Space Syntax Analysis and the Domestic Architecture of the Roman West

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Abstract

In the first century AD, following a period of expansion and conquest that stretched the bounds of its territory to the edges of the known world, the Roman Empire had grown to encompass the frontiers of the Roman northwest, a region which would come to be known as three separate provinces: Gaul, Germania, and the island of Britannia. These areas, at the edge of the Roman world, contained their own populations, replete with distinct cultures, architecture, and ways of life distinct from the cosmopolitan Mediterranean world of their Roman conquerors. Over the course of decades and centuries, indigenous ways of life adapted to and incorporated the advances and technological innovations brought by the Latin invaders. The phenomenon of this cultural change, long referred to by scholars as "Romanization," is manifest in the archaeological record. Nowhere is this truer than in the architectural remains of the domestic spaces occupied by these provincial inhabitants of the Roman Empire, traditionally grouped together under the umbrella term of "Celts."

Employing a methodology grounded in network theory, the present study applies space syntax analysis to the architectural plans of over 350 domestic sites from the Roman northwest. The goal is to search for evidence of consistent patterns to the use and arrangement of space, and to follow those patterns to discern if there is detectable change over time and geographic space. From that data, the Romanization model, now over a century old, is put to the test. The layouts of these domestic structures, which appear outwardly Roman in their architecture, yet distinct from Roman houses elsewhere in the Empire, contain a missing piece of information regarding the nature of how these citizens northerly citizens of the Roman Empire adapted and negotiated their place in the larger Roman world.

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For Ashley

Chapter 1

Introduction

1.1 Opening Remarks

The concept of the house represents more than simply a collection of discreet spaces where individuals live, work, and store their material possessions. Often, the home reflects the cultural values and norms of the society in which its inhabitants live, encoding the patterns of their lives in the spatial arrangements of the structures in which they dwell.[1] This principle is certainly true of the domestic architecture of northwestern Europe under the Roman Empire, in the regions then known as the provinces of Britannia, Gaul, and Germania.

Prior to the Roman conquest of the region, the inhabitants of the area, nebulously grouped under the cultural umbrella of the "Celts," practiced their own traditions of domestic life, living in houses, often constructed primarily of wood, and practicing essentially pastoral means of land use and subsistence.[2] Both before and after the coming of the Romans, the landscape of domestic settlement undergoes a transformation, with the adoption of building patterns and technologies more reminiscent of the Romans than familiar to the European Iron Age.

The Celtic peoples of central and northern Europe present a tapestry of interwoven cultures, loosely affiliated to one another through a shared material culture.[3] According to

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[1] The idea is an underpinning concept of the analytical process of space syntax, discussed at length in Hillier and Hanson 1984.

[2] The Celts are defined as a broad cultural group, spanning the majority of central and northern Europe up to the borders of the North Sea. Celtic populations are also located in the Iberian Peninsula and Anatolia. See Cunliffe 2003; These populations are connected to one another through shared linguistic and material ties, but are regionally distinct in terms of their architecture and religion, to name a few differences. See Green 1989; The most commonly associated cultures with the term "Celtic" are the Hallstatt and La Téne cultures of Central Europe, which are synonymous with the late Bronze and Iron Ages in that region. See Collis 2003; Harding 2007.

[3] See Harding 2007, 1-15.

Dennis Harding, "Celtic art is generally synonymous with the La Tène ornamental style of the pre-Roman Iron Age," but there are a number of subcategories that are used to refer to regional variations to that artistic style, such as the Early Style, the Sword Style, the Plastic Style, and the Waldalgesheim Style.[4] These variations represent distinct manifestations of mature Iron Age craft and artistic techniques, usually connected with metalworking, that appear at different times in different places. In terms of their domestic housing, these indigenous groups also maintained distinct practices and traditions. For example, while construction techniques in the European northwest focused on the use of timber, architectural forms differed by tribal group and locality. The Iron Age inhabitants of the British Isles, for instance, constructed round houses, while their Continental counterparts chose to dwell in rectilinear homes.[5] A classic example of the British round-house was excavated at Little Woodbury, near Salisbury in Wiltshire.[6] Contrasting this example are the Gallic houses excavated at Bibracte, near Autun in France, where the structures are rectangular.[7]

It is in this overarching context that the inhabitants of northwestern Europe appear to show tangible markers of Roman material culture. The evolution of domestic architecture in the region is often considered a primary marker of assimilation into Roman culture, broadly defined. The study which occupies the following chapters aims to test that supposition.[8] A sample of the Roman domestic remains from northern Europe will be analyzed using a methodology grounded in network science. Using space syntax analysis as a means of quantifying the spatial configurations and network principles to correlate and compare those numeric results, the

4 Harding 2007, 1; 15.
5 See Harding 2009.
6 See Bersu 1940.
7 Romero 2006, 87-89.
8 Percival 1976. Even going as far back as Francis Haverfield's coining of the term "Romanization," the connection between domestic architecture and Roman culture is made explicit; see Haverfield 1912.

approach used in this dissertation presents a new way of interpreting the Roman house at a regional scale.

1.2 Roman Domestic Architecture in Northwestern Europe

To begin, it is useful to define the chronological and geographical boundaries of the study area. The region of study is the northwestern provinces of the Roman Empire. More specifically, for the purposes of the present analysis, the extent of the area under examination includes the modern countries of England, Wales, the Netherlands, and Belgium. The northern half of France, and the Rhine Valley of Germany comprise the remainder of the material under consideration. Together, these areas cover a geographic extent which includes the portions of the British Isles, Britannia to the Romans, that fell under direct Roman control, the northern portion of the region known in antiquity as Gaul, and the area of modern Germany west of the Rhine river that fell within the Roman sphere of influence.[9]

Chronologically, the period of interest originates in the beginning of Roman colonization of the region in the first century AD, and ends with the loss of formalized Roman control, sometime in the fifth century with the collapse of the Western Empire. The exact date varies by province, with areas such as Britannia abandoned earlier than parts of the mainland. For the purposes of the present study, the chronological parameters run between the first and fifth centuries AD. These dates follow commonly-used chronological boundaries established in previous scholarship, such as in Greg Woolf's *Becoming Roman*, which challenges the traditional narrative of Romanization in Gaul, and David Mattingly's *An Imperial Possession*,

9 See Mattingly 2007, 126 for details of the Roman disinterest in expanding into Scotland and Ireland; see Woolf 1998, 51 on the geographical boundaries of ancient Gaul; see Maner 2018, 17-18 for more on Germany under the Roman Empire.

which discusses Britain in the context of the larger Roman Empire.[10]

Within that span of time and in those places, there are a large quantity of domestic contexts preserved.[11] Roman-style houses in northwestern Europe, particularly in Britain, have received considerable scholarly attention. Consequently, the typologies of specific categories and classifications of structure are generally decided upon by scholars, based primarily on the work of J. T. Smith and John Percival, both archaeologists concerned with Roman architecture.[12] Previous approaches to domestic architecture in the northern provinces have concentrated on details of regional architecture, or in the specific remains uncovered within the borders of a modern nation-state. For example, Ursula Heimberg's article on the subject of the Roman villa in the Rhineland-Pfalz region of Germany includes around one hundred distinct contexts from that area, but focuses on a particular geographic region.[13] In comparison, the present study counts 357 domestic contexts in its data set, assembled from across northwestern Europe. The methodology employed here enables a greater number of locations to be compared against one another than previous, non-computational approaches, which in turn enables the size of data sets to similarly expand in size and scale.

The domestic material from northern Europe is seen as key to understanding the processes of cultural change and assimilation in the region under Roman rule.[14] Similarly, public monuments are also seen as manifestations of *Romanitas* in the northern provinces.[15] The architecture employed by the residents of this most northerly portion of the Roman Empire sends

[10] Woolf 1998; Mattingly 2007.
[11] The exact criteria used in site selection are discussed in Chapter 2. See section 2.5.2 Analytical Processes.
[12] See Percival 1976; Smith 1997
[13] Heimberg 2002/2003.
[14] See Perring 2002.
[15] See McGowan 2005.

intentional messages about self-conception and the conspicuous consumption of Roman material culture and social practices. How the inhabitants reflected these values in the architecture of their homes speaks to the formation of their personal and collective identities within the wider Roman world.

1.3 Romanization and Domestic Archaeology

One of the driving issues in the archaeology and history of the Roman provinces for the last century has been the idea of Romanization. Concerned with the fundamental processes of cultural change in the areas of Roman occupation in the imperial period, the scholarly discussion of Romanization as a formal phenomenon, or not, traces back to the writings of Francis Haverfield, a British archaeologist of the late nineteenth and early twentieth century who was, in turn, influenced by the publications of the German historian Theodor Mommsen.[16] The debate over the concept of Romanization is particularly tied to the archaeology and history of the northwestern region of the Roman Empire, due to the discussion's origins in British scholarship and its relevance to research concerning identity and material culture in northern Europe.[17]

The discourse on Romanization was influenced by broader scholarly trends throughout the twentieth century, with generations of scholars, primarily British with some American input, weighing in on the subject.[18] The most recent major development in the debate has been the publication of Greg Woolf's *Becoming Roman* in 1998.[19] The central premise of Woolf's monograph is to dismember the idea of Romanization as a formalized process, driven by Roman or provincial elites in a systemic attempt to bring Roman culture to the provinces. Instead, Woolf

16 Mommsen 1888; Haverfield 1912.
17 Versluys 2014, 2-4.
18 For example, see Richmond 1930, and Manning 1962.
19 Woolf 1998.

argues that the process of cultural change should be viewed as a negotiated redefinition of identity, reliant more on changing practices and developing social customs than ascribable to any organized societal authority.[20] Since Woolf's publication, there have been several follow-up discussions of how to proceed since the described "death" of Romanization. Most recently, a special issue of *Archaeological Dialogues* was devoted to the topic.[21] Within the context of that discussion, Peter van Dommelen argues that the debate has moved on to more anthropological concepts, such as contact and colonization, with "Romanization" serving as convenient terminology.[22]

The archaeology of the Roman house is certainly connected to the discussion of Romanization. Studying Roman domestic space is intrinsically linked to the debate surrounding cultural change in the northern provinces. The use of residential structures as markers of cultural change dates to the early part of the twentieth century, and persists into the present.[23] Not without merit, scholars view the built environment as a reflection of cultural practices. New means of analysis and theoretical approaches have been used over the course of the last century, but the underlying principle remains the same: the archaeological remains of Roman houses can reveal information about how the inhabitants of those structures lived and conceptualized their identities. Our understanding of Roman identity is often intertwined with interpretations of architecture, and domestic structures represent a key part in understanding the northern provinces of the Roman Empire and the people who inhabited it.[24] The present analysis is situated within

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[20] Woolf 1998, 169-175.

[21] Versluys 2014; Notable inclusions in this volume, in addition to Versluys' article, are the publications by Greg Woolf and Peter van Dommelen; Woolf 2014, and van Dommelen 2014.

