Sutton Publishing.
Favro, D. (1996) *The Urban Image of Augustan Rome*. Cambridge: Cambridge University Press.
Fentress, E. (2005) On the Block: Catastae, chalcidia and cryptae in Early Imperial Italy. *Journal of Roman Archaeology* 18: 220-234.
Ferris, I.M. (1999) Invisible Architecture - Roman Memory. *TRAC*. DOI: http://doi.org/10.16995/TRAC1993_191_199.
Ferriss-Hill, J.L. (2015) *Roman Satire and the Old Comic Tradition*
. Cambridge: Cambridge University Press.
Filocamo, F., et al. (2018) Roman Builders Facing the Risk of Disaster: Coupling Archaeological and Geochemical Analyses on a Section of the 'Aqua Augusta' (the Roman Serino Aqueduct, Southern Italy). Archaeological and geochemical analyses on the 'Aqua Augusta'. *Archaeometry* 60(5): 915-932.
Finley, M.I. (1977) The Ancient City: From Fustel de Coulanges to Max Weber and Beyond. *Comparative Studies in Society and History* 19(3): 305-327.
Fitzgerald, W. (1996) Labor and the Laborer in Latin Poetry: The Case of the Moretum. *Arethusa* 29(3): 389-418.
Fitzgerald, W. (2007) *Martial: the World of the Epigram*. Chicago: Chicago University Press.
Fitzgerald, W. and Spentzou, E. (2018) The Production of Space in Latin Literature. Oxford: OUP.
Flint-Hamilton, K.B. (1999) Legumes in ancient Greece and Rome: food, medicine, or poison? *Hesperia* 68(3): 371–385.
Flohr, M. (2012) Working and living under one roof: workshops in Pompeian atrium houses. In: Anguissola A (ed) *Privata Luxuria: Towards an Archaeology of Intimacy*. Munich, pp.51-72.
Flohr, M. (2013) Review of Mayer, E., 'The Ancient Middle Classes. Urban Life and Aesthetics in the Roman Empire 100 BCE - 250 CE'. *Journal of Roman Studies* 103: 308-309.
Flohr, M. (2016) Quantifying Pompeii. *Economy of Pompeii*. pp.53-84.
Flohr, M. (2019) Artisans and Markets: The Economics of Roman Domestic Decoration. *American Journal of Archaeology* 123(1): 101-125.
Flohr, M. (2020) *Urban Space and Urban History in the Roman World*. London: Taylor Francis.
Flohr, M. and Wilson, A. (2016) The Economy of Pompeii. Oxford: Oxford University Press.
Folke, C., et al. (2010) Resilience Thinking: Integrating Resilience, Adaptability and Transformability. *Ecology and Society* 15(4).
Foote, N. (2019) *How to Grow, Plant, and Care for Almond Trees*. Available at: https://gardenerspath.com/plants/nut-trees/growing-almonds/.

Forum, W.C.C. (2021) *% of public green space (parks and gardens)*. Available at: http://www.worldcitiesculturefforum.com/data/of-public-green-space-parks-and-gardens.
Foss, P. (1994) KITCHENS AND DINING ROOMS AT POMPEII:
THE SPATIAL AND SOCIAL RELATIONSHIP
OF COOKING TO EATING IN THE ROMAN HOUSEHOLD.
Foucault, M. (1986) Of Other Spaces. *Diacritics* 16(1): 22-27.
Fox, A. (2021) Mitigating Pollution in Ancient Rome's Green Spaces. *New Classicists* 4: 2-11.
Foxhall, L. (1990) The Dependent Tenant: Land Leasing and Labour in Italy and Greece. *The Journal of Roman Studies* 80: 97-114.
Foxhall, L. (2007) *Olive Cultivation in Ancient Greece. Seeking the Ancient Economy*. Oxford: Oxford University Press.
Foxhall, L. (2013) *Studying Gender in Classical Antiquity*. Cambridge: Cambridge University Press.
Foxhall, L. and Forbes, H.A. (1982) *Σιτομετρεία: The Role of Grain as a Staple Food in Classical Antiquity*. Beck, C.H.
Frass, M. (2006) '*Antike römische Gärten: soziale und wirtschaftliche Funktionen der Horti Romani*'. Horn, Wien.
Frayn, J.M. (1993) *Markets and Fairs in Roman Italy*. Oxford: Oxford University Press.
Frier, B.W. (1980) *Landlords and Tenants in Imperial Rome*. Princeton: Princeton University Press.
Galinsky, K. (2014) *Memoria Romana: Memory in Rome and Rome in Memory (Supplements to the Memoirs of the American Academy in Rome)*. University of Michigan Press.
Galinsky, K. (2015) *Memory in Ancient Rome and Early Christianity*.
Galsterer, H. (2006) *Rom und Italien vom Bundesgenossenkrieg bis zu Augustus*. Frankfurt: Verlag Antike.
Gardelli, P. and Howe, T.N. (2016) Excavations and Documentation 2007 to Present. In: Gleason K, Gardelli P and Cominesi AR (eds) *Excavation and Study of the Garden of the Great Peristyle of the Villa Arianna, Stabiae, 2007-2012, Quaderni di Studi Pompeiani 7/2016*. pp.21-24.
GardenForumHorticulture (2009) *Square Foot Veg Growing: Plant Spacing, Cropping Time & Yield*. Available at: https://gardenforumhorticulture.co.uk/gyo/Square-Foot-Gardening.pdf (accessed 13 March).
Gardner, J.F. and Wiedemann, T. (1991) *The Roman Household: A Sourcebook*. London: Routledge.
Gargola, D.J. (2012) Centuriation. *The Encyclopedia of Ancient History*.
Garnsey, P. (1987) Urban Property Investment. In: Finley MI (ed) *Studies in Roman Property*. Cambridge: Cambridge University Press, pp.123-136.
Garnsey, P. (1999) *Food and Society in Classical Antiquity*. Cambridge: Cambridge University Press.
Garnsey, P. (2009) Mass diet and nutrition in the city of Rome. In: Scheidel W (ed) *Cities, Peasants and Food in Classical Antiquity: Essays in Social and Economic History*. Cambridge: Cambridge University Press, pp.226-252.
Garnsey, P. and Whittaker, C.R. (1983) Trade and Famine in Classical Antiquity. *Cambridge Philological Society*. Cambridge: Cambridge University Press.
Geels, F.W. (2010) Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy* 39: 495-510.

Geertman, H. (2007) The Urban Development of the Pre-Roman City. In: Dobbins JJ and Foss PW (eds) *The World of Pompeii*. London: Routledge, pp.82-97.
Geraci, G. (2018) Feeding Rome: The Grain Supply. In: Holleran C and Claridge A (eds) *A Companion to the City of Rome*. New Jersey: John Wiley & Sons Ltd., pp.219-245.
Giesecke, A. (2007) *Greece and the Garden*. Washington, DC: Center for Hellenic Studies.
Gleason, K. (2009) Digging Ancient Gardens. *Foundation for Landscape Studies* 9-11.
Gleason, K. (2013a) *A Cultural History of Gardens in Antiquity*.
Gleason, K. (2013b) Special Considerations in Excavating a Garden. In: Malek A-A (ed) *Sourcebook for Garden Archaeology : Methods, Techniques, Interpretations and Field Examples*. 1 ed. Bern: Peter Lang AG, pp.197-216.
Gleason, K.L. (2019) The lost dimension: pruned plants in Roman gardens. *Vegetation History and Archaeobotany* 28(3): 311-325.
Gleason, K.L. and Palmer, M.A. (2018) Constructing the Ancient Roman Garden. *Gardens of the Roman Empire*. pp.369-401.
Gold, B.K. and Donahue, J.F. (2005) *Roman Dining*. Baltimore: The John Hopkins University Press.
Goldhill, S. (1991) *The Poet's Voice: Essays on Poetics and Greek Literature*. Cambridge: University Press.
Gowers, E. (2000) *The Loaded Table: Representations of Food in Roman Literature*. USA: OUP.
Gowers, E. (2014) Vegetable Love: Virgil, Columella, and Garden Poetry. *Ramus* 29(2): 127-148.
Graeber, D. (2001) *Toward an Anthropological Theory of Value: The False Coin of Our Own Dreams*. Palgrave Macmillan US.
Grahame, M. (1997) Public and Private in the Roman House: Investigating the Social Order of the Casa del Fauno. In: Laurence R and Wallace-Hadrill A (eds) *Domestic Space in the Roman World: Pompeii & Beyond (Journal of Roman Archaeology Supplementary Series)*. Cambridge: Cambridge Core.
Grahame, M. (2000) *Reading Space: Social Interaction and Identity in the Houses of Roman Pompeii*. Oxford: Archaeopress.
Grasso, A.M., et al. (2017) Quantitative evaluation of modern Citrus seed shape and comparison with archaeological remains discovered in Pompeii and Rome. *Agrumed: Archaeology and History of Citrus Fruit in the Mediterranean*.
Greenberg, J. (2018) *The Cambridge Introduction to Satire*. Cambridge: Cambridge University Press.
Grimal, P. (1969) *Les jardins romains*. Paris: Presses Universitaires de France.
Grüger, E. (2002) Pollen analysis of soil samples from the A.D. 79 level. Boscoreale, Oplontis, and Pompeii. . In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press, pp.189-216.
Haeckl, A.E. and Gazda, E.K. (2010) *Roman Art in the Private Sphere: New Perspectives on the Architecture and Decor of the Domus, Villa, and Insula*. Michigan: University of Michigan Press.
Hales, S.J. (2003) *The Roman House and Social Identity*. Cambridge: Cambridge University Press.
Haley, E.W. (1990) The Fish Sauce Trader L. Iunius Puteolanus. *Zeitschrift für Papyrologie und Epigraphik* 80: 72–78.
Hanses, M. (2020) Men among Monuments: Roman Topography and Roman Memory in Plautus' Curculio. *Classical Philology* 115(4): 630-658.

Harl, K.W. (1996) *Coinage in the Roman economy, 300 B.C. to A.D. 700*. Maryland: Johns Hopkins University Press.
Harland, P.A. (2014) Review of Mayer, E., 'The Ancient Middle Classes. Urban Life and Aesthetics in the Roman Empire 100 BCE - 250 CE'. *Canadian Journal of History*, 49. (accessed 18 October 2020).
Harper, D. (2021) **gher- (1)*. Available at: https://www.etymonline.com/word/*gher-.
Harrison, G.W.M. (2001) Martial on Sportula and the Saturnalia. *Mouseion: Journal of the Classical Association of Canada* 1(3): 295-312.
Harrison, G.W.M. (2015) A Day at the Races Theatre: The Spectacle of Performance in the Roman Empire. *Brill's Companion to Roman Tragedy*. Leiden, The Netherlands: Brill.
Hartnett, J. (2017) *The Roman Street: Urban Life and Society in Pompeii, Herculaneum, and Rome*. Cambridge: Cambridge University Press.
Hartswick, K.J. (2004) *The Gardens of Sallust: A Changing Landscape*. Texas: University of Texas Press.
Hartswick, K.J. (2018) The Roman Villa Garden. *Gardens of the Roman Empire*. pp.72-86.
Hatcher, P.G. (2002) Wood Associated with the A.D. 79 Eruption. In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Häuber, R.C. (1986) '*Horti Romani. Die Gärten des Maecenas und des Lamia auf dem Esquilin. Geschichte, Topographie und Statuenfunde*'. Köln.
Haug, A. and Kreuz, P.A. (2016) Perspectives of Research into Sensory Perception of the City. *Stadterfahrung als Sinneserfahrung in der römischen Kaiserzeit*. Turnhout, pp.295-300.
Hawkins, C. (2012) Manufacturing. In: Scheidel W (ed) *Roman Economy*. Cambridge: Cambridge University Press, pp.175-194.
Heber, G. (2020) *How to Grow and Care for Olive Trees*. Available at: https://gardenerspath.com/plants/fruit-trees/grow-olive-trees/.
Heinrich, F. and Hansen, A. (2019) Pulses. In: Erdkamp P and Holleran C (eds) *The Routledge handbook of diet and nutrition in the Roman world*. London: Routledge, pp.116-128.
Hekster, O. (2015) *Emperors and Ancestors: Roman Rulers and the Constraints of Tradition*. Oxford: Oxford University Press.
Henderson, J. (1997) The Name of the Tree: Recounting Odyssey XXIV 340-2. *The Journal of Hellenic Studies* 117: 87-116
Henderson, J. (2002) Columella's Living Hedge: The Roman Gardening. *The Journal of Roman Studies* 92: 110-133.
Henneberg, M. and Henneberg, R.J. (2002) Reconstructing medical knowledge in ancient Pompeii from the hard evidence of bones and teeth. In: Renn J and Castagnetti G (eds) *Homo Faber: Studies on Nature, Technology, and Science at the Time of Pompeii*. Rome: L'Erma di Bretschneider.
Henneberg, M., et al. (1996) Skeletal material from the House of C. Iulius Polybius in Pompeii, 79 AD. *Human Evolution* 11(3-4): 249-259.
Herman, G. (1987) *Ritualised Friendship and the Greek City*. Cambridge: Cambridge University Press.
Hillier, B. and Hanson, J. (1984) *The Social Logic of Space*. Cambridge: Cambridge University Press.
Hoadley, M. (1996) *Roman Garden*. Frank Graham.
Hoffman, A. (1986) *Casa del Fauno (VI 12)*. AA.