[22] Van Dommelen 2014, 44.

[23] See Percival 1976, and Heimberg 2002/2003.

[24] See Gardner 2007, which contains a detailed discussion of interpreting Roman identity, particularly Chapter 4, which is concerned with interpreting Roman identity through space.

this wider scholarly context, and aims to introduce a new methodological means of interpreting the architectural remains of Roman structures in a way that relies on computational techniques to analyze and compare.

1.4 A New Approach

While past scholars have dealt with the contentious topic of Romanization, and the role of domestic architecture in tracing that phenomenon in the provinces, the sheer quantity of data presented to the modern archaeologist has limited both the time a scholar can devote to assembling and analyzing data, as well as the computational limits of technology. With advances in quantitative and computational technologies, these limitations continue to diminish. The current study employs space syntax analysis, and other methods of quantitative thinking grounded in network theory, in an effort to produce an approach that encompasses as much material as possible in a statistically rigorous way. The computational advantage offered by network analysis methods, coupled with the quantification of the domestic built environment, meets those criteria.

The decision to pursue a methodology grounded in network science came about as a result of early investigations concerning the proper means of capturing a truly regional snapshot of domestic architecture in northwestern Europe, primarily as a means of tracking evidence for the Romanization phenomenon in the material record. An encounter with the literature on space syntax, such as Mark Grahame's analysis of the domestic spaces of Pompeii, led in turn to broader consideration of the role of network science in archaeology.[25] Where Grahame's research engages with a single house at Pompeii, or even can be scaled up to encompass a

[25] Grahame 1998 and 1999. For more on networks in archaeology, see Brughmans 2013a.

number of residences at the site, the current approach expands that scope to an entire region. As a result, it provides a comparative sample across a geographic and temporal span that is not possible when restricting space syntax analysis to a single location.[26]

While the concept of space syntax as a means of spatial analysis is not new in archaeology, the more recent applications of network science to archaeological materials have not yet included the earlier work on space syntax among their number. Essentially, the methodology employed in this study is a network-based approach executed at two levels. At the most refined scale, the space syntax analysis of each architectural space in the data set is functionally the same as applying network analysis methods to each archaeological context. Each residence is converted into a graph representation of the spatial arrangement, which can be quantified mathematically. Space syntax analysis has been applied to a wide range of architectural material, both archaeological and as a means of assessing contemporary uses of space in structural design and urban planning.[27] Stepping back a level, the next step in the analysis of the data applies network methods of thinking to the results of the space syntax analysis. While not engaging with formalized network structures or generated plots of interconnected diagrams of similar sites, the theoretical concepts of network science propel the comparative analysis, which searches for a number of patterns within the data.

Due to the complicated nature of graphing complex network diagrams, the resulting plots are often nothing more than illustrations of the complexity of the data. The interwoven, tangled lines of connection between elements in the network are unreadable to the human observer. By necessity, then, a better way of examining and interrogating network structures is through

[26] Grahame 2000 expands his initial work with space syntax methods to a larger sample of houses at Pompeii.
[27] See Hillier and Hanson 1984, who establish the principles of space syntax analysis and its mathematical underpinings; and Hillier 2014, which adds a more explicit cultural heritage dimension to space syntax theory.

correlation analysis tests and other queries of data subsets, looking for similar values and recorded components of data, using network theory as a set of guiding principles. These core functions of network science drive any research that seeks to understand interactivity and the interconnectedness of objects and locations in the archaeological record, such as Shawn Graham's examination of the Antonine Itineraries using network modeling.[28]

In order to better examine the material collected as part of the current study, the data are separated into a number of subsets, based on criteria such as chronological span, geographic location, and structural type, which reveal patterns more readily than any network visualization. The primary split in the data, as detailed below, occurs at the grossest level possible, to separate the archaeological data by whether or not the site appears on the British or Continental coast of the English Channel.

1.5 The Insular/Continental Divide

The present study divides the assembled material, collected from published archaeological reports and cultural heritage databases, into two halves, based on geographical distribution. These two halves of the dataset are proscribed by the English Channel, separating the material into the Insular and Continental segments, each of which is examined in detail in its own chapter of the dissertation. The reasons for the distinction between the two areas of the study region involve practices of archaeological thinking involving the material culture of islands, as well as the natural division between island and continent that exists in the physical landscape.

The island as a distinct archaeological landscape has received considerable scholarly

[28] Graham 2006, 50.

attention, particularly in regards to oceanic regions of the world, such as the southeast Pacific and the Aegean. Archaeologists such as Cyprian Broodbank and Chris Gosden have discussed the practicalities and peculiarities of the island as an archaeological and cultural landscape, and conclude that the specifics of such locales merits a certain treatment distinct from more land-locked archaeological contexts.[29] It is sometimes assumed by archaeologists and anthropologists that islands can function as laboratories, relatively closed systems that can be compared to larger, more heterogeneous continental regions.[30] However, Broodbank argues the opposite, that the interconnectedness of island cultures, both to other islands and nearby continental societies, means such insular locations should be considered in a wider context.[31] Nevertheless, from an analytical standpoint, it is beneficial to the current study to keep the Insular and Continental distinct.

Consequently, it makes sense to separate Britain from the rest of the study area, in order to account for possible deviations that might arise from the physical geographic separation enforced by the English Channel.[32] Tangential to that argument, there is precedent for a conceptual division between Britain and the Continent in both the Iron Age and the Roman period. In the scholarship of Iron Age archaeology, there is a clear distinction made between the Iron Age inhabitants of each region.[33] The inhabitants of ancient, pre-Roman Britain, for instance, were removed from the tribal politics and rivalries of Gaul, to a certain extent. Further, there are slight differences in the material culture of each region, with pottery, metalworking,

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[29] See Broodbank 2000 and 2013, which examine the specific contexts of the Aegean islands; Gosden and Pavlides 1994 examines the islands of Papua New Guinea in a similar fashion; Fitzhugh and Hunt 1997 handles the phenomenon of island archaeology more generally.

[30] Fitzhugh and Hunt 1997, 380.

[31] See Broodbank 2013.

[32] David Mattingly cites Diodorus Siculus and Strabo as the ancient sources for his definition of ancient Britannia as comprised of the modern British Isles; Mattingly 2007, 28; Diodorus Siculus 5.19-40; Strabo IV.5.

[33] See Harding 2007.

and weaponry at Gallic and Germanic sites aligning much more closely with traditional La Tène chronologies, while sites in Britain lag behind by almost half a century, on average.[34] The Continent in this context is thus defined as the mainland of Europe that is distinct from the British Isles. That precedent, combined with the chronological distance in the Roman conquest of each area, tips the balance in favor of preserving the distinction between Insular and Continental in the present study.

1.6 Research Questions

With the greater geographical and temporal context in mind, as well as the role of digital technologies, the main research questions of the study come into focus. The study is motivated by one of the primary concepts of space syntax, that there is a culturally-specific manifestation of space that is quantifiable, regardless of the individual presentation of architecture. Bearing that in mind, the present study aims to test that assumption. Applying space syntax methods to a wide range of Roman domestic contexts from northern Europe, the analysis of those results will test to see if there is, in fact, a quantified expression of space that reads as distinctly Roman. These sites include elite, rural villas, such as Fishbourne Palace, contrasted with more humble, urban residences such as the homes found in *insula* I at Caerwent.[35] Across the English Channel, the evidence from the Continent incorporates locations such as the refined city dwelling of the Maison des Escargotiers at Mâlain, alongside the smallest farmsteads, like the early phase at Bollendorf in Germany.[36]

From there, if such a quantification of Roman spatial arrangements does present itself, is

[34] Harding 2007, 140.
[35] For Fishbourne, see Cunliffe 1971; For Caerwent, see Johnson 1996.
[36] For the Maison des Escargotiers, see Provost, et al. 2009a; For Bollendorf, see Percival 1976.

there a spatial or temporal element to that manifestation? Is there a change in how Roman residences appear in terms of spatial layout over time? Connected to that question, is there a geographic element to spatial arrangement, with domestic architecture in different parts of the region having different presentations of how space is structured? The overarching question concerns what this quantified data can do to inform the broader archaeological and historical discussion of how cultural change occurred in northern Europe under the Roman Empire. Ultimately, who were the occupants of these domestic spaces and how did they express the negotiation of their identities under Roman rule in the structures they built and lived in? These are among the main questions this dissertation will attempt to address in the following chapters.

1.7 Chapter Layout

In order to provide a clear and concise structure to the discussion of the study, data, and results, the chapters of this dissertation will proceed as follows. The second chapter begins by covering the history of the study of Roman houses across the Empire. The aim in doing so is to provide a wider context for the current study. The main scholarly publications and discussions concerning domestic architecture in the Roman world are summarized and the major categories of Roman residential structures will be detailed and described. The second portion of the chapter concerns the theoretical underpinnings of network-based approaches to archaeological data, including discussions of space syntax as a method and the foundations of network-centric means of thinking about archaeological material. The origins of these quantitative methods in the disciplines of architecture and sociology are also covered. The final part of the second chapter details the specific methodology employed to analyze the assembled data for this project. It describes in detail what is meant by space syntax analysis and lays out the principles of network science that underpin the current study.

Chapter 3 is the first of two core chapters dealing with specific portions of the data set. The first of the two chapters handles the Insular portion of the data. The first section of the chapter summarizes the state of the field of Roman domestic architecture studies in Britain, covering salient publications and scholars. A typology of the forms of the Roman house in Britain is also provided, based on the research of J. T. Smith and others.[37] The remainder of the chapter is devoted to a discussion of the Insular data itself, including its sources and a characterization of the collected information. The chapter closes with the analysis and interpretation of the archaeological data, following the methodological framework laid out in Chapter 2.

The fourth chapter, which concerns the Continental section of the data, follows a similar layout to the preceding chapter on the Insular material. The chapter opens with a discussion of the archaeological traditions of each of the modern countries included in the region of the European continent included in the study, including specifics on the scholarly treatment of Roman domestic architecture in those areas. The rest of the chapter is concerned with the specifics of the data and its constituent sites. The Continental chapter concludes, like its Insular counterpart, with the analysis and interpretation of the data. However, a potential difference in dealing with the Continental data is that the material from mainland Europe is spread over a greater geographic extent, as compared to the relatively compact territory of Roman Britain.

Chapter 5, the comparative chapter, brings together the two prior chapters on Insular and Continental sites and considers the data set in its entirety. The fifth chapter examines the two halves of the data against one another, and also in light of the combined data set. These comparisons highlight patterns in the data, with the objective of accessing trends in the data that

[37] See Smith 1997, and Perring 2002, which employs Smith's typology specifically to houses in Roman Britain.

might speak to issues of cultural assimilation, technological adaptation, and what the state of Roman housing in the northwestern provinces was during the duration of the Roman Empire in that region. Comparison between the two halves of the data set provides opportunity to identify more specifically trends in the assembled information that show distinction between the domestic architecture found in Britain and that of the Continent. Treating the data in smaller sections has the further benefit of enabling greater detail and nuance in the discussion, and highlights patterns at an additional level of scale. Modest trends in how specific provincial populations were using and modifying domestic architecture will manifest at such a scale, as opposed to a lower resolution when examined solely at the regional level.

Finally, the sixth chapter is the conclusion to the study, reflecting on the ways in which Roman-style houses manifest across time and space in northwestern Europe. The discussion progresses to an examination of how these domestic spaces might have been occupied and perceived by their occupants and visitors, before moving to a further investigation of the broader contexts these residential structures inhabit in the urban and rural landscapes. The chapter finishes with an inquiry into potential future directions that build off of or complement the scope and results of the present study.

1.8 Preliminary Conclusions

The data collected and analyzed in this study represent a large sample of the domestic sites in the area of northwestern Europe. While any sizable collection of archaeological data can appear daunting in scale and scope, developments in quantitative methods enable the manipulation and analysis of data on a scale previously unimaginable. Such large-scale, data-driven projects empower the modern archaeologist to reassess and revisit old arguments about identity and cultural change at a regional scale. One such discussion is the long-standing scholarly debate on the nature of the Romanization phenomenon, as shown in recent publications by Peter van Dommelen and Miguel Versluys.[38] The following chapter examines the history of scholarship surrounding Roman domestic spaces, and contextualizes the present study within that armature of past research and approaches. The material invites us to consider what, if anything, is unique about these regions, or do the houses of the Roman northwest belong to wider, Empire-wide trends that might also manifest in the eastern Mediterranean or North Africa.

One of the benefits to a computationally-driven, network-based approach is the facility with which data can be manipulated and interpreted with relative ease. In the case of Roman houses, this flexibility afforded by methodology and theory is anchored by a foundation of scholarly research extending through the last century. Welding an innovative computational approach to such a lengthy academic tradition, this dissertation aims to inject not only new information, but a new analytical method into the discourse surrounding the study and interpretation of domestic life in the northwestern Roman provinces. The ultimate goal, however, is a better understanding of the domestic spaces of the northern frontier of the Roman world, and a deeper insight into the people who called those buildings home.

[38] See van Dommelen 2014 and Versluys 2014, which are part of a series in *Archaeological Dialogues* on the topic of Romanization.

Chapter 2

Approaching Roman-Style Houses

2.1 Introduction

The groundwork of the present study is sited in the construct of the Roman-style houses of northwestern Europe.[1] At a base level, the residential unit described and defined by that term serves as the smallest discreet particle of functionality within the data analysis methods employed here. Sites are included in the data on the basis of particular structures meeting the qualifications of a Roman residential building, and phases of occupation at a given location are considered with the understanding that each context is a representation of a spatial configuration occupied primarily as a living space.

In order to understand the role not only of the Roman residential space as an object of quantitative study, but also as a vector for the transmission of cultural information across time through the archaeological record, it is important to situate the present research project within the wider body of scholarly literature on the subject. But first, there must be a practical definition of what a Roman-style house *is*, in order to properly utilize the term. Finally, the quantitative methodology employed in the current study also needs proper description and contextualization.

The present chapter will proceed to address these necessary topics, and will set the stage for the data analysis to follow in the coming chapters. The first subject that is addressed is the present and current state of academic study of Roman domestic spaces, Empire-wide. Such

[1] The terms "Roman-style houses" and "Roman domestic architecture" are being used here instead of "the Roman house" because the latter does not represent a universal construct within northern Europe, and therefore has no one single definition.

discussion will anchor the work of the present research in a deeper sub-field of Roman architecture and archaeological inquiry. Next, the existing scholarship, along with what evidence survives from the ancient primary sources, will be consulted to establish a satisfactory definition of what exactly constituted the Roman housing and the ways appear architecturally. Having a working definition at hand is important for the proper analysis of the architecture and the exploration of the results of that analysis.

Finally, the chapter concludes with a discussion of the methodological approaches employed in the current study, along with theoretical antecedents that make such a research agenda possible. Similar to the overview of the scholarship concerning Roman domestic architecture, the overview of quantitative methods provides a crucial contextualization to the present work. The conversation begins with the state of Roman domestic studies.

2.2 The Past and Current Study of Roman Domestic Architecture

The study of Roman domestic architecture is traditionally concerned with architectural plans and structural components of individual buildings or specific typologies of buildings. This tendency toward strict architectural analysis holds doubly true for the material remains of the Roman provinces. Few scholars have been willing to move the discourse toward a theoretically-engaged debate on topics such as the influence of Empire and adaptation of Roman architectural styles and techniques within provincial contexts. The preponderance of the scholarly discussion on provincial architecture remains, for the most part, rooted in a close, technical dialog concerning the architectural and technological details of Roman buildings in the provinces.[2] The current study aims to center the discussion of Roman provincial architecture, specifically the architecture of domestic spaces, in more theoretically-grounded territory. The study of Roman

[2] See Kampen 2015, 407 for a summary of the state of Roman art and architecture studies in the provinces.

architecture has lagged behind its sister discipline of Roman art in terms of theoretically engaging with questions of identity and colonialism, patronage, and experience, although the exact cause of the gap is difficult to concretely identify. These issues have certainly been flirted with, such as Andrew Wallace-Hadrill's writings on the Roman house in Pompeii, or Pierre Gros' typological work on the Roman house in France, but the corpus of Roman domestic architecture has never been systematically analyzed on anything approaching a scale above the provincial or sub-regional level.[3]

As far as the study of domestic architecture, much of the theory applied to Roman domestic spaces is common to the application of spatial methods found in other subfields of archaeology and architectural history. Theorizing on the subject is rooted in structuration theory, popularized by the sociologist Anthony Giddens.[4] For Mike Parker Pearson and Colin Richards, structuration theory "has provided a useful conceptual approach: social structures (as embodied in traditions and social rules) have a dialectical relationship with human actions. Structures are both the medium and the outcome of social practices."[5] In recent years, the proliferation of more advanced computing power has led to the adoption of more quantitative methods, such as space syntax, for the analysis of architectural configurations. Ray Laurence has, with mixed results, applied spatial syntax methods to the Roman house, in an attempt to examine the use of rooms in the Roman house based off of a measure of relative accessibility.[6]

According to Glenn Storey, the current authoritative sources for the study of Roman

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[3] Wallace-Hadrill 1988, 1996; Gros 1996, 2001. The exceptions that prove with rule (that no large-scale studies of Roman domestic architecture exist) are the studies that look at how buildings and urban plans in the provinces mirrored or copied from metropolitan Roman examples, such as MacDonald 1986 and Thomas 2007.

[4] Giddens 1984.

[5] Parker Pearson and Richards 1994a, 3.

[6] Laurence 1994, 126-129; Hales 2013, 60. For a further examination of spatial syntax methods, see the discussion later in this chapter.

domestic architecture are Alexander McKay's *Houses, Villas and Palaces in the Roman World*, Ian Barton's *Roman Domestic Buildings*, and Simon Ellis' *Roman Housing*.[7] On a more specific note, the latest summary of Roman villas, out of the numerous volumes on the subject, is J. T. Smith's *Roman Villas: A Study in Social Structure*.[8] Of these sources, all but McKay's volume proved useful to the present study. McKay's survey, published in 1975, has been superseded by later comprehensive publications on the subject, such as Barton's and Ellis'. More specialized works, concentrating on specific classes of architecture, such as villas, comprise a sizable subset of the available literature.[9] Likewise, region- or province-specific studies represent a significant portion of the available research.[10] For the purposes of the present study, one of the crucial concepts to define based on this scholarly tradition of Roman domestic spaces is the idea of the house itself as a unit of architecture. Before doing so, however, it is worth taking a step back to reflect on two case studies, both from the current data set, as an illustration of how domestic architecture is considered and treated in the context of larger-scale excavations. The two case studies are the Roman villas at Fishbourne, in Sussex, and Abermagwr, in modern Wales.

2.2.1 Fishbourne

The Roman villa at Fishbourne, often referred to as "Fishbourne Palace," is a monumental villa complex of grand scale. Located in Sussex, in the south of England, the Flavian-period structure preserves evidence for at least 112 rooms and spaces, and a total

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[7] McKay 1975; Barton 1996; Ellis 2000; Storey 2013, 167.

[8] Smith 1997; Michele George provides an examination of Roman domestic architecture in northern Italy, offering some comparison to provincial examples. See George 1997.

[9] See Percival 1976 and Mielsch 1987. Smith 1997 remains the standard text on villas as a category of housing in the Roman world.

[10] For example, see Perring 2002 on Roman Britain and Timár 2011 on Southern Gaul.

footprint of around 22,500 square meters for the entire site.[11] Considered the largest Roman domestic structure north of the Alps, Fishbourne represents the wealthiest segment of Romano-British society, and is linked through archaeological finds and textual sources to the tribal chieftain Cogidubnus, leader of the Atrebates tribe.[12] The tribe's territory was centered around the modern city of Chichester, which was once the Roman settlement of Noviomagus Reginorum.[13]

The domestic residence at Fishbourne was initially investigated archaeologically in the middle of the twentieth century, with excavations directed by Barry Cunliffe running from 1961 to 1968.[14] These inquiries revealed a pair of construction phases, one dating to the early first century AD, the second to the latter half of that same century. It is this second, grander phase, which is most associated with Fishbourne, and is shown in **Figure 2.1**.[15]

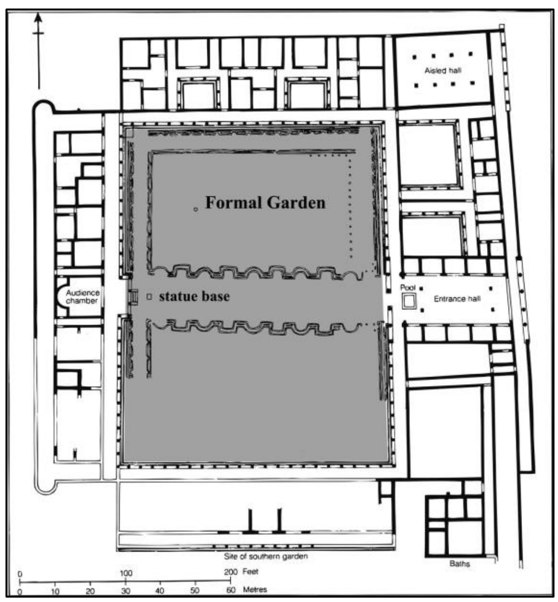

Figure 2. 1 - Fishbourne, Flavian Period

[11] See Cunliffe 1971.
[12] Tacitus, *Agricola* 14.
[13] Cunliffe 1971, 20.
[14] See Cunliffe 1971 for the excavation report.
[15] Plan from Cunliffe 1998.