Hölkeskamp, K.J. (1996) "Exempla" und "mos maiorum". Überlegungen zum kollektiven Gedächtnis der Nobilität. *Vergangenheit und Lebenswelt. Soziale Kommunikation, Traditionsbildung und historisches Bewußtsein*. Tübingen: Narr, pp.301-338.
Hollander, D.B. (2018a) *Farmers and Agriculture in the Roman Economy*. London: Routledge.
Hollander, D.B. (2018b) Problems and Sources. *Farmers and Agriculture in the Roman Economy*. Taylor & Francis Group, pp.1-19.
Hollander, D.B. (2019) *Farmers and Agriculture in the Roman Economy*. Taylor & Francis Group.
Holleran, C. (2012) *Shopping in Ancient Rome: The Retail Trade in the Late Republic and the Principate*. Oxford: Oxford University Press.
Holleran, C. (2019) Market Regulation and Intervention in the Urban Food Supply. In: Holleran C and Erdkamp P (eds) *The Routledge Handbook of Diet and Nutrition in the Roman World*. London: Routledge, pp.283-295.
Holling, C.S. (1996) Engineering Resilience versus Ecological Resilience. *Engineering within Ecological Constraints*. Washington D.C.: National Academy Press, pp.31-43.
Hölscher, T. (2003) Images of war in Greece and Rome: Between military practice, public memory, and cultural symbolism. *The Journal of Roman Studies* 93: 1-17.
Hölscher, T. (2004) *The Language of Images in Roman Art*. Cambridge: Cambridge University Press.
Hooley, D.M. (2007) *Roman Satire*. Malden, M.A.: Wiley.
Hordijk, M., et al. (2014) Resilience, transition or transformation? A comparative analysis of changing water governance systems in four southern cities. *Environment and Urbanisation* 26(1): 130-146.
Howe, T.N. (2018) A Most Fragile Art Object: Interpreting and Presenting the Strolling Garden of the Villa Arianna, Stabiae. *The Actual Problems of History and Theory of Art* 8: 691-700.
Hudson, N.F. (2010) Changing Places: The Archaeology of the Roman "Convivium". *American Journal of Archaeology* 114(4): 663-695.
Hunt, J.D. (2000) *Greater Perfections: The Practice of Garden Theory*. Philadelphia: University of Pennsylvania Press.
Hurschmann, R. (2006) Sportula. In: Cancik H and Schneider H (eds) *Brill's New Pauly*.
Jansen, G.C.M. (2018) Water and Water Technology in Roman Gardens. *Gardens of the Roman Empire*. pp.402-431.
Jashemski, W.F. (1963) The Flower Industry at Pompeii. *Archaeology, Archaeological Institute of America* 16(2): 112-121.
Jashemski, W.F. (1967) The Caupona of Euxinus at Pompeii. *Archaeology* 20(1): 36-44.
Jashemski, W.F. (1973) The Discovery of a Large Vineyard at Pompeii: University of Maryland Excavations, 1970. *American Journal of Archaeology* 77(1): 27-41.
Jashemski, W.F. (1974) The Discovery of a Market-Garden Orchard at Pompeii: The Garden of the" House of the Ship Europa". *American Journal of Archaeology* 78(4): 391-404.
Jashemski, W.F. (1977) The Excavation of a Shop-House Garden at Pompeii (I. XX. 5). *American Journal of Archaeology* 81: 217-227.
Jashemski, W.F. (1979) *The Gardens of Pompeii: Herculaneum and the Villas Destroyed by Vesuvius, Vol. I*. New Rochelle, New York: Caratazas Brothers.
Jashemski, W.F. (1993) *The Gardens of Pompeii: Herculaneum and the Villas Destroyed by Vesuvius, Vol. II*. New Rochelle, New York: Aristide D. Caratzas.

Jashemski, W.F. (2015) *Discovering the Gardens of Pompeii: Memoirs of a Garden Archaeologist*. Creative Commons Attribution Non Commercial License.
Jashemski, W.F., et al. (2018) *Gardens of the Roman Empire*. Cambridge: Cambridge University Press.
Jashemski, W.F. and Meyer, F.G. (2002) *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Jashemski, W.F., et al. (2002) Plants: evidence from wall paintings, mosaics, sculpture, plant remains, graffiti, inscriptions, and ancient authors. In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Johnson, M. (2021) *Panis Quadratus: Ancient Bread of Pompeii*. Available at: https://breadtopia.com/panis-quadratus-ancient-bread-of-pompeii/ (accessed 3 March 2022).
Jones, F.M.A. (2014) Roman Gardens, Imagination, and Cognitive Structure. *Mnemosyne* 67(5): 781-812.
Jones, N.B. (2019) *Painting, Ethics, and Aesthetics in Rome. Greek culture in the Roman world*. Cambridge: Cambridge University Press.
Jongman, W.M. (1988) *The Economy and Society of Pompeii* Amsterdam: Gieben.
Jongman, W.M. (2007) The Early Roman Empire: Consumption. *The Cambridge Economic History of the Greco-Roman World*. pp.592-618.
Jonkers, E.J. (1963) *Social and Economic Commentary on Cicero's De Lege Agraria Orationes Tres*. Leiden: E.J. Brill.
Joshel, S.R. and Petersen, L.H. (2014) *The Material Life of Roman Slaves*. Cambridge: Cambridge University Press.
Kaszab-Olschewski, T. (2019) Central and Northern Europe. In: Erdkamp P and Holleran C (eds) *The Routledge Handbook of Diet and Nutrition in the Roman World*. London: Routledge, pp.189-207.
Keenan, D. (2004) *Water Supply and Wastewater Disposal in Pompeii: An Overview*. Macquarie Ancient History Association.
Kenney, E.J. (1984) *The Ploughman's Lunch: Moretum, a Poem Ascribed to Virgil*. Bristol: Bristol Classical Press.
Kenty, J. (2016) Congenital Virtue: Mos Maiorum in Cicero's Orations. *The Classical Journal* 111(4): 429-462.
Kenty, J. (2020) *Cicero's Political Personae*. Cambridge: Cambridge University Press.
Ker, J. (2010) "Nundinae": The Culture of the Roman Week. *Phoenix* 64(3/4): 360-385.
Kierdorf, W. (2006) Brill's New Pauly. In: Cancik H and Schneider H (eds). Brill.
Killgrove, K. (2018) Using Skeletal Remains as a Proxy for Roman Lifestyles: The potential and problems with osteological reconstructions of health, diet, and stature in imperial Rome. In: Erdkamp P and Holleran C (eds) *The Routledge Handbook of Diet and Nutrition in the Roman World*. London: Routledge, pp.245-248.
King, A. (2002) Mammals: evidence from wall paintings, sculpture, mosaics, faunal remains, and ancient literary sources. In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press.
Knust, J.W. and Várhelyi, Z. (2011) *Ancient Mediterranean Sacrifice*. New York: Oxford University Press.
Konstan, D. (1997) Friendship in the Classical World. *Cambridge* University Press.
Konstan, D. (2014) The joy of giving: Seneca De beneficiis 1.6.1. *Paradeigmata: Studies in Honour of Øivind Andersen*. Athens: Norwegian Institute at Athens, pp.171-176.

Krasilnikoff, J.A. (2010) Irrigation as innovation in ancient Greek agriculture. *World Archaeology* 42(1): 108-121.
Kronenberg, L. (2009a) *Allegories of Farming from Greece and Rome: Philosophical Satire in Xenophon, Varro, and Virgil*. Cambridge: Cambridge University Press.
Kronenberg, L. (2009b) The art of farming. *Allegories of Farming from Greece and Rome*. pp.76-93.
Kuniholm, P.I. (2002) Dendrochronological Investigations at Herculaneum and Pompeii. In: Jashemski WF and Meyer FG (eds) *The Natural History of Pompeii*. Cambridge: Cambridge University Press, pp.235-239.
Lanciani, R. (1883) *Atheneum*.
Lanciani, R. (1892) Gambling and Cheating in Ancient Rome. *The North American Review* 155(428): 97-105.
Landgren, L. (2004) '*Lauro Myrto et Buxo Frequentata: A Study of the Roman Garden through Its Plants*'. Lund University.
Landgren, L. (2013) Plantings. In: Gleason K (ed) *The Cultural History of Gardens in Antiquity*. London: Bloomsbury, pp.75-98.
Langellotto, G.A., et al. (2018) Garden Pollinators and the Potential for Ecosystem Service Flow to Urban and Peri-Urban Agriculture. *Sustainability* 10(6).
Larmour, D. and Spencer, D. (2007) *The Sites of Rome: Time, Space, Memory*. Oxford: OUP.
Larsen, C.S. (2002) Bioarchaeology: The Lives and Lifestyles of Past People. *Journal of Archaeological Research* 10(2): 119-166.
Laurence, R. (2005) Health and the Life Course at Pompeii and Herculaneum. *Health in Antiquity*. London: Routledge.
Laurence, R. (2007) *Roman Pompeii: Space and Society*. London: Routledge.
Laurence, R. (2011) Traffic and Land Transportation in and near Rome. In: Erdkamp P (ed) *The Cambridge Companion to Ancient Rome*. New York: Cambridge University Press, pp.246-261.
Laurence, R. and Newsome, D. (2011) *Rome, Ostia, Pompeii: Movement and Space*. Oxford: OUP.
Lazer, E. (2009) *Resurrecting Pompeii*. Abingdon: Routledge.
Lefebvre, H. (1974) *La production de l'espace*. Paris: Éditions Anthropos.
Lefebvre, H. (1991) *The Production of Space*. Oxford: Blackwell Publishing.
Leidwanger, J., et al. (2014) A manifesto for the study of ancient Mediterranean maritime networks. *Antiquity* 88(342).
Lennon, J. (2012) Pollution, religion and society in the Roman world. In: Bradley M and Stow K (eds) *Rome, Pollution and Propriety: Dirt, Disease and Hygiene in the Eternal City from Antiquity to Modernity*. Cambridge: Cambridge University Press, pp.43-58.
Lewis, C.T. and Short, C. (1879) hērēdĭŏlum. *A Latin Dictionary*. Oxford: Clarendon Press.
Ling, R. (1991) *Roman Painting*. Cambridge: Cambridge University Press.
Lippi, M.M. and Bellini, C. (2005) I giardini di Pompei e il territorio vesuviano: il contributo delle analisi palinologiche. *Atti della Giornata di Studio "Scienze e Archeologia"* 23 Oct. 2003: 87-94.
Lippi, M.M. and Ciarallo, A. (1993) The Garden of'Casa dei Casti Amanti (Pompeii, Italy). *Garden History* 21(1): 110-116.
Lipps, J. (2019) The house of Augustus: a historical detective story (Review). *Bryn Mawr Classical Review*.