Arranged around a central courtyard, the villa takes the shape of a large square, with residential and entertainment spaces arrayed around the garden in the middle of the structure. These spaces preserve evidence of delicate mosaic pavements, intricate *opus sectile* marble detailing, and other finds associated with Roman upper class culture.[16] From this material culture, it is apparent that the occupant of Fishbourne, whether Cogidubnus or some other local aristocrat, was engaged in a conspicuous display of Roman cultural markers, broadcasting both outwardly and to the local indigenous community that the owners of Fishbourne were conversant in Roman cultural practices.

Within the wider landscape, the villa is a dominant presence, masking a continuity of Iron Age inhabitation in that same landscape. From more recent archaeological work on the wider Fishbourne landscape, the image of occupation and interaction within the immediate vicinity of the Flavian palace becomes slightly clearer. Investigations in 2011 by Martyn Allen and Naomi Sykes reveal a late Iron Age community predating and overlapping with the Roman-style habitation at the site.[17] Traditional Celtic architecture and material culture coexists in the same landscape as Roman stone-build architecture, showcasing an intertwining of Iron Age and Roman material culture and practices at odds with traditional interpretations of Roman settlement in Britain.

2.2.2 Abermagwr

Quite distinct from the palatial complex at Fishbourne, both in scale and location, the Roman-style residence at Abermagwr exemplifies the other end to the chronology of Roman

[16] See the second volume of Cunliffe 1971, which details the finds from Fishbourne.
[17] Allen and Sykes 2011.

settlement in the British Isles. Dated to the third and fourth centuries by numismatic evidence and pottery, the complex at Abermagwr displays many features expected of a typical Roman habitation. A winged-corridor villa in plan, the site preserves evidence of a hypocaust system and stone construction, but lacks the finer decorations that mark Fishbourne as a residence of the a person or persons with access to the material goods of the Roman upper class.

The site was originally identified through aerial prospection in 1979, and confirmed through magnetometry survey in 2009.[18] Excavations were conducted in 2010 and 2011, and confirmed the results of the prior surveys. The extent of the structure is shown in **Figure 2.2**.[19]

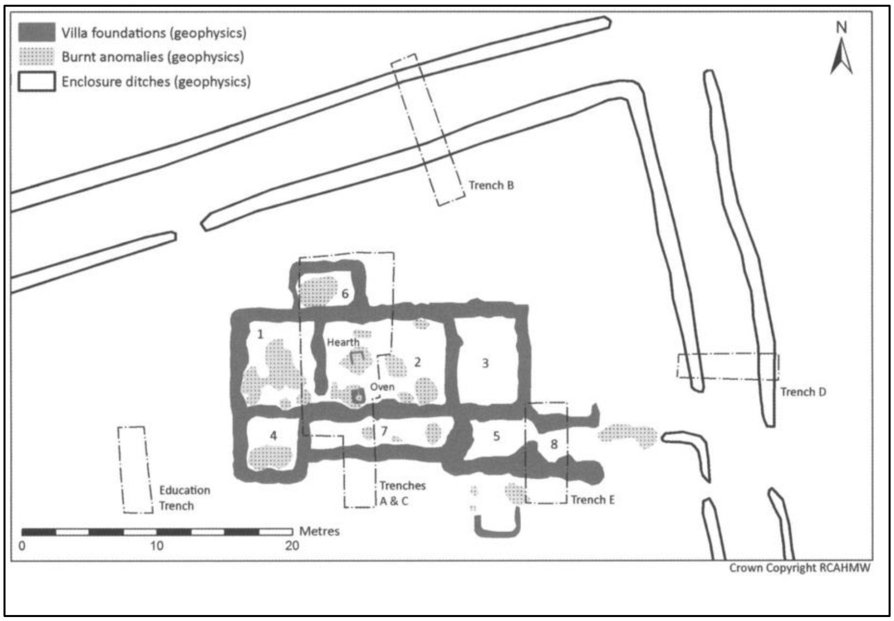

Figure 2. 2 - Abermagwr

The material culture of the site is outwardly Roman in character, with samian pottery and Roman coins providing concrete evidence of Roman interaction with the occupants of the site. If those individuals did not identify as Roman themselves, then they were certainly conversant in

18 Davies and Driver 2011.

19 Plan from the Coflein database entry on Abermagwr, found at https://www.coflein.gov.uk/en/site/405315/details/abermagwr-roman-villaabermagwr-romano-british-villa

acquiring and displaying salient elements of Roman material culture. There is evidence, however, of some non-Roman character at the site. The villa's grounds are bounded by a double-ditch, which is more in keeping with Celtic divisions of space and property. Abermagwr, while occupied centuries after the earlier settlement at Fishbourne, still retains some physical traces that point to a continuation and entangling of Iron Age practices with the imported practices of the Romans.

2.3 The "Roman House" Defined

On the matter of the Roman domestic architecture, the ancient literary record is remarkably unclear as to what, exactly, constitutes a "Roman house." For example, the term *villa*, which holds a certain connotation in the modern mind, does not have a clear-cut usage in Latin literature.[20] It is clear from the available references, however, that the *villa* is confined in the Roman usage of the term to being a rural phenomenon, frequently used in reference to farmhouses.[21] Roman-style domestic architecture takes many forms across the geographic extent of the Roman Empire. As a consequence, it is difficult to settle on a concrete definition of what a Roman residence looks like, as the known architectural manifestations are numerous and diverse.[22]

Even Vitruvius, the surviving architectural author from the Roman world, does not provide much more information on the subject of Roman domestic architecture in *De Architectura*. Where he does discuss elite Roman housing, it is in idealized, abstracted terms, providing details on the dimensions, technologies, and perspectives which coalesce into the

[20] Percival 1976, 15.
[21] Apulius, *Apologia* 67, II; Columella, *De Re Rustica*, I, 6, 21; Cato, *De Agri Cultura*, iv, 1.
[22] For example, see Nevett 2007 on the Roman residences in Greece, particularly Pella.

Roman house for the first century author.[23] Vitruvius contributes an informative view into the mind of a Roman architect, and greatly illuminates understanding of principles found throughout Roman architecture, such as symmetry and proportion. Additionally, one of Vitruvius' most useful contributions to the modern study of Roman architecture is his Latin nomenclature for specific rooms and spaces, although that terminology should be employed carefully in archaeological circumstances, where it can be difficult to assess the appropriate function of areas of a domestic structure without sufficient material.[24]

For a more nuanced interpretation, legal writings are useful for deducing definition from terminology. Varro, in his *Res Rustica*, notes that a *villa* is a building in the countryside, whereas a similar structure in an urban context is referred to as an *aedes*.[25] More specific information is known about the *villa,* described in Justinian's *Digest.* According to the *Digest*, the *villa* and its surrounding land, its *ager*, comprise an estate, or *fundus*.[26] However, there is no information about function (apart from agriculture), scale, or decoration implied by the term *villa*. Indeed, apart from the monumental residences of the rural elite, what terms exist that can accurately describe the multitude of other structures found in the Roman countryside? Authors such as Caesar and Varro are even reluctant to apply the term *villa* to domestic structures that follow traditional indigenous models, instead choosing to employ terms like *aedificia* or *tuguria,* which are much more general or pejorative in definition.[27] Given a Roman tendency to find analogies

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23 See specifically Books VI and VII of *De Architectura*.

24 See also Allison 2001, 183 for further discussion of Vitruvius' contributions to and use in modern scholarship of Roman architecture, particularly his relative utility in understanding a Roman perspective on domestic spaces.

25 Varro, *Res Rustica*, iii, 2, 6.

26 *Digest* L. 16. 211; The Latin reads as follows: 'fundi' appellatione omne aedificium et omnis ager continetur. sed in usu urbana aedificia 'aedes,' rustica 'villae' dicuntur. locus vero sine aedificio in urbe 'area,' rure autem 'ager' appellatur. idemque ager cum aedificio 'fundus' dicitur.

27 Caesar, *De Bello Gallico*, iii, 29; v, 12; Varro, *Res Rusticae*, iii, 1, 3; here, *aedificia* is translated as a generic word for "buildings," while *tuguria* is translated as "huts." This point was first observed by Rivet, and is echoed by Percival, Rivet 1969, 181-2; Percival 1976, 14.

for their own institutions in other cultures and apply Latin terminology as labels for those parallels, it is striking that such a practice is not the case here, and might speak to what a *villa* was perceived to be in a Roman mind.[28] The danger lies in deciding what is and is not Roman in a time and place where such concepts are increasingly seen as fluid or in a state of flux.

It is here where it becomes necessary for the discussion to turn to the wider topic of "Romanization." Given the history of the debate about what exactly constitutes Roman culture at both the material and social levels, and how that payload of "Roman-ness" was spread to (or adopted by, as the case may be) provincial populations, the definition and function of the Roman *villa* has certainly played a role in the discussion. Modern attempts to define the parameters of the *villa* as a building type and concept have invariably made reference to the concept of Romanization at some point, as first noted by W. H. Manning in 1962.[29] Ian Richmond discusses villas as a sign of "the adoption of Roman standards in greater or lesser degree by natives of substance."[30] Recently, the discussion of Romanization as a phenomenon has become more closely aligned with more mainstream scholarly discourse on colonialism. The main issue with Romanization, as Peter van Dommelen sees it, is that the debate is not really about "Romanization" anymore.[31] Instead, the discourse is now centered around topics of contact and colonialism, with Romanization functioning as a convenient shorthand for those groups involved in the process of colonial acculturation or hybridization in a context of Roman expansionism.

Conventional understanding of Roman domestic architecture differentiates between residential structures primarily in regards to setting or context, rural or urban. Because of a

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[28] Percival considers this to indicate that a *villa* is a building that is recognizably Roman, either in appearance and/or function. Percival 1976, 14-15.
[29] Manning 1962, 56-8.
[30] Richmond 1963, 109.
[31] Van Dommelen 2014, 44.

preponderance of evidence from the archaeological sites around the Bay of Naples, such as Pompeii and Herculaneum, a majority of modern texts on the matter of Roman domestic living concern themselves with evidence from these contexts.[32] Using these abundant sites as a foundation, scholars have reconstructed a picture of the Roman house's development over time.

Perhaps one of the most influential authors on the topic of the Roman house is Andrew Wallace-Hadrill. In his 1988 article, "The Social Structure of the Roman House," he presents a key concept of Roman domestic life, that of the distinction between public and private space, which he intrinsically connects to the architectural arrangement of the domestic structure.[33] He confines his discussion to the urban setting, using the evidence from Pompeii for the type of house commonly referred to as a *domus*, a single-family residence of the Roman elite.[34] Defined by John Clarke as requiring a minimum area of around 450 square meters, the *domus* represents the lavish urban accommodations of the Roman upper classes.[35] Occupying a much larger area than the more modest classes of the freedmen and working poor, which range from around 120 to 350 square meters, the *domus* represents both the private residences of the Roman aristocracy, but also their public-facing places for conducting business.[36] For Wallace-Hadrill, there is not only a tension between the publicly-accessible spaces and the more private areas, but the very functionality of those spaces is connected to their architectural form.[37] Through this link between form and function, the upper class Roman house acts as a conduit and focal point for expressions of social, political, and economic activity.

32 John Clarke makes this explicit in the introduction to his chapter on Roman housing in *A Companion to Roman Architecture*. Clarke 2014, 342.
33 Wallace-Hadrill 1988, 55.
34 See Clarke 2014 for a definition of the *domus* as an upper class living space.
35 Clarke 2014, 348.
36 De Vos and de Vos 1982, 333-334.
37 Wallace-Hadrill 1988, 55-56. John Clarke echoes this point in his chapter in *A Companion to Roman Architecture*. See Clarke 2014, 343.

In its role as a symbol of Roman aristocratic life and status, the *domus* serves as a physical representation of that way of life within the city. Wallace-Hadrill echoes the idea of *Durchblick*, or "view-through," popularized by the German archaeologist Heinrich Drerup in 1959.[38] Drerup's conceptualization sees the *domus* arranged around one or more visual axes, along which framing architectural and decorative elements draw the visitor's attention through the space, highlighting salient rooms and spaces which showcase the prestige, wealth, and social standing of the owner.[39] For example, the House of Menander at Pompeii, shown below in **Figure 2.3** displays two such visual axes.[40]

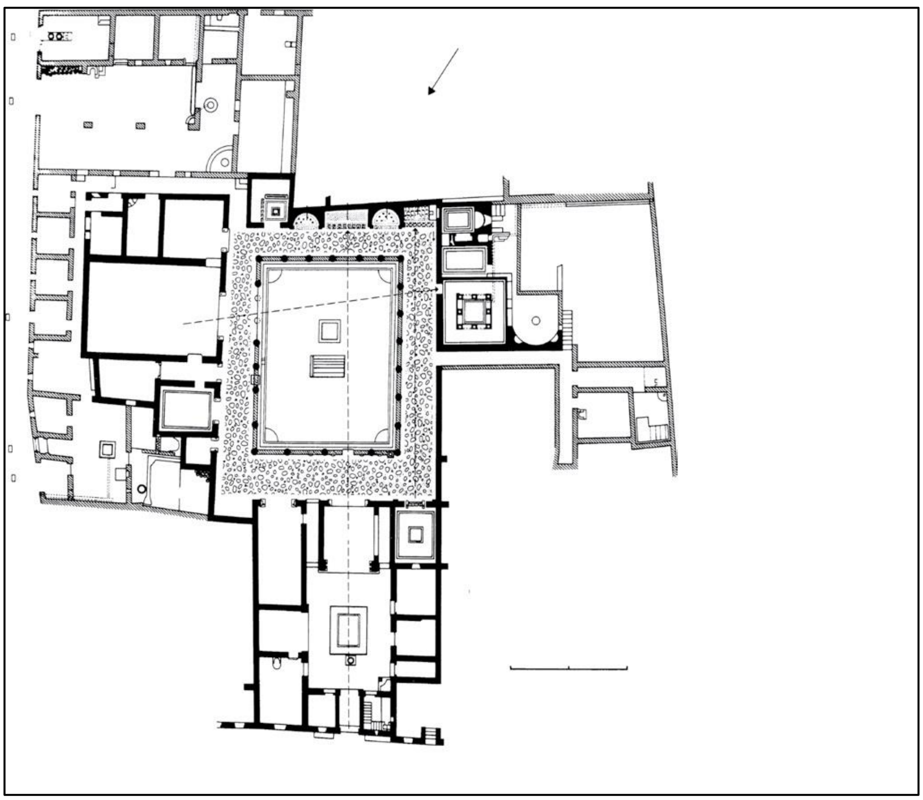

Figure 2. 3 − The House of Menander, Pompeii

38 See Drerup 1959, 145-174.

39 Clarke 2014, 351.

40 The plan is from Clarke 2014, 351.

Shown as dotted lines on the plan, the lines of sight through the residence draw the eye across the most important spaces of the Roman house, intersecting in the peristyle garden. The primary axis leads through the main entry to the street, the *fauces*, through the *atrium* and *tablinum*, before terminating in the peristyle garden. The secondary axis runs from a large *triclinium*, or dining area, across the open, colonnaded garden into an *exedra*. In doing so, the lines pass through some of the most important public-facing areas of the Roman house. The *fauces* is the portal through which clients access the patron's house, leading into the *atrium* where they are received. The *tablinum* is most analogous to the modern home-office, where the Roman aristocrat conducted his business with his clients and petitioners. Similarly, the open dining room and decorated space opposite the peristyle garden would have been used for conspicuous displays of entertainment and dining, as another vector for social display.

The *domus* as an architectural form eventually makes its appearance across the Roman Empire, but especially in the urban centers of the western provinces, as discussed by Simon Ellis in his survey of domestic architecture in the Roman world.[41] The most marked development in the traditional Roman *domus*-type house occurs after the second century BC, with the introduction of the peristyle garden. An example of a peristyle garden drawn from the study data is the Domus des Epars, near the modern city of Chartres, France, shown in **Figure 2.4**.[42]

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[41] Ellis 2000, 73-113. Ellis' thoughts are echoed in Clarke 2014. See also Timár 2011 for a more specific discussion of the *domus*-type in southern Gaul.

42 Plan from Ollagnier and Joly 1994, 138

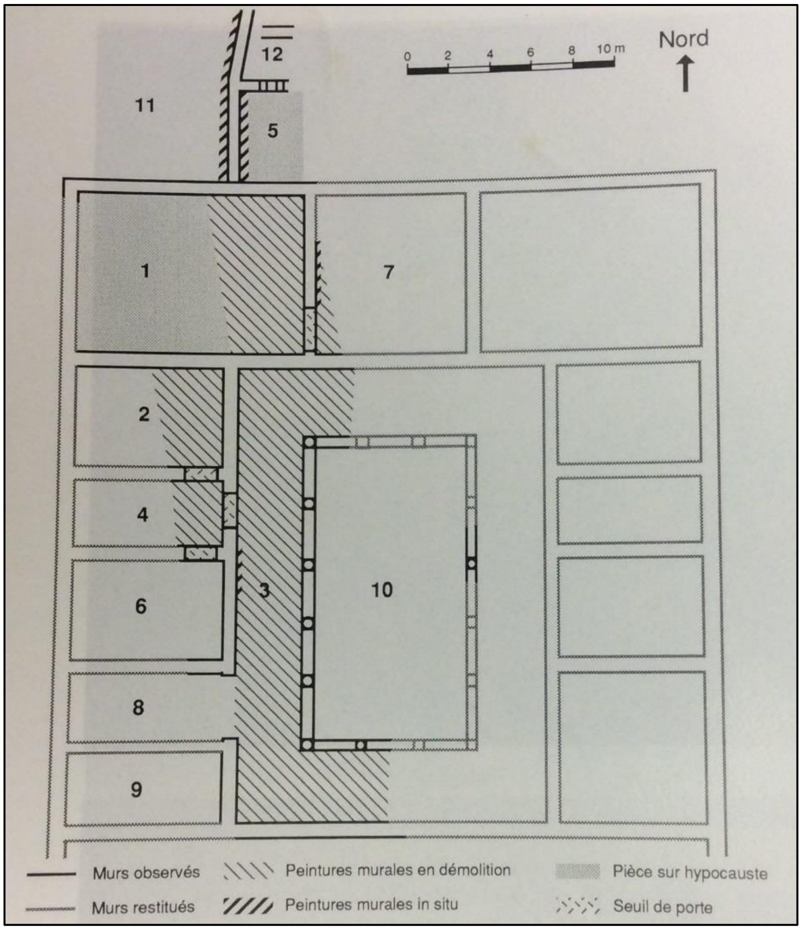

Figure 2. 4 - Domus des Epars, Chartres, France

The peristyle garden, as seen previously in the House of Menander, presents in the architectural plan of the Roman house as an open, rectilinear zone lined with columns. The area is often used as a garden, a leisure-space in the urban fabric of elite Roman life.[43] The Roman conquest of the Hellenistic East in the second century BC introduced the peristyle to the lexicon of Roman architecture.[44] Based on the monumental colonnades of eastern Greek cities, the peristyle form was modified by the Romans, who added greenery and appended the resulting garden space to their domestic architecture.[45] The peristyle joined the traditional visual axis of

43 See Allison 2007.
44 See Eckstein 2008.
45 Zanker 1998, 145-163.

the *domus*, following the *tablinum* in the *fauces-atrium-tablinum* sequence.[46]

While the names of the individual rooms of the Roman house are known from Vitruvius' writings, the Pompeian evidence shows a degree of multifunctionality to the rooms of the Roman house, as shown by the various small finds and other accoutrements preserved in situ by the Vesuvian eruption.[47] The material from the buried cities around the Bay of Naples presents a large corpus of data on the Roman elite house in an urban context, almost unmatched elsewhere in the rest of the Roman Empire. Similarly, a great deal is known about the development of rural domestic forms from the Italic evidence.

As noted previously, the Latin authors have a fair amount to say about the Roman aristocratic home in the countryside. There is a tension identified in the Roman mindset between the concepts of *otium* and *negotium*, or leisure and business.[48] For the Roman authors, the countryside villa represented the perfect expression of the balance between this tension, as a physical manifestation of not only the life of luxury afforded to the elite Roman landowner, but also the economic exploitation of that rural landscape through the *latifundia* system.[49] The author Varro, writing in the middle of the first century BC, makes a categorical distinction between the two functions. In his *Res Rustica*, Varro names the two types: the *villa rustica*, a frugal, working farm in the country, and the *villa urbana*, a luxurious, palatial home to escape the pressures of city life.[50]

While Varro writes in the first century BC, toward the end of the Roman Republic, the idea of the grand, elite country house dates to almost half a millennium prior. Country homes for

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46 Clarke 2014, 349.

47 See Berry 1997; Mols 1999, 115-131; Allison 2004.

48 See Zanker 1998, 123, 125.

49 Zarmakoupi 2014, 363. Michael Ytterberg also discusses the distinction between *otium* and *negotium*, in the context of Hadrian's Villa near Tivoli. See Ytterberg 2005.

50 Varro, *Res Rustica* 1.13.6.

the aristocracy, such as the Auditorium site near Rome, stand as evidence of the phenomenon existing as early as the sixth century.[51] The full maturation of the villa as an expression of social values occurs in the second century BC, around the time of the Roman conquest of the Greek East.[52] The incorporation of the eastern Mediterranean into the sphere of Roman hegemony brought an influx of wealth to the Roman state, and with it, a desire to display that increased social capital publicly.[53]

In earlier periods, during the expansion of the Roman Republic through Italy and territories immediately adjacent, the most common public expression of wealth and socio-political status was in the private funding of public spectacles, such as festivals and triumphal processions.[54] After the incorporation of the Hellenistic kingdoms, the Roman desire to display their wealth publicly shifted in a more private direction. Influenced by the monumental colonnaded architecture of the Hellenistic cities, such as at Ephesus and Priene, Roman elites channeled their performative expressions of status into the architecture of their homes and estates.[55] As previously mentioned, one of these adopted architectural elements is the peristyle garden. Another transformative technology introduced in this period is *opus caementicium*, or Roman concrete, as a method of construction that enabled the rapid, cheap assembly of large, monumental architecture.[56] Such innovations enabled the creation of vast, luxurious displays of Roman elite ostentation, shifting the venue for elite socio-political competition in a more domestic direction.