Littlewood, A.R. and von Stackelberg, K.T. (2013) Verbal Representations. In: Gleason K (ed) *A Cultural History of Gardens in Antiquity*. London: Bloomsbury, pp.135-150.
Lodwick, L. (2015) Identifying Ritual Deposition of Plant Remains: A Case Study of Stone Pine Cones in Roman Britain. *Theoretical Roman Archaeology Journal* DOI: https://doi.org/10.16995/TRAC2014_54_69. 54-69.
Lorenz, K. (2015) Wall Painting. In: Borg BE (ed) *A Companion to Roman Art*. New Jersey: John Wiley & Sons, Ltd., pp.252-267.
Lorenz, W.F. and Wolfram, E.J. (2014) The Wells of Pompeii. *Ground Water* 52(5): 808-811.
Lotman, M.K. (2000) Word-ends and metrical boundaries in ancient iambic trimeter of comedy. *Studia Humaniora Tartuensia* 1: 1-12.
Lynch, K.M. (2007) More thoughts on the space of the symposium. *British School at Athens Studies* 15: 243-249.
Macaulay, E. (2006) The role of ollae perforatae in understanding horticulture, planting techniques, garden design and plant trade in the Roman World. *The archaeology of crop fields and gardens*. 207-220.
Macaulay-Lewis, E. (2010) Imported Exotica: Approaches to the Study of the Ancient Plant Trade. *Bollettino di Archeologia on line* Speciale D: 16-26.
Macaulay-Lewis, E. (2013) Use and Reception. In: Gleason K (ed) *A Cultural History of Gardens in Antiquity*. London: Bloomsbury, pp.99-118.
Macaulay-Lewis, E. (2018) The Archaeology of Gardens in the Roman Villa. *Gardens of the Roman Empire*. pp.87-120.
MacDougall, E.B. (1981) *Ancient Roman Gardens*. Washington D.C.
MacKinnon, M. (2001) High on the Hog: Linking Zooarchaeological, Literary, and Artistic Data for Pig Breeds in Roman Italy. *American Journal of Archaeology* 105(4): 649-673.
MacMullen, R. (1970) Market-Days in the Roman Empire. *Phoenix* 24(4): 333-341.
Maiuri, A. (1933) *Pompeii*. Roma: Libreria dello Stato.
Maiuri, A. (1955) *Herculaneum*. Roma: Istituto Poligrafico Dello Stato.
Malkin, I. (2011) *A Small Greek World: Networks in the Ancient Mediterranean*. USA: OUP.
Malkin, I., et al. (2009) Greek and Roman Networks in the Mediterranean. London: Routledge.
Mancini, R. (1887) Orvieto: Giornale degli scavi della necropoli volsiniese, in contrada Cannicella, redatto dall'ing. *Notizie degli Scavi*
Marano, Y.A. (2011) Spoliazione di edifici e reimpiego di materiali da costruzione in età romana: le fonti giuridiche. In: Pettenò E and Rinaldi F (eds) *Memorie dal passato di Iulia Concordia. Un percorso tra le forme del riuso e del reimpiego*. Rubano: Grafiche Turato Edizioni, pp.141-174.
Marano, Y.A. (2012) Fonti giuridiche di età romana per la storia del reimpiego (I sec. a.C. - VI sec. d.C.). *Antichità Altoadriatiche* 74: 63-84.
Markard, J., et al. (2012) Sustainability transitions: An emerging field of research and its prospects. *Research Policy* 41(6): 955–967.
Martyn, R.E., et al. (2018) Capturing Roman dietary variability in the catastrophic death assemblage at Herculaneum. *Journal of Archaeological Science: Reports* 19: 1023-1029.
Marzano, A. (2013) *Harvesting the Sea: The Exploitation of Maritime Resources in the Roman Mediterranean. Oxford Studies on the Roman Economy*. Oxford: Oxford University Press.

Marzano, A. (2014) Roman gardens, military conquests, and elite self-representation. In: Coleman K (ed) *Le jardin dans l'antiquité. Entretiens sur l'antiquité classique Fondation Hardt (LX)*.
Marzano, A. (2015) Villas as instigators and indicators of economic growth. In: Erdkamp P and Verboven K (eds) *Structure and performance in the Roman economy : models, methods and case studies*., pp.197-221.
Marzano, A. (2018) Fish and Fishing in the Roman World. *Journal of Maritime Archaeology* 13: 437 - 447.
Marzano, A. (2020) A story of land and water: Capital and investment in large-scale fishing and fish-salting operations. *Capital, Investment, and Innovation in the Roman World*. Oxford: Oxford University Press, pp.275-306.
Mastrolorenzo, G., et al. (2001) Herculaneum victims of Vesuvius in AD 79. *Nature* 410: 769–770.
Matyas, D. and Pelling, M. (2014) Positioning resilience for 2015: The role of resistance, incremental adjustment and transformation in disaster risk management policy. *Distasters* 39(SI): 1-18.
Mau, A. (1899) *Pompeii: It's Life and Art*. Norwood: Macmillan Norwood Press.
Mawford, K. and Ntanou, E. (2021) *Ancient Memory: Remembrance and Commemoration in Graeco-Roman Literature*. Berlin: De Grutyer.
Mayer, E. (2012) *The Ancient Middle Classes: Urban Life and Aesthetics in the Roman Empire, 100 BCE–250 CE*. Harvard: Harvard University Press.
McGinn, T.A.J. (2008) Something Old, Something New... Augustan Legislation and the Challenge of Social Control *Ancient History Bulletin* 22(1-2): 1-32.
Meacham-Hensol, K., et al. (2020) Plot-level rapid screening for photosynthetic parameters using proximal hyperspectral imaging. *Journal of Experimental Botany* 71: 2312–2328.
Meerow, S., et al. (2016) Defining urban resilience: A review. *Landscape and Urban Planning* 147: 38-49.
Meyer, F.G. (1980) Carbonized Food Plants of Pompeii , Herculaneum , and the Villa at Torre Annunziata. *Economic Botany* 34(4): 401-437.
Miller, F., et al. (2010) Resilience and Vulnerability: Complementary or Conflicting Concepts? *Ecology and Society* 15(3).
Miller, N.F. and Gleason, K. (1994) The Archaeology of Garden and Field. Pennsylvania: University of Pennsylvania Press.
Milnor, K. (2005) *Gender, domesticity, and the age of Augustus : inventing private life. Oxford studies in classical literature and gender theory*. Oxford: OUP.
Moeller, W. (1973) Gnaeus Alleius Nigidius Maius, Princeps Coloniae. *Latomus* 32: 515-520.
Mommsen, T. (1894) *The History of Rome, Vol. 5*. London.
Montanari, E. (2009) *Fumosae Imagines. Identità e memoria nell'aristocrazia repubblicana*. Rome: Bulzoni Editore.
Monteix, N. (2016) Urban Production and the Pompeian Economy. *The Economy of Pompeii*. Oxford: Oxford University Press.
Moormann, E. (2007) Villas surrounding Pompeii and Herculaneum. In: Dobbins JJ and Foss P (eds) *The World of Pompeii*. London: Routledge, pp.435-454.
Morcillo, G. (2000) El macellum magnum y la Roma de Nerón. *Iberia* 3: 265-286.
Morgan, T. (2007) *Popular Morality in the Early Roman Empire*. Cambridge: Cambridge University Press.
Morley, N. (1996) *Metropolis and Hinterland*. Cambridge: Cambridge University Press.

Morley, N. (2012) Autarky, self-sufficiency. *The Encyclopedia of Ancient History*.
Morris, A.S. (1990) Mendoza: Land Use in the Adobe City. In: Yadav CS (ed) *The Morphology of Towns: Perspectives of Urban Geography*. New Delhi: South Asia Books.
Morton, J.F. (1987) Fig. *Fruits of Warm Climates*. Miami: Julia F. Morton, pp.47-50.
Murphy, C. (2015) *Romans, Rubbish, and Refuse: The archaeobotanical assemblage of Regione VI, insula I, Pompeii*. Archaeopress Roman Archaeology 8.
Murphy, C., et al. (2013) Roman food refuse: urban archaeobotany in Pompeii, Regio VI, Insula 1. *Vegetation History and Archaeobotany* 22: 409–419.
Myers, K.S. (2018) Representations of Gardens in Roman Literature. *Gardens of the Roman Empire*. pp.258-277.
Nappo, S.C. (2007) House of Regions I and II. In: Dobbins JJ and Foss PW (eds) *The World of Pompeii*. London: Routledge, pp.347-372.
Nelsestuen, G. (2016) Storing Produce and Staging Dinner Parties: Fruit-Galleries and Genre in Varro's De re rustica 1 *Illinois Classical Studies* 41(1): 21-40.
Nenova, S. *Sicilian passito – an ancient wine seducing gods*. Available at: https://www.wondersofsicily.com/sicily-food-passito.htm.
Newlands, C. (1987) Urban Pastoral: The Seventh "Eclogue" of Calpurnius Siculus. *Classical Antiquity* 6: 218-231.
Newsome, D. (2009) Centrality in its Place: Defining Urban Space in the City of Rome. In: Driessen M, Heeren S, Hendriks Jet al. (eds) *TRAC*. Oxford: Oxbow Books, pp.25-38.
Newsome, D. (2011) Introduction. In: Laurence R and Newsome D (eds) *Rome, Ostia, Pompeii: Movement and Space*. Oxford: OUP, pp.1-57.
Nichols, M.F. (2017) House and Man. *Author and Audience in Vitruvius' De architectura*. Cambridge: Cambridge University Press, pp.83-129.
Nichols, S.G. (1991) Seeing Food: An Anthropology of Ekphrasis, and Still Life in Classical and Medieval Examples. *MLN* 106(4): 818-851.
Nicosia, C., et al. (2019) The pre-79 CE alluvial environment south of Pompeii's city walls. *Geoarchaeology: An International Journal* 34(6): 727-744.
Noè, E. (2002) Il progetto di Columella: profilo sociale, economico, culturale. *New Press* 47.
Nora, P. (1989) Between Memory and History: Les Lieux de Mémoire. *Representations* 26(Spring): 7-24.
Noreña, C.F. (2013) Review of Mayer, E., 'The Ancient Middle Classes. Urban Life and Aesthetics in the Roman Empire 100 BCE - 250 CE'. *American Historical Review* 118: 1576-1577.
Olsson, P., et al. (2004) Social-ecological transformation for ecosystem management: the development of adaptive comanagement of a wetland landscape in southern Sweden. *Ecology and Society* 9(4).
Orlin, E. (2015) Augustan Reconstruction and Roman Memory. *Memory in Ancient Rome and Early Christianity*. Oxford: OUP, pp.116-144.
Ortner, D.J., et al. (2012) Special Courses in Human Skeletal Paleopathology. *The Global History of Paleopathology*. 684-693.
Osanna, M. (2020) *Les Nouvelles Heures de Pompéi*. Flammarion.
Ostenberg, I., et al. (2015) *The Moving City: Processions, Passages and Promenades in Ancient Rome*. London: Bloomsbury Academic.
Pagán, V.E. (2006) *Rome and the Literature of Gardens*. London: Gerald Duckworth & Co. Ltd.

Pagán, V.E. (2016) Horticulture and the Roman Shaping of Nature. *Oxford Handbooks Online*. Oxford Handbooks Online.

Pagnoux, C., et al. (2013) The introduction of Citrus to Italy, with reference to the identification problems of seed remains. *Vegetation History and Archaeobotany* 22(5): 421-438.

Parkins, H. (1997) The "Consumer City" Domesticated? The Roman City in Elite Economic Strategies. *Roman Urbanism*. London: Routledge.

Pasco-Pranger, M. (2015) Finding Examples at Home: Cato, Curius Dentatus, and the Origins of Roman Literary Exemplarity. *Classical Antiquity* 34(2): 296-321.

Pate, F.D., et al. (2016) Stable carbon and nitrogen isotope evidence for dietary variability at Ancient Pompeii, Italy. *Mediterranean Archaeology and Archaeometry* 16: 127-133.

Pearse, R. (2019) *"Bread for slaves – 2" – An ancient shopping list from Pompeii*. Available at: https://www.roger-pearse.com/weblog/2019/10/22/bread-for-slaves-2-an-ancient-shopping-list-from-pompeii/.