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51 Terrenato 2001.
52 Zarmakoupi 2014, 364; See also Wallace-Hadrill 1998.
53 Zarmakoupi 2014, 364.
54 Beard 2007, 55.
55 Zanker 1998, 145-163.
56 See Mari 1991, 31-39; Tombrägel 2010.

Roman houses traditionally appear in both urban and rural contexts, each wrapped in specific socio-cultural and political signaling for the Roman upper classes. The material uncovered in the Italian peninsula shows a pattern of using domestic spaces as a means of social display stretching arguably back to the sixth century BC, but certainly to the second century of that era. The quantity of evidence from Italy, and specifically from Pompeii and other sites around the Bay of Naples, has tilted the scholarly conversation to favor those locations. In sum, the evolution of Roman domestic spaces and their functions in Italy, at least for the upper crust of Roman society, is well-understood. Elsewhere in the Roman Mediterranean, residential architecture took on regional flavor, influenced not only by considerations of local climate, but also the preferences and modifications of the pre-Roman indigenous cultures.

2.4 Network Analysis: A New Approach

To better grapple with the enormous amount of available data regarding Roman domestic habitation, quantitative methods become ever more attractive to the archaeologist, as commercially-available computing power continues to become more powerful and more affordable. Additionally, the quantitative means of addressing complexity originating in mathematical graph theory translate particularly well to the realities of the messy and incomplete data commonplace to archaeological research in the real world. The following section will discuss the theoretical underpinnings of network analysis as a discipline, as well as its specific applications to archaeology. Then, the discussion will move to the specifics of space syntax analysis and the application of networks as a structural cognitive framework for thinking about the archaeological data in the present study. It is hoped that the methodological developments produced for the present study will benefit the further study of Roman houses, their function, and use by their builders and occupants.

2.4.1 Theoretical Methodology and Background

The increasing prevalence of digital analytical techniques and applications derived from the social and hard sciences has enabled archaeologists and architectural historians, or really any scholar looking to quantify and analyze large sets or groupings of data, to approach and handle data in innovative and powerful ways. Specifically, the increasing adoption of network analysis methods in the humanities has also begun to influence archaeological studies. Network methods provide a means of highlighting patterns and connections within datasets at a level previously unthinkable, but made possible with modern computing and software power. Applications of network analysis include examining any number of possible types and categories of subject, from pottery wares and their distribution patterns, to the identification of authorship in Shakespeare's plays through studies of word adjacency.[57] For archaeologists, the numerous ways network theory can be employed opens different avenues to interpret old evidence and interrogate and visualize that data in greater quantities than previously possible.

The network has risen to popularity in multiple disciplines as a way to describe structures as seemingly unconnected as the World Wide Web, insect colonies, and the global economy. For archaeologists, developments in social network analysis (also referred to by the acronym SNA) and social physics have been of particular relevance and influence. Formal network methods have been applied within the field of archaeology to topics such as the transmission of ideas, the movement of people and objects, the identification of social and cultural boundaries, and maritime connectivity.[58] The rapid expansion and adoption of network-centric approaches in

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[57] Specifically, the reference to Shakespearean network studies is for Segarra, et al. 2016, wherein the authors examine the verbiage of *Henry VI* in order to attempt to identify if the true authorship of the play was Christopher Marlow or William Shakespeare.

[58] Graham 2006 examines the spread of information in the Antonine period through shared itineraries using a

archaeology, its various subfields, and related disciplines, has resulted in a diverse range of research traditions, vocabularies, quantitative techniques, and software, but a shared fundamental concept is that the focus of all of these approaches is on the relationship between entities and the patterns that emerge from those relationships. More specifically, network studies assume relationships between entities, regardless of whether those entities are people, objects, or ideas, and believe that those entities should not be examined in isolation, but instead that those relationships should be examined in their own right.[59]

Another major assumption of network-based approaches is that entities cannot be understood independently of the connected whole and *vice versa*.[60] In essence, the whole is greater than the sum of the parts. Change causes complex systems or networks to constantly produce new properties that are emergent at variable levels of complexity.[61] For scholars interested in understanding networks, the underlying question is, according to Watts, "how does individual behavior aggregate into collective behavior?"[62] Carl Knappett notes the methodological advantages of networks, listing the following five in the introduction to his 2011 volume on examining material culture and past societies through the use of networks:

1. They force us to consider relations between entities;
2. They are inherently spatial, with the flexibility to be both social and physical;
3. Networks are a strong method for articulating scales;
4. Networks can incorporate both people and objects;
5. More recent network analysis incorporates a temporal dimension.[63]

Tom Brughmans considers Knappett's advantages to serve as an important framework for what

network-centric approach. Brughmans 2010 and Brughmans and Poblome 2012 look at distributions of Roman pottery. Knappett et al. 2008 are interested in charting maritime exchange networks in the Bronze Age Aegean.

59 A major evangelist for network-based approaches has been the sociologist Duncan J. Watts; See Watts 2003.

60 Brughmans 2013a, 625.

61 Anderson 1972, 393; Brughmans 2013a, 625.

62 Watts 2003, 24.

63 Knappett 2011, 10.

Brughmans describes as "network thinking," due to Knappett's emphasis on the multi-scalar relationships between objects and people. Brughmans provides an overview of the state of network applications in his 2013 article "Thinking Through Networks."[64] He also charts the trajectory of network studies broadly defined, as well as the adoption of network methods within archaeology.

The study of networks traces its origins to the field of mathematics, specifically to the work of Leonhard Euler on graph theory starting around the year 1736. Graph theory is the foundation upon which the fields of social network analysis and social physics are built, and offers a way to visualize networks as a series of vertices (or nodes) and lines, backed by a robust descriptive and mathematical system. Harary et al. describe the potential usefulness of graph theory for the then-nascent field of social network analysis, noting that graph theory provides a vocabulary to describe social structure, a set of mathematical operations to measure that social structure, and allows scholars to prove theorems about social structure represented as graphs.[65]

In archaeology, graph theory has been employed in one form or another since the 1960s, leading to the development of a number of quantitative methods within the field. For many, graphs were simply another tool for visualization, rather than potential tools for analysis.[66] However, Clive Orton, in his 1980 *Mathematics in Archaeology*, suggests the graph as a substitute for matrices as a means of visualizing, stating that "each object can be thought of as a point in space, closer to objects which are more similar…and further from objects which are less similar," laying out what de Nooy and his co-authors refer to as "graph drawing aesthetics."[67]

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64 Brughmans 2013a.
65 Harary et al. 1965, 3.
66 Brughmans 2013a, 629.
67 Orton 1980, 45; de Nooy, et al. 2005, 14.

Generally speaking, however, many early uses of graphs in archaeology were limited to studies of seriation.[68] In more recent years, however, the adoption of networks as an analytical framework and tool within archaeology has been on the upswing, with recent publications, such as Astrid Van Oyen's 2016 book on *terra sigillata* pottery and the Roman economy, showcasing the robustness and flexibility of network approaches to archaeological data.[69] Tom Brughmans notes three issues with the adoption of network methods in archaeology: first, that "the research potential of graph theory as an alternative approach for the visualization and analysis of social or geographical hypotheses in archaeology has been recognized at least since the 1960s;" second, that "in spite of the obvious similarities in approaches and the relevance to archaeological network analysts, the research potential illustrated by early graph theoretical work in archaeology has not been very influential to more recent network applications in the discipline;" and finally, that "the introduction of graph theory and SNA [social network analysis] into the archaeological discipline happened largely independently, and unlike social network analysts, archaeologists did not collaborate with graph theorists to develop mathematical techniques tailored to their needs."[70] Brughmans critique can be summarized fairly simply: despite the knowledge of networks as a methodological approach for decades, archaeologists have generally approached networks, when they engage with them at all, on an ad hoc basis, developing their own tools and methods independent of network researchers in other disciplines.

Where network methods have cropped up in archaeology, those methods have generally been influenced by the sociological subfield of social network analysis. Social network analysis is concerned with measuring the interpersonal relationships in small groups of people, and was

[68] See Kendall 1969, 1971; also see Shuchat 1984.

[69] Van Oyen 2016.

[70] Brughmans 2013a, 631-632.

founded by Jacob Moreno, the inventor of the sociogram, an early method for plotting the structure of a group as points and lines in a two-dimensional space (in other words, somewhat like a graph).[71] Early methods of social network studies drew their theoretical and methodological underpinnings from the mathematical fields of graph theory, statistics and probability theory, and algebra.[72] Stanley Wasserman and Katherine Faust, some of the key researchers in the field of social network analysis, provide the following list of shared principles that can be found in most major applications of social network analysis:

> 1. Actors and their actions are considered to be interdependent, rather than autonomous.
> 2. Connections between actors are conduits for the transfer of resources between actors.
> 3. Models interested in individuals conceive of the network environment as creating structure for the actions of individuals.
> 4. Models view structure as durable, lasting patterns of relationships between actors.[73]

What stands out from other, sociological approaches is the focus on social entities and their relationships, an interest which was noticed and adopted by early network pioneers in archaeology to examine in greater detail subjects such as trade and exchange networks, using social network analysis methods for their models.

Brughmans identifies Cynthia Irwin-Williams' research on prehistoric trade as one of these earlier pioneers, but also as an early scholar of networks in archaeology whose approaches are just now being given appropriate attention within the field.[74] Brughmans argues that the adoption of network methods by archaeologists did not achieve a more wide-spread status due to the lack of large, digitized datasets and cheap, efficient computing power at the time, and argument that has a certain degree of attractiveness. However, this line of reasoning does not

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71 See Moreno 1946 and 1960.

72 Brughmans 2013a, 632.

73 Wasserman and Faust 1994, 4.

74 Brughmans 2013a, 634; Irwin-Williams 1977.

explain the lack of adoption for smaller-scale studies. Carl Knappett suggests that Processual archaeologists, who were concerned with universal theories of human behavior grounded in quantitative data, were reluctant to adopt networks because of how the concept of connectivity was construed at the time.[75] Generally, it was conceived of as the interactions occurring in the liminal spaces around sites, rather than as concrete connections or geographic linkages.

In more recent years, network analysis methods have been embraced more readily by archaeologists, for a number of diverse applications. Scholars such as Shawn Graham have examined the diffusion of material or ideas across networks, in his case, by examining the Antonine Itineraries to create a network of locations from the text and identifying how information might have been disseminated by actors through that network.[76] Centrality measures, which are arguably the most common and popular tools of social network analysis, according to Brughmans, are commonly applied to the analysis of organizational structures, such as Munson and Macri's study of the sociopolitical relationships among the Classic Maya.[77] Centrality has also been employed to map ancient transportation networks, such as Leif Isaksen's article on Roman transport networks in Spain.[78] Affiliation networks track participation in an organization or event as the source of social ties, and have been infrequently applied to archaeological data. Tom Brughmans and Jeroen Poblome have used affiliation networks as a means of modeling relationships between sites and specific pottery forms, grounded in the assumption that sites with certain ceramic types are in some way connected to the production sites are areas of those specific ceramic types.[79] For archaeological purposes, the main hurdle to

[75] Knappett 2011, 17-18.
[76] Graham 2006.
[77] Munson and Macri.2009.
[78] Isaksen 2007.
[79] Brughmans 2010; Brughmans and Poblome 2012.

implementing network analysis methods is, as Brughmans puts it, “the interpretative jump from identifying patterns in static network structures using SNA to explaining them in terms of past social processes.”[80]

Even though many social network analysis techniques come with social explanations included as part of the underlying theory, the nature of archaeological data makes their implementation problematic for a number of reasons. Brughmans provides three major reasons why social network analysis frameworks can be troublesome for archaeologists. First, because the archaeological record does not fully represent the complexity of past social interactions, social network analysis cannot succeed in representing said complexity. Second, social network analysis has limited utility as an explanatory tool on its own, without sufficient theoretical backing. Finally, exploring past social systems can be problematic, as human actions are based upon local knowledge of social networks.[81] Brughmans argues for a combination of methodological approaches from both social network analysis and the tangential field of complexity theory.

Complexity theory concerns itself with the study of complex systems, which Melanie Mitchell defines as “a system in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution.”[82] An archaeological examples of complex systems include studies of the way densely populated settlements such as cities arise and unfold without centralized, top-down planning, driven instead by the needs and actions of the people

[80] Brughmans 2013, 641.
[81] Brughmans 2013. 641.
[82] Mitchell 2009, 13.

who inhabit it.[83] Because computer technology has sufficiently advanced to enable the analysis of datasets and problems that might have previously been categorized as impossible to manage, archaeologists can now examine wide-ranging issues and examine vast quantities of data, uncovering patterns and models that may exist on such a large scale as to have been previously undetectable.

From the broad scale of regional analysis, the application of networks to archaeology can contract to the scope of a single structure. While not considered a branch of network science, the graph-based approach found in the study of spatial syntax, particularly regarding the interaction between spaces through their connective architecture, is very much of interest to archaeologists. Descended not from social network analysis, but from urban planning, the study of spatial syntax is concerned with examining the configuration of space, and how human actors interact with that space.[84] The pioneering work of Bill Hillier is foundational to the field of spatial syntax analysis, beginning with his 1984 book, *The Social Logic of Space*, co-authored with Julienne Hanson.[85] Similar to network analysis methods, spatial syntax analysis is predicated on several assumptions or propositions. The first, is that "space is not a background to human activity, but intrinsic to it."[86] The second, assumes space as primarily configurational, meaning a space can be examined in terms of how that space interacts with all others. According to Hillier, human interaction with space is a fundamentally non-discursive act; space and spatial relations are so fundamental to how humans understand the world around them, that spaces "form part of the ideas we think *with*, rather than those we think *of*."[87] In order to discuss spatial relationships, a means of

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83 For a more comprehensive treatment of complex systems in archaeology, see Bintliff 2004.
84 Hillier 2014, 19.
85 See Hillier and Hanson 1984. A more recent chapter on the same topic by Hillier summarizes and updates his earlier thinking on spatial syntax theory. See Hillier 2014.
86 Hillier 2014, 19.
87 Hillier 2014, 20.

describing and talking about space must be invented. Here, Hillier and Hanson turn to graph theory. Similar to network analysis methods, spatial syntax analysis embraces the graph as a means of abstractly illustrating the relationships between *nodes* or *vertices*, representing entities, and *links* or *edges*, standing for the connections between those entities.

While Tom Brughmans does not delve into spatial syntax (also referred to as 'access analysis') methods in his review of network analysis applications in archaeology, he does cite several archaeologists who do provide an overview of possible applications.[88] In addition to Hillier and Hanson's volume, recent research into applying spatial syntax methods to archaeological material includes Sally Foster's research on the structures of the Atlantic Iron Age in Scotland, Graham Fairclough's analysis of medieval architecture, and Mark Grahame's examination of the House of the Faun in Pompeii.[89] In each of these studies, a specific structure or group of structures is analyzed using spatial syntax methods, in order to examine issues of accessibility and spatial organization. Marion Cutting provides a caveat to the use of spatial syntax methods by archaeologists.[90] A major distinction she makes is between employing spatial syntax as a purely *quantitative* method of analysis, and in using it as a more subjective framework for discussing spatial arrangements and connections.[91] Her argument is in line with post-processual critiques of purely quantitative approaches; the removal of the subjective experience of the scholar is detrimental to the overall analysis.

Turning now to more practical principles of networks and how they function as

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88 Brughmans 2013a, 628.

89 Foster 1989; Fairclough 1992; Grahame 1997; Grahame's work is not the only application of space syntax analysis methods to Roman material. For another example, see Stöger 2015.

90 Cutting 2006, 233.

91 More specifically, Cutting believes a structure needs clear evidence of access points into all rooms, as well as extant remains of upper levels of the building, in order for space syntax to function properly as a tool for quantitative analysis. She bases her thinking in her own fieldwork on prehistoric structures of Anatolia.

quantifiable artifacts, or representations of space, some basic fundamentals present themselves. Most formal network methods are unified in how networks are commonly illustrated, as a web of points connected by lines. Points represent entities of interest to the specific research question, and are the smallest unit of formal analysis in network theory. These points can represent almost any conceivable discrete unit, from individual people, to objects, to entire sites and regions. Most networks are composed of a single type of these points, commonly referred to as *nodes*.[92] A network with multiple types of nodes is possible, but uncommon. For Roman houses, the most straightforward application of network principles is to separate the individual rooms of the structure and treat them as nodes in a network structure, where the connecting edges are the doorways and other passages between those rooms.

The connections between *nodes* are most frequently represented as lines. As with nodes, the relationships between them can be just as diverse, as found in networks of social ties, roads, and the co-occurrence of artifact types between sites. One of the most common ways to describe the connections between nodes is with the term *edges*.[93] Edges can be considered *directed* or *undirected*, and can have a value, or *weight* to them. A directed edge in a network describes the transmission of information or material from one node to another. An example of a directed network is a citation network, where a publication will have a directed edge drawn from it to the cited work. In an undirected connection, there is no directionality, meaning the direction of transmission is either unknown or unimportant. Weighted edges represent an attribute of that connection, such as the number of sherds found at a site, and give an indication of intensity or density in a network. For any analytical archaeological project, whether employing legacy data,

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[92] The term *node* will be the preferred term used in this study.

[93] Similarly to *nodes*, the term *edges* will be the most common vocabulary found in this study.

as in the current case, or one using freshly excavated data, looking to employ networks as a methodological tool, the best representation depends on the research questions, as well as what definitions are chosen for nodes, edges, and the network as a whole.[94]

The theoretical approaches to the study of networks, and the use of networks in archaeology more specifically, draw material and techniques from a range of other disciplines, from mathematics to sociology. The application of space syntax analysis to the present study follows in the next section.

Visualization of networks is important, but not necessary to perform data analysis of a network. When visualizations are needed, network scientists have adopted the graph from the mathematical discipline of graph theory, as described above. The graph is a set of nodes and the edges between them, acting as a symbolic representation of those relationships. These constructs are referred to as *node-link diagrams*.[95] An additional means of visualizing network relationships is through *adjacency matrices*, which have the advantage of being able to represent absent relationships as well as present connections, and are often a better choice for large datasets, such as the present study.[96]

The most commonly used metric in the study of archaeological networks is centrality. Examining centrality allows for the recognition of nodes with better access to information and better opportunities to pass that information along to other nodes, either due to a more central position in the network, or due to a role as a necessary intermediary within the social network. Centrality is often applied to analyzing the structure of organizations, highlighting optimal flows

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[94] See Laumann et al. 1992 and Marsden 2005 on defining network boundaries; See Frank 2005 and Orton 2000 on critically assessing sample size in archaeology.

[95] For more on algorithms pertaining to the layout of node-link diagrams, see Freeman 2005, Golbeck and Mutton 2005, Krempel 2005, and de Nooy, et al. 2005.

[96] See Riche 2008.

of information through key nodes.[97] For archaeologists, measures of *degree centrality, closeness centrality, betweenness centrality,* and *eigenvector centrality* are the most widely applied.[98] *Degree centrality* is the simplest, measuring the number of connections a node has to other nodes in the network, identifying the likelihood of a node being exposed to information from elsewhere in the system. *Closeness centrality* describes the average length of the shortest path between that node and all others in the graph, so the more central a node, the closer it is to all other. *Betweenness centrality* counts the number of times a node acts an intermediary between two others, assisting in the identification of so-called "brokers" in a network, important for their role in the transmission of information. Finally, *eigenvector centrality* measures the influence a node has on the rest of a network, assigning relative scores to each node based on their connections to other important nodes. The method Google uses to rank the importance of webpages in search results is a variation of eigenvector centrality.[99]

For most archaeologists, the most difficult obstacle to implementing methods of social network analysis is not technological, but interpretive, from "identifying patterns in static network structures using SNA [social network analysis] to explaining them in terms of past social processes.[100] Archaeology adds additional hurdles to the study of past networks, identified by Brughmans as three main points:

> 1. The full complexity of past social interactions is not reflected in the archaeological record, and social network analysis does not succeed in representing this complexity;
> 2. The use of social network analysis as an explanatory tool is limited, and it poses the danger that the network as a social phenomenon and as an analytical tool are confused;
> 3. Human actions are based on local knowledge of social networks, which makes the task of exploring past complex social systems through particular material remains

97 See Michael and Massey 1997 and de Nooy, et al. 2005, 123-137.
98 Freeman 1979 and Bonacich 1972.
99 Watts 2003, 54.
100 Brughmans 2013a, 641.

problematic.[101]

He concludes by stating that the key to unlocking the potential of networks for archaeologists lies in a combination of social network analysis metrics and complex network simulation techniques.

2.4.2 Analytical Processes

The discussion of the analytical methods employed in the current study also involves a survey of the specific software packages and workflows applied to the assembled data. In order to properly reflect on the experimental process utilized for the data analysis process, some of the limitations and shortfalls of the chosen means of analysis are also covered.

While some theorists, such as Tom Brughmans, refrain from discussion of space syntax methods in archaeology as part of larger network analysis methods, for practical purposes in the present study, space syntax is network analysis by another name, at a different level of resolution.[102] For example, the network analysis of closeness centrality measures how “close” a given node is within a given network arrangement. Put another way, the more central a node, the greater its proximity to all other nodes in the network, based on the sum of path lengths along the connecting edges.