Pelling, M. and Manuel-Navarrete, D. (2011) From resilience to transformation: The adaptive cycle in two Mexican urban centers. *Ecology and Society* 16(2): 1-11.

Pendall, R., et al. (2007) *Resilience and Regions: Building Understanding of the Metaphor, Working Paper 2007-12*. University of California: Institute for Urban and Regional Development.

Pennacchio, M., et al. (2010) *Uses and Abuses of Plant Derived Smoke: Its Ethnobotany as Hallucinogen, Perfume, Incense, and Medicine*. Oxford: Oxford University Press.

Perkell, C.G. (1981) On the Corycian Gardener of Vergil's Fourth Georgic. *Transactions of the American Philological Association* 111: 167-177.

Pesando, F. (2011) Ruinae et Parietinae Pompeianae. Distruzioni e abbandoni a Pompei all'epoca dell'eruzione. *Vesuviana* 3: 9-30.

Pickett, S., et al. (2004) Resilient cities: Meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms. *Landscape and Urban Planning* 69(4): 369–384.

Pirson, F. (1997) *Rented accommodation at Pompeii: the evidence of the Insula Arriana Poliana VI.6*. Portsmouth: Journal of Roman Archaeology.

Pirson, F. (2007) Shops and Industries. In: Dobbins JJ and Foss P (eds) *The World of Pompeii*. London: Routledge.

Platts, H. (2019) *Multisensory Living in Ancient Rome: Power and Space in Roman Houses*. London: Bloomsbury Academic.

Platts, H. (2020) *Multisensory Living in Ancient Rome: Power and Space in Roman Houses*. Cambridge: Cambridge University Press.

Plutarch. Lives, Volume X: Agis and Cleomenes. Tiberius and Gaius Gracchus. Philopoemen and Flamininus. 'Translated by' Perrin B. Loeb Classical Library 102. Cambridge, MA. Harvard University Press 1921.

Poehler, E.E. (2011) Where to Park? Carts, Stables and the Economics of Transport. In: Laurence R and Newsome D (eds) *Rome, Ostia and Pompeii: Movement and Space*. Oxford: Oxford University Press.

Poehler, E.E. (2016) Measuring the movement economy: a network analysis of Pompeii. In: Flohr M and Wilson A (eds) *The Economy of Pompeii*. Oxford: Oxford University Press.

Poehler, E.E. (2017a) *Pompeii Bibliography and Mapping Project*.

Poehler, E.E. (2017b) *The Traffic Systems of Pompeii*. Cambridge: Cambridge University Press.

Poehler, E.E. and Ellis, S. (2014) The 2013 Season of the Pompeii Quadriporticus Project: Final Fieldwork and Preliminary Results. *The Journal of FASTI Online*. 1-10.
Poindexter, J. (2019) *Vegetable Garden Size Calculator: How Much to Plant for Your Family*. Available at: https://morningchores.com/vegetable-garden-size/ (accessed 13 October 2020).
Pompeiiinpictures (2021) *Oplontis, Villa di Poppea or Villa of Poppea or Villa Poppaea or Oplontis Villa A or Torre Annunziata, Villa romana di Poppea in Oplontis. Room Plan*. Available at: https://www.pompeiiinpictures.com/pompeiiinpictures/VF/Villa_055%20Oplontis%20Villa%20of%20Poppea%20plan.htm.
PompeiiSites (2020) *House of the Ephebe*. Available at: http://pompeiisites.org/en/archaeological-site/house-of-the-ephebe/.
Popkin, M.L. (2016) *The architecture of the Roman triumph : monuments, memory, and identity*. New York: Cambridge University Press.
Purcell, N. (1995) The Roman villa and the landscape of production. In: Cornell TJ and Lomas K (eds) *Urban Society in Roman Italy*. 1st ed. London: Routledge, pp.157-184.
Purcell, N. (1996) The Roman Garden as a Domestic Building. In: Barton IM (ed). Exeter: University of Exeter Press, pp.121-151.
Purcell, N. (2001) Dialectical Gardening. Review of by Horti Romani: Atti del Convegno Internazionale R. 4-6.
Purcell, N. (2003) The way we used to eat: diet, community, and history at Rome. *Am J Philol* 124(3): 329-358.
Purcell, N. (2007) The horti of Rome and the landscape of property. In: Cornell TJ and Lomas K (eds) *Urban society in Roman Italy*. London: UCL Press, pp.151-179.
Putnam, M.C.J. (1979) *Virgil's Poem of the Earth: Studies in the Georgics*. Princeton: Princeton University Press
Reay, B. (2003) Some Addressees of Virgil's Georgics and Their Audience. *Vergilius* 49: 17-41.
Rice, C. (2016) Shipwreck Cargoes in the Western Mediterranean and the Organization of Roman Maritime Trade. *Journal of Roman Archaeology* 29.
Riggsby, A.M. (1997) 'Public' and 'private' in Roman culture: the case of the cubiculum. *Journal of Roman Archaeology* 10.
Rizzello, C.J., et al. (2014) Use of sourdough fermentation and mixture of wheat, chickpea, lentil and bean flours for enhancing the nutritional, texture and sensory characteristics of white bread. *International Journal of Food Microbiology* 180: 78-87.
Roberts, P. (2019) *Last Supper in Pompeii*. Oxford: Ashmolean Museum Publications.
Roberts, P. and Robinson, M. (2019) Food and Drink for the City. In: Roberts P (ed) *Last Supper in Pompeii*. Ashmolean Museum, University of Oxford.
Robinson, M. (2002) Domestic burnt offeringsand sacrifices at Roman and pre-Roman Pompeii, Italy. *Vegetation History and Archaeobotany* 11: 93-99.
Roselaar, S.T. (2010) *Public Land in the Roman Republic: A Social and Economic History of Ager Publicus in Italy, 396-89 B.C*. Oxford: Oxford University Press.
Roselaar, S.T. (2019) *Ager publicus: Land as a spoil of war in the Roman Republic*. London: Routledge.
Rosenzweig, R. (2004) *Worshipping Aphrodite: Art and Cult in Classical Athens*. Michigan: University of Michigan Press.

Rosillo-López, C. (2021) Destitute, homeless and (almost) invisible: Urban property and the rental market in the Roman world. In: Courrier C and Oliveira JCMd (eds) *Ancient History from Below: Subaltern Experiences and Actions in Context*. Taylor & Francis.
Ross, D. (1975) The Culex and Moretum as Post-Augustan Literary Parodies. *Harvard Studies in Classical Philology* 79: 235-263.
Rowan, E. (2015) Olive Oil Pressing Waste as a Fuel Source in Antiquity. *American Journal of Archaeology* 119(4).
Rowan, E. (2016) Sewers, Archaeobotany, and Diet at Pompeii and Herculaneum. *Economy of Pompeii*. pp.111-134.
Rowan, E. (2019) Same Taste, Different Place: Looking at the Consciousness of Food Origins in the Roman World. *Theoretical Roman Archaeology Journal* 2(1).
Ruggieri, N. (2017a) Seismic Protection in Pompeii during the Age of Nero and Vespasian. *Journal of Architectural Engineering* 23(4).
Ruggieri, N. (2017b) Seismic Vulnerability of the Ancient Pompeii through the Evaluation of the 62 AD Earthquake Effects. *International Journal of Architectural Heritage* 11(4): 490-500.
Russo Ermolli, E. and Messager, E. (2013) The gardens of Villa A at Oplontis through pollen and phytolith analysis of soil samples. *Villa A ("of Poppaea") at Oplontis*.
Rutledge, S.H. (2012) *Ancient Rome as a museum: power, identity, and the culture of collecting*. *Oxford studies in ancient culture and representation*. Oxford: OUP.
Sadori, L., et al. (2009) The introduction and diffusion of peach in ancient Italy. PaCE, a project for Europe. In: Morel JP and Mercuri AM (eds) *Plants and culture: seeds of the Cultural Heritage of Europe*. EDIPUGLIA, pp.45 - 61.
Scarth, E.-A.L. (2004) '*Mnemotechnics and Virgil: The Art of Memory and Remembering*'. University of Victoria, Victoria.
Schefold, K. (1952) *Pompejanische Malerei. Sinn und Ideengeschichte*. Basel: Schwabe.
Scheidel, W. (1996) Prices and Other Monetary Valuations in Roman History: Ancient Literary Evidence.
Scheidel, W. and Friesen, S.J. (2009) The Size of the Economy and the Distribution of Income in the Roman Empire. *The Journal of Roman Studies* 99: 61-91.
Sharman, J.A. (2013) '*Age, sex and the life course: population variability in human ageing and implications for bioarchaeology*', Ph.D., Durham University, Durham.
Shimpo, N., et al. (2019) How community gardens may contribute to community resilience following an earthquake. *Urban Forestry & Urban Greening* 38: 124-132.
Shirvani, H. (1985) The Philosophy of Persian Garden Design: The Sufi Tradition. *Landscape Journal* 4(1): 23-30.
Silver, M. (2006) Thoughts on the Roman" Consumer City". *Münstersche Beiträge zur Antiken Handelgeschichte* 25(1): 125-129.
Slater, W.J. (2000) Handouts at Dinner. *Phoenix* 54(1/2): 107-122.
Smerlak, M. and Vaitla, B. (2017) A non-equilibrium formulation of food security resilience. *Royal Society Open Science* 4(1).
Smith-Doerr, L. and Powell, W.W. (2005) Networks in economic life. In: Smelse NJ and Swedberg R (eds) *The Handbook of Economic Sociology*. 2nd ed. Princeton: Princeton University Press and Russell Sage Foundation.
Soja, E. (1987) *Thirdspace: Journeys to Los Angeles and Other Real-and-imagined Places*. London: Wiley-Blackwell.
Soja, E. (1996) *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Wiley-Blackwell.

Soncin, S., et al. (2021) High-resolution dietary reconstruction of victims of the 79 CE Vesuvius eruption at Herculaneum by compound-specific isotope analysis. *Science Advances* 7(35): 1-9.

Spanier, E. (2010) '*The Good Farmer in Ancient Rome War, Agriculture and the Elite from the Republic to Early Empire*'. University of Washington.

Spencer, D. (2010) *Roman Landscape: Culture and Identity*. Cambridge: Cambridge University Press.

Spencer, D. (2015) Vitruvius, Landscape, and Heterotopias: How 'otherspaces' enrich Roman identity. In: Rebecca Kennedy MJ-L (ed) *The Routledge Handbook of Identity and the Environment in the Classical and Early Medieval Worlds*. London: Routledge.

Spencer, D. (2017) Horace's Garden Thoughts Rural Retreats and the Urban Imagination. In: Rosen R and Sluiter I (eds) *City, Countryside, and the Spatial Organization of Value in Classical Antiquity*. pp.239-274.

Squire, M. (2017) Framing the Roman 'Still Life': Campanian Wall-Painting and the Frames of Mural Make-Believe. In: Platt V and Squire M (eds) *The Frame in Classical Art: A Cultural History*. Cambridge: Cambridge University Press, pp.188-254.

Staeheli, L.A., et al. (2002) Conflicting Rights to the City in New York's Community Gardens. *GeoJournal* 58(2-3): 197–205.

Stevens, S. (2020) Urban borderscapes in Roman Italy: Arenas for social, political, and cultural interaction. In: Flohr M (ed) *Urban Space and Urban History in the Roman World*. Taylor Francis, pp.285-303.

Stöger, H. (2011) *Rethinking Ostia: A Spatial Enquiry into the Urban Society of Rome's Imperial Port-town*. Leiden: Leiden University Press.

Stowers, D. (2011) The Religion of Plant and Animal Offerings versus the Religion of Meanings, Essences, and Textual Mysteries. In: Knust V (ed) *Ancient Mediterranean Sacrifice*. New York: Oxford University Press.

Strocka, V.M. (2007) Domestic Decoration: Painting and the "Four Styles". In: Dobbins JJ and Foss P (eds) *The World of Pompeii*. London: Routledge.

Taegio, B. (2011) *La Villa*. Pennsylvania: University of Pennsylvania Press.

Taivalkoski, A., et al. (2022) Bird eggs in the diet of ancient Pompeii: An SEM analysis of archaeological avian eggshell. *Journal of Archaeological Science: Reports* 41

Tamm, M. (2008) History as Cultural Memory: Mnemohistory and the Construction of the Estonian Nation. *Journal of Baltic Studies* 39(4): 499-516.

Tate (2021) *Still Life - Art Term*. Available at: https://www.tate.org.uk/art/art-terms/s/still-life (accessed 3 February 2021).

Taylor, C. and Vlassopoulos, K. (2015) Communities and Networks in the Ancient Greek World. Oxford: Oxford University Press.

Tchernia, A. (1986) *The wines of Roman Italy*. Paris: E. De Boccard.

Temin, P. (2013) *The Roman Market Economy*. Princeton: Princeton University Press.

Thébert, Y. (1987) Private life and domestic architecture in Roman Africa. In: Veyne P (ed) *A History of Private Life, Volume 1: From Pagan Rome to Byzantium*. Cambridge, M.A.: Belknap Press.

Thibodeau, P. (2001) The Old Man and His Garden (Verg. Georg. 4, 116-148). *Materiali e discussioni per l'analisi dei testi classici* 47: 175-195.

Thomas, R.F. (1992) The Old Man Revisited Memory, Reference and Genre in Virg., Georg. 4, 116-48. *Materiali e discussioni per l'analisi dei testi classici* 29: 35-70.

Tibbott, G., et al. (2012) The 2012 Field Season at I.1.1 - 10, Pompeii: Preliminary report on the excavations. *The Journal of FASTI Online*. 1-21.

Toner, J. (2014) *A Cultural History of the Senses in Antiquity*. London: Bloomsbury.
Trimble, J. (2011) *Women and Visual Replication in Roman Imperial Art and Culture*. *Greek culture in the Roman world*. Cambridge: Cambridge University Press.
Tröster, M. (2012) Plutarch and Mos Maiorum in the Life of Aemilius Paullus. *Ancient Society* 42: 219-254.
Tuck, S.L. (2008/2009) Scheduling Spectacle: Factors Contributing to the Dates of Pompeian "Munera". *The Classical Journal* 104(2): 123-143.
Tuori, K.T. (2015) Studying public and private in the Roman house. *Journal of Roman Archaeology* 102: 7-15.
Turner, A., et al. (2001) From Isovists to Visibility Graphs: A Methodology for the Analysis of Architectural Space. *Environment and Planning B: Urban Analytics and City Science* 28(1): 103-121.
Twiss, K.C. (2019) *The Archaeology of Food. Identity, Politics, and Ideology in the Prehistoric and Historic Past*. Cambridge: Cambridge University Press.
Tzamalikos, P. (1991) Origen and the Stoic View of Time. *Journal of the History of Ideas* 52(4): 535-561.
Valentine, G., et al. (2004) *Key Thinkers on Space and Place*. London: SAGE Publications.
Van der Poel, H.B., et al. (1986) *Corpus Topographicum Pompeianum: Pars IIIA, The Insulae of Regions I-V*. Texas: The University of Texas at Austin.
Van Limbergen, D. (2018a) What Romans ate and how much they ate of it. Old and new research on eating habits and dietary proportions in classical antiquity. *Revue belge de philologie et d'histoire* 96(3): 1049-1092.
Van Limbergen, D. (2018b) What Romans ate and how much they ate of it. Old and new research on eating habits and dietary proportions in classical antiquity. *Revue belge de philologie et d'histoire* 96: 1049-1092.
Van Nes, A. (2011a) Measuring spatial visibility, adjacency, permeability and degrees of street life in Pompeii In: Laurence R and Newsome D (eds) *Rome, Ostia and Pompeii: Movement and Space*. Oxford: Oxford University Press, pp.100-118.
van Nes, A. (2011b) Measuring spatial visibility, adjacency, permeability, and degrees of street life in Pompeii. In: Laurence R and Newsome D (eds) *Rome, Ostia, Pompeii: Movement and Space*. Oxford: Oxford University Press.
Van Nes, A. (2014) Indicating street vitality in excavated towns: Spatial configurative analyses applied to Pompeii. *Spatial analysis and social spaces: Interdisciplinary approaches to the interpretation of prehistoric and historic built environments*.
Venner, J. (2015) '*The Cultivation and Sale of Local Produce in Pompeii*', MA, Birkbeck College, University of London, London.
Venner, J. (2021) Rus 'Becomes' Urbs: Hard and Soft Landscape Elements in the Gardens of Pompeii. *New Classicists*. 13-40.
Vidal, J.M. and Corredor, D.M. (2018) The Roman Amphorae Average Capacity (AC). *Oxford Journal of Archaeology* 37(3): 299-311.
Vignola, C., et al. (2021) At the origins of Pompeii: the plant landscape of the Sarno River floodplain from the first millennium BC to the AD 79 eruption. *Vegetation History and Archaeobotany*. DOI: https://doi.org/10.1007/s00334-021-00847-w.
Viitanen, E., et al. (2012) Street Activity, Dwellings and Wall Inscriptions in Ancient Pompeii: A Holistic Study of Neighbourhood Relations. *Theoretical Roman Archaeology Journal*. DOI: https://doi.org/10.16995/TRAC2012_61_80. 61-80.
Viitanen, E.M. (2020) Review: The Fortifications of Pompeii and Ancient Italy. *Etruscan Studies* 23(1-2): 216-219.

Vogel, S. and Märker, M. (2010) Reconstructing the Roman topography and environmental features of the Sarno River Plain (Italy) before the AD 79 eruption of Somma–Vesuvius. *Geomorphology* 115: 67-77.
Vogel, S., et al. (2016) The Ancient Rural Settlement Structure in the Hinterlandof Pompeii Inferred from Spatial Analysis and Predictive Modeling of Villae Rusticae. *Geoarchaeology: An International Journal, Wiley Periodicals, Inc*. 31: 121-139.
von Reden, S. and Scheidel, W. (2002) *The Ancient Economy*. New York: Routledge.
von Stackelberg, K. (2009) *The Roman Garden: Space, Sense, and Society*. London: Routledge.
von Stackelberg, K.T. (2014) Garden Hybrids. *Classical Antiquity* 33(2): 395-426.
Von Thünen, J.H. (1921) *Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie*. Jena, Germany: Fischer.
Vössing, K. (2004) *Mensa Regia. Das Bankett beim hellenistischen König und beim römischen Kaiser*. München/Leipzig.
Wagner, I.K. and Breil, P. (2013) The role of ecohydrology in creating more resilient cities. *Ecohydrology and Hydrobiology* 13(2): 113-134.
Wallace-Hadrill, A. (1988) The social structure of the Roman house. *Papers of the British School at Rome* 56: 43-97.
Wallace-Hadrill, A. (1994) *Houses and Society in Pompeii and Herculaneum*. Princeton: Princeton University Press.
Wallace-Hadrill, A. (1998) Horti and hellenization. In: La Rocca E and Cima M (eds) *Horti Romani*. Rome: L'Erma di Bretscheider, pp.1-12.
Wallace-Hadrill, A. (2013) Trying to define and identify the Roman "middle classes". *Journal of Roman Archaeology* 26(1): 605-609.
Wamsler, C., et al. (2019) The being of urban resilience. *The Routledge Handbook of Urban Resilience*. London: Routledge.
Watts, C.M. (1996) The Square and the Roman House: Architecture and Decoration at Pompeii and Herculaneum. *Nexus: Architecture and Mathematics*. Florence: Edizioni dell'Erba, pp.165-181.
Weber, M., et al. (2020) Pollen analysis of volcanic ash in Pompeian human skeletal remains. *Grana* 59(1): 107-113.
Weir, S. (2015) Xenia in Vitruvius' Greek house: andron, ξείνία and xenia from Homer to Augustus. *The Journal of Architecture* 20(5): 686-883.
White, K.D. (1970) Fallowing, Crop Rotation, and Crop Yields in Roman Times. *Agricultural History* 44(3): 281-290.
Wilkes, J. (2015) *Sheep in the Vines in Northern California*. (accessed 12 May 2021).
Wilkins, J. and Hill, S. (2006) *Food in the Ancient World*. Oxford: Blackwell Publishing Ltd.
Willis, M. (2015) *Broad Bean Harvest*. Available at: https://marksvegplot.blogspot.com/2015/07/broad-bean-harvest.html (accessed 14 July).
Wilson, A., et al. (2012) Mediterranean connectivity and Roman ports. In: Keay S (ed) *Rome, Portus and the Mediterranean*. London: British School at Rome Archaeological Monograph, pp.367-391.
Wood, S. (2004) '*Rus in Urbe: The Domus Aurea and Neronian Horti in the City of Rome*'. University of Newcastle upon Tyne Newcastle.
Wood, S. (2010) Horti in the City of Rome: Emulation and Transcendence in the Late Republic and Early Empire. *Theoretical Roman Archaeology Journal*. 75-90.

Woolf, G. (1992) Review: The unity and diversity of Romanisation. *Journal of Roman Archaeology* 5: 349-352.
Yerushalmi, Y.H. (1982) *Zakhor: Jewish history and Jewish memory*. Washington D.C.: University of Washington Press.
Ynnilä, H. (2012) '*Pompeii, Insula IX.3: A case study of urban infrastructure*'. University of Oxford, Oxford.
Zanker, P. (2007) *Roman Art*. Getty Publications.
Zarmakoupi, M. (2014) *Designing for Luxury on the Bay of Naples: Villas and Landscapes (c. 100 BCE - 79 CE)*. Oxford: Oxford University Press.
Zekahat, M. (2017) *Satire, Humor and the Construction of Identities*. Amsterdam: John Benjamins Publishing Company.
Zuiderhoek, A. (2018) *The Ancient City. Key themes in ancient history*. Cambridge: Cambridge University Press.

APPENDICES

Appendix A

Vegetable	Latin name	Evidence	References
Asparagus	*Asparagus officinalis*	Paintings (Pompeii): House of the Vettii (VI.16.1); House of Chlorus and Caprasia (IX.2.10); House of the Cryptoporticus (I.6.2/16); Temple of Isis. Paintings (Herculaneum): House of the Relief of Telephus (Ins. Or. I.2-3). Select literary references: Pliny (*HN* 19.145-50) says that asparagus grown on the island of Nesita off the coast of Naples is the best asparagus by far.	Jashemski 2002, 92-3.
Beetroot	*Beta vulgaris subsp. vulgaris Conditiva Group*	Graffiti (Pompeii): VII.2.30 (shopping list); VI.14.30 (used as a slur). Select literary references: Pliny (*HN* 19.117) says beets are among the vegetables grown in a kitchen garden (as does Col. *Rust*. 10.254, 326) and Pliny refers to a spring and autumn beet (*HN* 19.132-5). Martial (33.47.9) says beets are 'among the abundance of the rich country'.	Jashemski 2002, 93-4.
Broccoli	*Brassica oleracea var. italica*	Archaeobotanical (Pompeii): Pollen discovered by Vignola et al. (2021) just outside of the southern walls was either from cabbage or broccoli.	Vignola et al. 2021.
Cabbage	*Brassica oleracea*	Archaeobotanical (Pompeii): Charred seed from the House of Hercules' Wedding (VII.9.47); Mineralised seed from House of the Vestals (VI.1.7). Pollen discovered by Vignola	Jashemski 2002, 94; Ciaraldi 2007.

		et al. (2021) just outside of the southern walls was either from cabbage or broccoli. Graffiti (Pompeii): VII.2.30 (referred to as *col(iculum)*, another word for 'stem' and synonymous with cabbage); VII.2.30 (shopping list). Select literary references: Columella (*Rust*. 157.1-2) lists three varieties. Writing more than a century later, Pliny (*HN* 19.136-7) list seven varieties, one of which is the Pompeian cabbage (*HN* 19.139-41).	
Carob	*Ceratonia siliqua*	Archaeobotanical (Pompeii): Charred and ritual deposits in House of Hercules' Wedding (VII.9.47); Dish of pods in Naples Museum (w/o inv. no.). Archaeobotanical (Herculaneum): Broken pieces of pods (in the *deposito*). Paintings (Pompeii): House of the Ephebe (I.7.10-12). Paintings (Herculaneum): Casa dei Cervi (IV.21). Select literary references: Pliny (*HN* 13.59, 14.103, 26.52) describes carob as an evergreen tree with pods and also discusses wine made from carob; Columella (*Rust*. 5.10.20, 7.9.6, *Arb*. 25.1) describes carob as a furnishing food for pigs.	Jashemski 1979; Ciaraldi 2007.
Carrot	*Daucus carota*	Archaeobotanical (Pompeii): Mineralised seeds in the House of the Vestals (VI.1.7) and an unspecified location. Archaeobotanical (Oplontis): Leaves and flowering umbels in the carbonised hay.	Jashemski 1979; Ciaraldi 2007.

		Select literary references: Pliny (*HN* 25.111) mentions 4 kinds which 'grow everywhere on earthy hills and cross-paths'; Dioscorides (3.83) describes the 'coriander leaves, white flowers, top and seeds like dill and terminal umbels like parsnip'.	
Cucumber or melon	*Cucumis sativus / Cucumis melo*	Archaeobotanical (Pompeii): Mineralised seeds in the House of the Vestals (VI.1.7) and an unspecified location; Carbonised seeds in the House of the Surgeon (VI.1.10). Selected literary references: Columella (11.3.48) details ways to cultivate the cucumber and its need for lots of water; Pliny variously discusses their cultivation and uses (*HN* 19.23); Martial (9.7) expresses his embarrassment at the size of his garden (or window box) due to his inability to grow a cucumber in it.	Ciaraldi 2007; Murphy 2015.
Fennel	*Foeniculum vulgare*	Archaeobotanical (Pompeii): Mineralised seeds in the House of Hercules' Wedding (VII.9.47), House of the Vestals (VI.1.7), and an unspecified location. Selected literary references: Pliny (*HN* 18.57, 20.100) talks of the medicinal uses of fennel.	Ciaraldi 2007.
Garlic	*Allium sativum*	Archaeobotanical (Herculaneum): Carbonised cloves in the Casa dell'Alcova (IV.3-4) and unspecified locations (inv. no. 2059 and 84633). Graffiti: Peristyle of M. Holconius Rufus (*CIL* IV 2070) and at IX.8.2 (*allio (a)sses II*) (*CIL* IV 5246).	Jashemski 2002, 87-8.

		Selected literary references: Theophrastus (*Hist. pl.* 7.4.7) mentions a variety used in salads; Pliny (*HN* 19.111-16, 20.50-7) describes several types of garlic and directions for their cultivation, as well as its medicinal uses; Apicius (4.1.3, 9.13.3) uses garlic as seasoning in two recipes; Horace uses his third Epode to the 'guilty garlic'; the pseudo-Vergilian *Moretum* discusses the use of garlic to make the humble dish.	
Leek	*Allium ampeloprasum*	Selected literary references: Cato (*Agr*. 47, 70) discusses the planting of leek beds in vineyards as well as its medicinal uses for livestock; Col. (*Rust*. 6.10, 12.9) discusses the various uses and means of preserving leeks. Martial (*Ep*. 5.78, 10.48) refers to the leek as a humble vegetable; the leeks are grown in Simulus' garden in the pseudo-Vergilian *Moretum* (73).	N/A
Lettuce	*Lactuca sativa*	Selected literary references: Lettuce is grown in Simulus' garden in the pseudo-Vergilian *Moretum* (73); Columella (*Agr*. 10.190-3, 11.3.25-30, 12.9) talks of the lettuce in the vegetable garden and its preservation; Pliny (*HN* 19.19.59, 32.31.101) talks of the medicinal uses of lettuce, its cultivation, and its use as a surname for noble families.	N/A
Onion	*Allium cepa*	Archaeobotanical (Herculaneum): Carbonised remains of bulbs in the Casa a Graticcio (III.13-15) (inv. no. 248); broken pieces of bulb in the Casa dei Cervi (IV.21) (inv. no. 640); carbonised bulbs on the Decumanus Maximus (inv. no. 2325, 13; bulbs in the *Casa*	Maiuri 1947, 236; Meyer 1988, 195-6; Jashemski

		del Bel Cortile (V.8) (w/o inv. no.); dish of carbonised onions in the National Museum, Naples. Archaeobotanical (Pompeii): Onion seed in fodder assemblage in the House of the Chaste Lovers (IX.12.6). Cast: Imprint of a thick layer of onions from cubiculum 16 in the Villa of the Mysteries. Graffiti: Listed in a graffiti list in IX.7.24-25 in Pompeii (*CIL* IV 5280); graffiti in V.3.10 in Pompeii; graffiti in the Gladiatorial Barracks (V.5.3) in Pompeii (*CIL* IV 6722, 4422).	2002, 86-7; Ciaraldi 2007.
Parsnip	*Pastinaca sativa*	Selected literary references: Columella (*Agr*. 9.4.5, 11.3.14, 35) references wild and cultivated varieties and its cultivation in the garden; Pliny (*HN* 19.27, 29, 20.17) references wild and cultivated varieties, its cultivation, and its uses.	N/A
Radish	*Raphanus sativus*	Paintings (Herculaneum): House of the Cryptoporticus (I.6.2/16); Casa dei Bronzi. Paintings (Pompeii): VIII.6.4. Selected literary references: Cato (*Agr*. 35.2), Columella (*Rust*. 11.3.47, 59), and Pliny (*HN* 19.83.5) give directions for its cultivation; Pliny (HN 17.240, 18.130,19.81-83, 86-7, 19.86-7, 20.23-8, 22.125, 23.16, 94, 25.59) describes two varieties and its appearance, its use by the Greeks, Egyptians, and Germans, and its medicinal uses; Dioscorides (2.137) describes the medicinal uses of radishes; Apicius (3.14) references one recipe for the radish.	Spinazzola 1953, 522; Helbig 1868, 154; Reinach 1922, 89.2; Schefold 1937, 188; Schouw 1859; Comes 1879, 74; Jashemski

			2002, 157-8.
Turnip	*Brassica rapa*	Archaeobotanical (Pompeii): Carbonised and mineralised seeds at the House of the Vestals (VI.1.7) and an unspecified location. Archaeobotanical (Naples Museum): Large dish of turnip or rapeseed (now lost). Paintings (Pompeii): Unspecified location (now destroyed). Selected literary references: Theophrastus (*Hist. pl.* 16.6) describes the fleshy root of the turnip; Pliny (HN 18.126-30) said the turnip can be used in many different ways, as a food for animals, birds, and humans, and grows up to 40 pounds in weight; Cato (*Agr*. 5.8, 6.1, 35.2) describes how to cultivate turnips; Varro (Rust. 1.59.3) describes how to preserve turnips; Columella (Rust. 2.10.22) describes turnips as a 'filling food' for rustic people and as a winter food for livestock; Apicius (1.12.8, 3.12.1-2, 6.2.3) describes how to preserve turnips and how to cook them; Dioscorides (2.134) describes that the tops are the most nourishing part of the plant, as well as their medicinal uses; Suetonius (*Vesp*. 4.3) retells the tale of turnips being thrown at Vespasian as an insult.	Wittmack 1906, 61; Helbig 1868; Schouw 1851; Comes 1879; Jashemski 2002, 94-5; Ciaraldi 2007.

Table A: Summary of vegetables from the archaeobotanical, archaeological, and literary remains in Campania.

Appendix B

Human energy expenditure is relatively stable, meaning that modern estimates can be broadly applied to ancient populations. However, such an analysis requires an appreciation of the fact that an individual living in ancient Pompeii was likely more active than the average individual living in the west today (excepting elite members of society who were less likely to be regularly active due to typically undertaking sedentary occupations and employing slave labour for most tasks). To illustrate the typical levels of energy likely being expended by different members of the Pompeian population in the mid-first century AD, I use epigraphic and literary information to categorise Pompeian occupations into the three levels of activity: sedentary, active, and vigorously active.[958] This categorisation allows an extrapolation of calorie-burning brackets for each of these groups to understand the typical consumption levels required to maintain the high level of nutrition seen in the paleonutritional assemblages from Campania.

For the most part, much of the Pompeian population would have been engaged in 'obligatory activities', including manual labour, manufacture, retail, hospitality, entertainment, and/or slavery, as well as 'non-mechanised domestic chores', such as collecting water and wood.[959] As such, the majority would be placed in the 'vigorously active' category.[960] Using Cooley and Cooley's summary as a guide, I have summarised these into the level of activity categories in Table B.

[958] These categories are provided by the Food and Agriculture Organization of the United Nations (FAO).
[959] The FAO specify that 'vigorously active' individuals would be engaged in the usual daily activities, such as cooking, eating, personal care, walking and light leisure activities, in addition to 'non-mechanized agricultural work', 'non-mechanized domestic chores' and 'collecting water/wood' (unlike 'active' and 'sedentary' Physical Activity Levels (PALs)); for full descriptions of each PAL see FAO 2001. The FAO defines 'obligatory activities' as those which 'can seldom be avoided within a given setting, and they are imposed on the individual by economic, cultural or societal demands'.
[960] For lower- and middling-income level households, it is difficult to assess what level of slave labour would have contributed to household and occupational tasks. I therefore take non-slave labour as an indicator, and as a proxy for the diet of any slaves which are not counted in the above sample.

Level of Activity	Trades mentioned in written sources
Sedentary	Architect, banker, doorman, moneylender, scorer (?), scribe, soothsayer
Active	Barber, bath-attendant, cloak-seller, cushion-seller, clapper-beater (?), felt-worker, gem-cutter, goldsmith, ointment-seller, outfitter, painter, pastry-cook, priest's attendant, surveyor, theatre official, weaver, woolworker
Vigorously Active	Baker, builder, carpenter, carriage-driver, chicken-keeper, cobbler, dyer, engraver, farmer, fisherman, fruiterer, fuller, furnace-stoker, grape-picker, guard, herdsman, innkeeper, lupin-seller, miller, mule-driver, pig-breeder, porter, prostitute, rag-and-bone man, tanner, wagoner, wine-seller

Table B: Levels of Activity for humans organised by occupations referenced in graffiti and tombs from Pompeii (per Cooley and Cooley 2004, 174-5).

Average height and weight estimates extracted from bone assemblages discovered in Pompeii and Herculaneum enable us to build a clearer picture of health and dietary standards in Pompeii (as discussed in detail in Chapter Three).[961] I will then apply available paleonutritional data to weight and height indexes provided by the FAO to estimate general energy requirements of the population living in Pompeii in the first century AD.

Henneberg and Henneberg analysed 500 individuals and fifty complete skeletons from over 250 years of excavations in Pompeii and used the results to create a life table for the population. They found a low life expectancy of around twenty-five years, 'high infant and juvenile mortality, and rather small proportion (fourteen percent) of people surviving to old age.'[962] Yet, despite these findings, Lazer and Henneberg and Henneberg, and Henneberg, Henneberg, and Pate, separately found osteological evidence which suggested that the Pompeian population was benefitting from 'adequate diets and [its inhabitants] were in

[961] In the absence of observational data from small samples of a population in a laboratory context, the FAO advises using body weight and/or height instead.
[962] Only half of this is estimated to have survived to the present day; see Henneberg and Henneberg 2002, 169.

relatively good health during the period of bone growth [the crucial stage of development which is affected by stress and illness].'[963]

Henneberg and Henneberg found that birth rates in Pompeii were high, estimating the rate at between six and seven children per Pompeian woman. However, only fifty percent of children were thought to have survived past the age of ten, meaning a survival rate of around three children per mother.[964] This rate is higher than the 1.69 estimated mean number of births given by Bisel and Bisel from their study of thirty-seven adult women from the Herculaneum assemblages.[965] To be cautious, I thus use three children for my sample below, in addition to a male and female adult in each nuclear family. For clarity, this does not include any parents who in some cases may have also resided in one household, or any slaves, for estimates vary greatly relating to the number of slaves per person in Roman society.

In terms of nuclear units, the articulated assemblage found at the House of C. Julius Polybius is of some use. While we have no way of knowing how many of the twelve individuals were inhabitants in this house, mitochondrial DNA has shown that at least six were related: a man in his twenties and a pregnant woman (aged sixteen to eighteen years-old), and four children, all of whom were maternally related.[966] This was the young woman's first child. Assuming she and the child would have survived past childbirth, the estimates above suggest a likelihood of her bearing at least one more child which would make it past its tenth birthday. To be cautious, I include three children under the age of fourteen in my hypothetical sample household below.

The same assemblage was not tested for paternal relationships, and so the 'adult old couple' (a menopausal woman (forty-five plus) and an old man (fifty plus)) and the 'adult tentative couple' (an older male (forty-five plus) and a female in her thirties) may have been

[963] Lazer 2009, 184. See also Henneberg and Henneberg 2002; Bisel and Bisel 2002; Henneberg, Henneberg and Pate 2016.
[964] Henneberg and Henneberg 2002, 174. The sixty percent mortality rate of children living in the *suburbium* of Rome during the Imperial era was unlikely to be as high in Pompeii, where nutritional and sunlight deficiencies were not as prevalent.
[965] An adult female (Erc98) was thought to have given birth to between four and five children; see Bisel and Bisel (2002, 466-7) and Laurence (2005, 89) single this woman out as unusual, though assuming that prostitution was the possible reason for her high birth rate should be rejected as conjecture.
[966] Though related, this young pair may have been a couple (both being cousins).

'related' to the above six paternally.[967] Similarly, in the Pompeian assemblage, Henneberg and Henneberg found that most adults were aged between twenty and forty years-old when they died in the eruption and, according to literary references to the age of women when married, it is safe to assume that most females were younger than their male husbands.[968] While males could be married from the age of fourteen, studies show that this was often later. This house thus provides the opportunity to create a very basic, hypothetical household for the following analysis, consisting of one male in his thirties, one female in her twenties, and two children below the age of fourteen.[969]

To provide a context for the yields in Chapter Three, I will now estimate brackets for the energy requirements and income levels for this sample household. I will do this via an assessment of information relating to height and weight in the Pompeian and Herculanean populations. Stature is affected by genetic make-up and environment during the key stages of growth and can therefore provide important information relating to the health and diet of a population.[970] From a summary of Pompeian studies undertaken between 1899 and 1951, Henneberg and Henneberg found an average height of 166 centimetres for males and 154 centimetres for females.[971] This data is consistent with data from Herculaneum found by Capasso and Bisel and Bisel.[972] Using the same average weight values for fifty-two populations worldwide, Henneberg and Henneberg were able to find an average weight of sixty-six kilograms for males and fifty kilograms for females. Using this information, the Body Mass Index (BMI) for males and females can be calculated as 24.2 and 20.8, both

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[967] Ciarallo and Carolis 2001.

[968] For age analysis, Henneberg and Henneberg (2002) found that most ages fell between twenty and forty years-old for the assemblage studied. For marriage ages, see Lelis, Percy and Verstraete (2003, 15-20, 29-72, 91-101, esp. 103-25 (database)). This study is also referenced by Scheidel (2007) in his study of age at first marriage, according to funerary epigraphic material. See also Lelis 2003.

[969] This is based on the estimated age gap between 3A and 3B, the former a male between the ages of 25-30 years old, the latter a female between the ages of sixteen to eighteen years old, and assumes that, if she and her first child had lived, she would have gone on to bear at least one other child. See Lazer (2009, 138-45) for a discussion related to the higher accuracy of aging during adolescent phases.

[970] As Lazer states, "Regardless of the formulae that are applied, the heights mostly do not diverge by more than a few centimetres and the range of errors show considerable overlap." Lazer uses this argument to support her view that there exists a regional continuity between ancient and modern Campanians in stature.

[971] Henneberg and Henneberg 2002 (using femur and humerus length as a guide).

[972] Notable in the work of D'Amore et al. (1964) is the discovery of mean height for modern Neapolitans as similar to those of our averages for ancient Pompeians, these being 164cm for males and 152.6cm for females for the modern population. Lazer (2009) takes the shorted stature in modern Naples as a sign either of poorer diet and health, or a population unrelated to the ancient Campanians. This could also be the result of urban living, according to the health conditions such as poor light and disease more prevalent here (as discussed above).

within the expected well-nourished range. This provides a base from which to estimate the nutritional requirements of our sample household.

For estimating the calorie requirements of the ancient Pompeian population, Foxhall and Forbes chose to take a modern historical perspective: the population of post-war Crete. Drawing a close comparison between the post-War Cretan rural population and Pompeii in regard to agricultural activity and access to resources, the modern sample typically resided in rural areas and fell within the 'vigorously active' category seen above. In the modern group studied, the average calorie consumption for a 'vigorously active' adult male was 2,565.[973] These calories were typically attained via olives, pulses, fruit, herbs, goat's milk, meat, fish, and cereal. Cereal was measured at between sixty and ninety percent of total calories consumed.[974] Many similarities are once again observable between the post-War Cretan population and the ancient population living in Pompeii, particularly in regard to the variety and efficiency of local diets for requirements. This importantly supports the evidence discussed in Chapter Three for a well-nourished population living in Pompeii before the eruption.

In 1996, the FAO stated that 2,700 calories per day was adequate for proper nutrition.[975] This number is congruent with the post-War Cretan calorie estimate of 2,565 calories consumed per day though does not allow enough energy for a 'vigorously active' individual.[976] Therefore, the numbers used in Table C are taken from the FAO estimates for 'vigorously active' males and females of the age and weight established above.[977]

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[973] The study was conducted in 1948, with daily calorie intake compared with the Food and Agriculture Organisation (FAO) estimates of daily calories (see Foxhall and Forbes 1982, 41-90).
[974] Foxhall and Forbes 1982, 66. See also Wilkins and Hill (2006, 114). Amemiya (2007, 75) states that 'a person takes seventy percent of calories from grain', while Gallant (1991, 66) notes that this was between eighty-five and ninety percent in 1920s Cyprus. Foxhall and Forbes (1982, 56) state that today this consumption in this region is now as low as sixty percent.
[975] FAO 2001.
[976] Amemiya (2007, 75) in his study of the Ancient Greek diet and economy applies a fifteen percent adjustment to Food and Agriculture Organisation (FAO) calorie figures, though how he has come to this percentage is not made clear. I use the FAO estimates in this scenario.
[977] The FAO uses PAL, Physical Activity Levels, to estimate energy requirements by gender and age brackets. A PAL of 1.75 is taken as 'moderately active'. Therefore, the three PALs above this, 1.90, 2.05, and 2.20, fall into the 'vigorously active' category. I have taken the middle point (2.05) as the example energy requirement here. For moderately active, I have taken 1.75.

	Adult male (vigorously active)	**Adult female (vigorously active)**	**Children (x3)**	**Total**
Average age	30-39	20-29	3-14	
Average height	166cm	154cm	N/A	
Average weight	66kg	50kg	N/A	
Daily average energy requirement	3,300 kcal	2,500 kcal	10-year-old girl = 2,000 7-year-old boy = 1,575 5-year-old boy = 1,350 TOTAL = 4,925 kcal	10,725 kcal

* Based on 2.05 PAL (Physical Activity Level)

	Adult male (moderately active)	**Adult female (moderately active)**	**Children (x3)**	**Total**
Average age	30-39	20-29	3-14	
Average height	166cm	154cm	N/A	
Average weight	66kg	50kg	N/A	
Daily average energy requirement	2,850 kcal	2,150 kcal	10-year-old girl = 2,000 7-year-old boy = 1,575 5-year-old boy = 1,350 TOTAL = 4,925 kcal	9,925 kcal

Table C: The energy requirements for 'vigorously active' and 'moderately active' scenarios. The children are taken as above breast-feeding age and below the age of fourteen (illustrative examples taken as a ten-year-old girl, a seven-year-old boy, and a five-year-old boy).[978]

[978] Based on weight data from Henneberg and Henneberg 2002, 172-83, height data from Bisel and Bisel 2002, 455, and age data from Henneberg and Henneberg 2002, 172, using Herculaneum assemblages. Figures for kcal from FAO (2001), based on males aged thirty to fifty-nine, and women aged eighteen to twenty-nine. Children are taken to be between the ages of three and fourteen due to the tendency of children below the age of two-and-

To understand how these energy requirements may have been met, I will undertake an analysis of the long shopping list from IX.7.24-5 in Pompeii and use this as a comparison point. Utilising the same methodology as in Chapter Three, I assume standard portions of the Oscan pound (272.81g) (for example, for items such as nuts and vegetables) unless dealing with bread and wheat. For grain-based goods, I assume the standard weight of four Roman *libra* (around 1,300g) per one loaf of bread and one *modius* for the 'wheat' costing one *denarius* (or 16 *asses*), which would make roughly sixteen loaves of bread.[979] For this and other bread references, I use the nutritional information for one loaf of Roman spelt bread (including those which are 'plain' and 'for slaves', and therefore likely of lower quality). The calculations for this analysis are summarised in Table D, Table E, and Table F.

Shopping list items from IX.7.24-5			**Nutritional Information in Oscan *libra* (272.81g, shown as grams)**				
Items	**Cost in *as* over 8 days**	**Estimated portions**	**kcal**	**Protein**	**Fat**	**Carbs**	**Fibre**
cheese	9 *asses*	9 x Basin A	1,060	87	74	10	0
bread	40 *asses*	20 x loaves	7,313	0	650	12,350	2,600
onion	5 *asses*	Single portion	77	3	0	18	130
bread for slaves	10 *asses*	10 x loaves	29,250	0	325	6,175	1,300
porridge	8 *asses*	8 x Basin A	1,123	40	44	146	27
beef	1 *as*	1 x Basin A	453	60	22	0	0
dates	1 *as*	1 x Basin A	340	4	0	86	19

a-half years to be breastfed. The calories have been calculated based on a hypothetical combination of one boy aged five, one child aged seven, and one girl aged ten, according to the 'pattern of pre-Malthusian birth spacing' without any mortality; see no.85. *Based on 2.05 PAL (Physical Activity Level).

[979] For weight, see Johnson 2021 (referencing the research of Farrell Monaco). 'Each modius would… yield 16 loaves (96 loaves/*artaba*, divided by 6 *modii*/*artaba*), each containing one sextarius of wheat'; see Bagnall 2001.

small sausage	1 *as*	1 x chorizo (200g)	910	48	77	4	0
soft cheese	4 *asses*	4 x Basin A (ricotta)	395	26	30	5	0
leek	2 *asses*	2 x leeks	88	6	2	12	9
plain bread	4 *asses*	4 x loaves	11,700	0	130	2,470	520
whitebait	2 *asses*	2 x Basin A	359	56	11	0	0
wheat	16 *asses*	16 x loaves	46,800	0	520	9,880	2,080
dried nuts/fruit*	16 *asses*	1 x Basin A	1,613	0	142	57	29
beans	16 *asses*	1 x Basin B (1000g)	1,100	76	4	197	54
Totals	**135 *asses*****		**102,580**	**406**	**2,031**	**31,409**	**6,767**

Table D: Summary of the cost, portions, and nutritional information (in Oscan *libra*, but shown as grams) of all edible items on the shopping list from IX.7.24-5 in Pompeii.[980]

Per 8 Days	**Activity Level**		**Per week**	
Calories by Energy Level	**Vigorously Calories**	**Moderately Calories**	**Vigorously Calories**	**Moderately Calories**
Adult male	3,300	2,850	26,400	22,800
Adult female	2,500	2,150	20,000	17,200
Adult male	3,300	2,850	26,400	22,800
Child x3	4,925	4,925	39,400	39,400
Total	**14,025**	**12,775**	**112,200**	**102,200**

Table E: Energy Requirements by age, gender, and activity level (as per FAO 2001).

[980] * I take almonds as an example, for these appear to be the most common nut consumed at Pompeii (see Chapter Three).
** This list does not include the other, non-edible items included on the list (e.g., a lamp).
Nutritional information taken from NutritionData 2020; EatThisMuch 2021; Yazio 2021; Sainsburys 2022.

Energy Requirements per 8 Days	**Calories**
1 x male adult, 1 x female adult, 3 x children (moderately active)	79,400
1 x Slave (vigorously active)	26,400
Total per week	105,800

Table F: Summary of Energy Requirements by group and activity level (as per FAO 2001).

The estimates taken in these tables reveals that the 'shopping list' recording eight days of purchases likely provided adequate nutrition to six individuals, including three adults and three children: this list would have provided ninety-seven percent of the nutritional requirements of this hypothetical household. Removing the ten asses for the slave diet on the list (assuming that the slave ate ten *asses* worth of bread (equivalent to ten loaves), plus an unaccounted-for wine and oil allowance, and potential household leftovers) leaves around 125 *asses* for the family of five. This equates to around three *asses* per day per person, just over the two *asses* per person described by Suetonius as sufficient for a frugal diet.

It goes without saying that this calculation is very rough and assumes a lot about the activity levels of the individuals, and the make-up of the house, not to mention assuming that this was indeed a shopping list and not some other record. Furthermore, this hypothetical scenario does not consider the possibility of the household eating out regularly or on occasion and does not include the added nutritional benefits of fruit, vegetables, oil, and wine which are either not included, or are included only in small numbers on the list. Nonetheless, this scenario provides a good idea of how much food an average Pompeian household would have to be purchasing over the course of the week.

Appendix C

The following explains the process for creating stippled maps, as visualisations of GI, LIP, and SIP data via the process of spatial syntax analysis. To illustrate the methodology, I use the Garden of Hercules (II.8.6) as a case study.

Global Integration (GI)

As established in Chapter Five, GI establishes which rooms in a property were the most integrated with others in the property, and therefore most likely to encourage social integration. Establishing GI requires the calculation of Mean Depth (MD) and Relative Asymmetry (RA). In spatial syntax, each node is taken at a value of one (including the one external point), irrespective of size or contents, and 'is based on the number of boundaries that need to be crossed (as opposed to metric distance travelled) between each point, and the mean depth of each point from the system as a whole.'[981] This approach works to reveal the accessibility of each node within a given property from the point of the external.

To begin calculating GI, one node on an access map is chosen as a starting point. For illustration, I will assess node A, marked with an X on Figure A for clarity. Each node is assigned a value according to the number of boundaries between it and node A.[982] For example, from node A there are two nodes one barrier away, three located two barriers away, three located three barriers away, and so on. Once these values have been calculated, their sum is divided by the total number of nodes in the property (*k*), excluding the external node (therefore, in this case, *k* would equal fourteen). The final number given is the Mean Depth, or MD, for node A. This process is then repeated for each node (excepting the external node).

[981] von Stackelberg , 58.
[982] Nodes which are one boundary away from X are assigned a value of 1, those two boundaries away are assigned a value of 2, and so on.

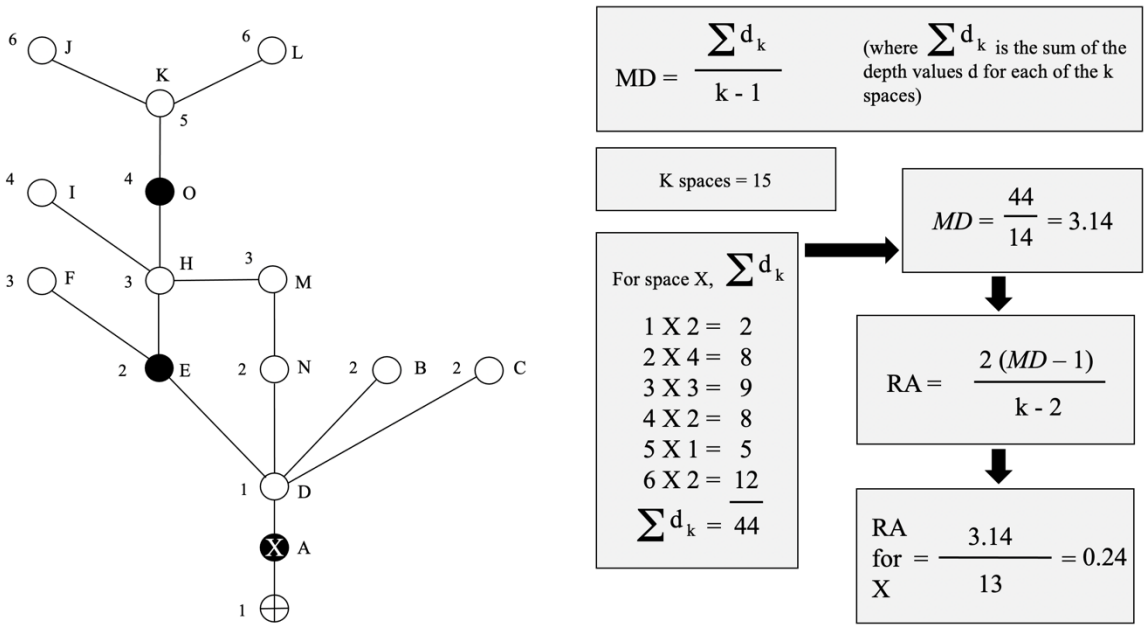


Figure A: Justified access map for the House of the Garden of Hercules (II.8.6) in Pompeii, with MD and RA calculations. An example for calculating the MD and RA for node A (signified as X above).

MD values can then be used to calculate the Relative Asymmetry (RA) value of each node. RA at Global and Local levels can be seen in Figure 29 in Chapter Five.[983] As established in the chapter, RA is useful for establishing the accessibility of a given space within the global unitary control of one property. However, as a configuration gets larger, the RA can become disproportionately small, thus skewing results. This is because RA is standardised, with the quantification of accessibility by room only ever ranging between 0 and 1. Real Relative Asymmetry (RRA) acts as a development of RA and represents accessibility on a range from 0 to infinity. In this way, RRA can help to differentiate more clearly between Local and Global accessibility. For example, this may allow the data to express nodes which are 'locally accessible, but globally inaccessible', or nodes which are accessible but have low control over their neighbouring units (for example, a storage room close to the exterior). As described by Grahame: 'The higher the RRA value, the more inaccessible a space will be'.[984]

[983] A description of RA can be found on page 149.
[984] Grahame , 35, 46.

RRA can be calculated using *k* values and D-values. One unique D-value was assigned to each *k* value by Hillier and Hanson in their original publication on the methodology of spatial syntax analysis.[985] To calculate RRA, the MD for a node is divided by the given property's D-value. When combined, these figures represent the overall Global Integration of a property in a stippled map. For the above example, a table such as that seen in Table G would be produced.[986] The list of RRA values are then ranked from lowest to highest and divided into three to create the categories of High, Moderate, and Low Global Integration (Table H), to be input into stippled maps (see Figure 42).

	Nodes													
MD	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
	2	1	1	5	3	1	2	4	1	1	3	1	2	2
	8	8	8	8	14	4	10	8	6	4	2	4	8	10
	9	12	12	6	6	21	12	15	12	3	9	3	15	9
	8	8	8	4	8	8	4	4	20	12	12	12	12	12
	5	5	5	10		10	10		5	15	15	15		5
	12	12	12							18	6	18		
										7		7		
Total	44	46	46	33	31	44	38	31	44	60	47	60	37	38
MD=	3.14	3.29	3.29	2.36	2.21	3.14	2.71	2.21	3.14	4.29	3.36	4.29	2.64	2.71
RA=	0.33	0.35	0.35	0.21	0.19	0.33	0.26	0.19	0.33	0.51	0.36	0.51	0.25	0.26
RRA=	1.27	1.36	1.36	0.81	0.72	1.27	1.02	0.72	1.27	1.95	1.40	1.95	0.98	1.02

Table G: GIP calculations, including Mean Depth (MD), Relative Asymmetry (RA), and Real Relative Asymmetry (RRA) values for node A in the Garden of Hercules (II.8.6) in Pompeii.[987]

[985] Hillier and Hanson .
[986] Each value must first be converted to RRA values; see Grahame 2000, 35. For D-values, see Hillier and Hanson 1984, 112.
[987] The D-value for this property is 0.259.

Space ID	RRA Value	Cumulative Total	Cumulative Percentage	Rank Order	Level of Global Integration
E	0.19	0.19	4%	1	High
H	0.19	0.37	8%	2	High
D	0.21	0.58	13%	3	High
M	0.25	0.84	19%	4	High
G	0.26	1.10	25%	5	High
N	0.26	1.36	31%	6	High
A	0.33	1.69	38%	7	High
F	0.33	2.02	46%	8	Moderate
I	0.33	2.35	53%	9	Moderate
B	0.35	2.70	61%	10	Moderate
C	0.35	3.05	69%	11	Moderate
K	0.36	3.42	77%	12	Low
J	0.51	3.92	89%	13	Low
L	0.51	4.43	100%	14	Low

Table H: Ranked RRA values for the Garden of Hercules (II.8.6) in Pompeii, with High, Moderate, and Low Global Integration ranked for each node.

Local Interaction Potential (LIP)

As established in the main chapter, LIP helps to establish which rooms in a property had the most control over other spaces, and as such those which were most frequented, namely by members of the household. To calculate LIP, each node is again assigned a value of one and is 'distributed' among neighbouring nodes. For example, node A will have the values of 1, from the neighbouring external node, and 0.2, from node D which has five neighbouring nodes. This process is repeated for all other nodes in the access map, their values being totalled up by node into 'Control Values'. As with GIP, these final values are ranked from highest to lowest and divided by three to create the LIP stippled map. Once again, the external point is not included in the ranking, despite sharing its value with other nodes. In Table I, nodes D and K are the highest ranked, meaning that these spaces were

likely atriums or courtyards of sorts, where frequent interactions of different individuals were designed to take place. A check of the floorplan confirms this as true (see Figure 42).

Space ID	**Control Value**	**Cumulative Total**	**Cumulative Percentage**	**Rank Order**	**Interaction Potential**
D	3.33	3.33	23%	1	High
K	2.50	5.83	40%	2	High
H	2.33	8.16	56%	3	Moderate
E	1.45	9.61	66%	4	Moderate
A	1.20	10.81	75%	5	Moderate
M	0.75	11.56	80%	6	Low
G	0.70	12.26	85%	7	Low
N	0.58	12.84	89%	8	Low
F	0.33	13.17	91%	9	Low
J	0.33	13.50	93%	10	Low
L	0.33	13.83	96%	11	Low
I	0.25	14.08	97%	12	Low
B	0.20	14.28	99%	13	Low
C	0.20	14.48	100%	14	Low

Table I: Ranked Control Values for calculating LIP for the Garden of Hercules (II.8.6) in Pompeii, with High, Moderate, and Low Interaction Potential ranked for each node.

Stranger Interaction Potential (SIP)

Stranger Interaction Potential creates a visual for which rooms were most accessible to strangers, and therefore most likely to be frequented by them or, alternatively, be limited to them (perhaps entirely or by invitation). To quantify SIP, justified access maps are once again required; I once again use the same property as an example. Based on the knowledge established in Chapter Five, and in consideration of the relation between depths of a *domus* and social hierarchies (the deeper one moves into a property, the closer they are to the host),

SIP treats the exterior as the starting point and conflates stranger accessibility with the number of barriers crossed.

A justified access map allows the easy calculation of a node's depth from the exterior; for SIP, all nodes are ranked by their depth from the exterior, before once again being split into three (from one upwards) to produce a stippled SIP map (see Table J below and Figure 42 for the stippled map). The exterior is, of course, excluded from the final ranking. Once LIP, GIP, and SIP have been quantified and visualised in stippled maps, 'we can begin to access the *ideas* that people had about how space should be ordered' and their relations to different buildings and the conventions which ordered them.[988] The outcomes of this for the garden properties under study are discussed in depth in Chapter Five.

Space ID	**Depth from Exterior**	**Interaction Potential**
A	1	High
D	2	High
B	3	Moderate
C	3	Moderate
E	3	Moderate
G	3	Moderate
F	4	Moderate
H	4	Moderate
M	4	Moderate
I	5	Moderate
N	5	Moderate
K	6	Low
J	7	Low
L	7	Low

Table J: Ranked SIP for the Garden of Hercules (II.8.6) in Pompeii, showing High, Moderate, and Low Interaction Potential for each node.

[988] Grahame 2000, 35-6.