To assist in the visualization of these concepts, consider the plan of Thomas Jefferson’s residence at Poplar Forest, Virginia, shown below in **Figure 2.5**.[103]

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101 Brughmans 2013a, 641.
102 Brughmans 2013a, 628.
103 The plan is a detail from manuscript #N258K18 in the Coolidge Collection of Thomas Jefferson Manuscripts at the Massachusetts Historical Society.

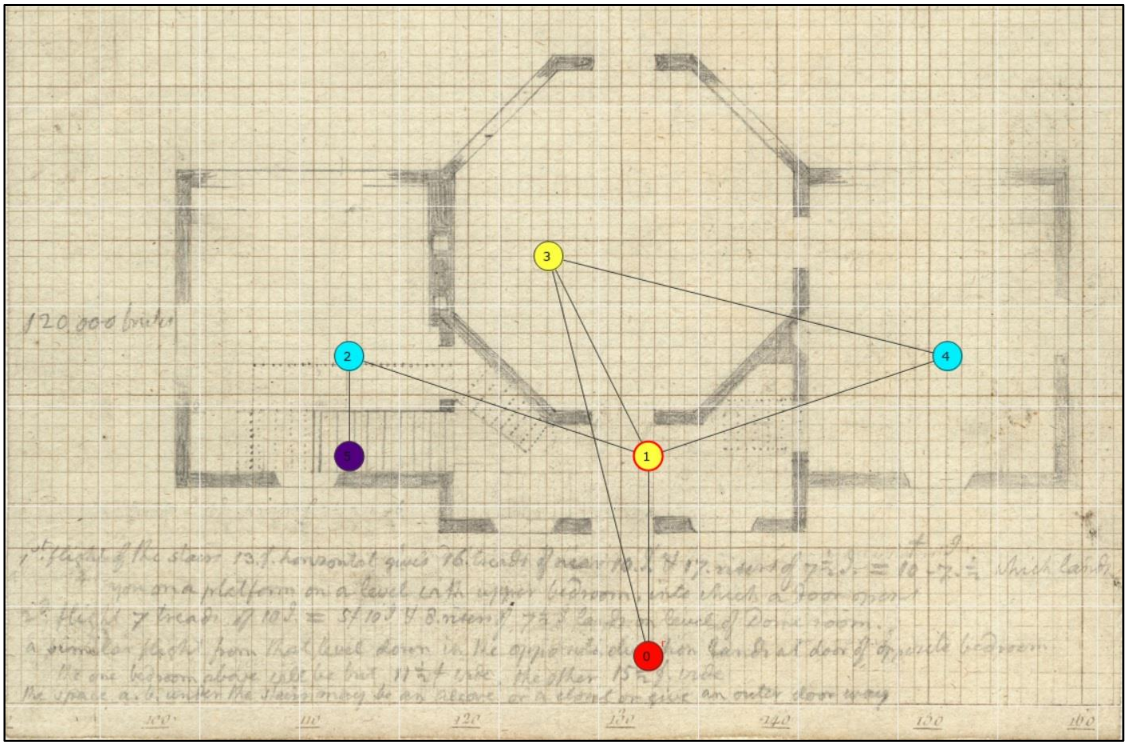

Figure 2. 5 - Thomas Jefferson's Poplar Forest

In **Figure 2.5**, the relatively simple arrangement of the structure's main floor has been augmented with an overlay of nodes and their connecting edges. The nodes have been colorized based on their depth from the exterior of the structure, a node colored in red at the bottom of the image to indicate that the node is serving as the base for the graph of the spatial arrangement. The further away from the exterior of the building, the cooler, or closer to purple, the node colors get. The large octagonal space and the entry hall are both directly adjacent to the outside, and so are only a single step of depth from the base of the network graph. The wings of the building are two steps of depth from the exterior, and appear in light blue as a consequence. The deepest space in the main level of the structure, in relation to the outside, is a stairway leading up from one of the wings, and so that stairwell appears in purple to indicate its relative depth. For each Roman domestic structure in the study data set underwent the same graphical breakdown of its component spaces as the example from Poplar Forest. These graphical representations of spatial arrangements form the core of the space syntax analysis conducted with the assembled material from northwestern Europe.

In space syntax, integration and relative asymmetry measure how integrated a space is in relation to the larger spatial arrangement. Both metrics examine the placement of a node in relation to its peers in a graphical arrangement. For Per Östborn and Hendrik Gerding, closeness centrality and integration measure the same phenomenon, and, due to different disciplinary ancestry, are essentially different terms for the same concept.[104]

One of the key concepts of space syntax as a means of analysis is to push the analysis of space beyond the intrinsic properties of space, such as shape and size. Relating form to function is difficult, because each discreet area is divorced from the whole, and, lacking context, almost meaningless on its own, from the point of view of architectural analysis. A solution can be achieved by also examining the extrinsic, or configurational, properties of space, i.e., how the spaces in a system relate to one another. In doing so, the individual units of a system become more easily differentiated from one another, due to the patterns of arrangement and potential movement through those patterns that are now made clear. In this formulation, the definition of an architectural space is made sharper and more keenly defined. The spatial system is not just a set of convex elements and their relationships, but a layered series of justified graphs, where each node in the graph is a position from which the entire system can be seen, along with its attendant intrinsic and extrinsic attributes. By Hillier's reckoning, thinking of each space within a building, or each street in a city as a point of view on the whole system, a physical view is reconciled with a phenomenological one, because the system is now defined both objectively and quantifiably, while also being defined as a set of different perspectives from which the whole

[104] Östborn and Gerding 2014, 76.

system can be seen.[105] By extension, the primary properties of space are extrinstic, and measurable numerically.

The degree to which a space in a system, or network, is integrated can be calculated from its justified graph. The process functions by assigning a "depth-value" to each level of the graph. *Nodes* in the first level away from the root node are assigned a value of one, the second level is two, and so on. The total sum of these values provides a quantification for the total depth of the system from a single particular space. For analyzing the entire system, or a single structure, in the case of this project, total depth values are calculated for each node in the building's network, providing a *mean total depth* that can then be used in comparison to other structures. From the total depth, a number of other metrics can be calculated, each a step in a quantitative chain of data which results in what space syntax scientists refer to as an *inequality genotype*, a pattern to the network based on the comparative integration and segregation of its constituent nodes.[106] The spatial patterns of these architectural networks, their inequality genotypes, are considered by Hillier to be *culturally specific*, even when the exact spatial geometry of the buildings in question differ.[107] In his view, this presents a "clear and culturally variable *spatial meaning* to the idea of *function*."[108]

After total depth, the first of these additional metrics is the *mean depth*, calculated by taking the total depth and dividing by the total number of nodes in the network, usually referred to as the value "k," minus one. The mean depth represents the average shortest distance from a node "n" to all other nodes. Using the resulting value for mean depth, the useful metrics of

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105 Hillier 2014, 22.
106 For more on inequlity genotypes, see Conroy-Dalton and Kirsan 2008.
107 Hillier 2014, 23.
108 Hillier 2014, 23.

relative asymmetry and *integration value* are then calculated. Relative asymmetry describes the level of integration of a node as a value between the integers 0 and 1, with lower values representing a higher level of integration. The relative asymmetry is quantified by subtracting 1 from the mean depth value and multiplying the resulting number by 2. Then, that result is divided by the number of nodes, k, minus 2. Integration value is similar to relative asymmetry. Both are representations of integration, the difference being that in the case of the integration value, the higher the value, the greater the integration. Consequently, the integration value is simply the inverse of relative asymmetry.

A concern in comparing two networks to one another is the inherent problems of scale. Can two systems of differing sizes truly be compared to one another in a mathematical sense, given that the measures of integration and depth applied by the space syntax methodology are ultimately keyed to quantifications based on the number of nodes in a given network? To examine two networks, or in the present case, architectural arrangements, of different sizes, in some cases on an order of magnitude, the two sets of data points need to be mathematically transformed. Hillier and Hanson present a process of regularizing the values produced from different-sized systems.[109] The mechanics are simple: the real asymmetry value of the spatial system or systems are compared against the real asymmetry value for the root of a diamond-shaped pattern of spaces. Hillier and Hanson have conducted a space syntax analysis of this hypothetical diamond-shaped space, producing a table of decimal numbers, which they refer to as *D-values*, which can then be used to adjust the real asymmetry calculations for the real systems in question.[110] By dividing the real asymmetry value by the corresponding *D-value* on

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[109] Hillier and Hanson 1984, 109-113.
[110] The table of values can be found in Hillier and Hanson 1984, 112.

the table, a regularized measure of integration is produced that can be held up next to similar values from systems of differing sizes.

The first stage of applying space syntax analysis to the remains of Roman domestic architecture is to collect architectural plans of the structures in question. Take, for example, the Roman-style house at Newport, on the Isle of Wight. The plan of the structure, shown in **Figure 2.6**, represents the beginning phase of space syntax analysis.[111]

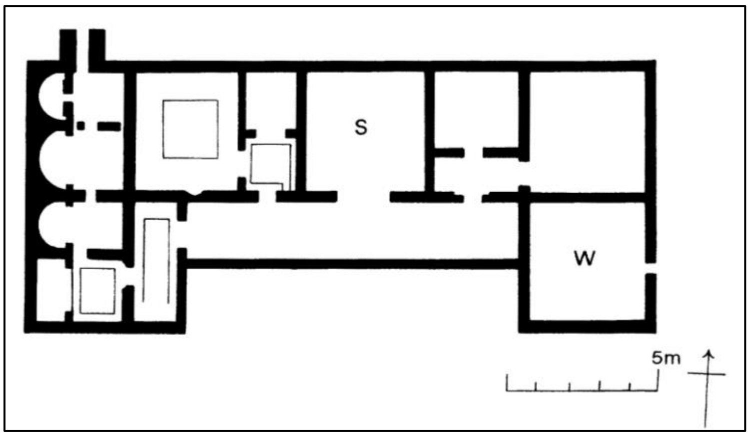

Figure 2. 6 - Newport

The next stage of the workflow was to subject each spatial arrangement to space syntax analysis. Normally, space syntax analysis, a process mainly used by architects interested in movement through space, is performed using specialized software called DepthMapX, specially designed at University College London's school of architecture. Use of the software is predicated on the availability of computer-aided design (CAD) plans of the structures to be analyzed. In the case of modern architectural applications of space syntax, this is not a problem, as CAD drawings are part and parcel to the architect's trade. However, for the architecture of two thousand years ago, this requirement creates a very large obstacle. Not only would CAD drawings need to be created for every building or architectural space in the dataset, but those digital plans would require

111 Plan from Cosh 2001, 222.

further consideration toward digital storage, as CAD files can be fairly large in size.[112] Also, due to the fairly simple application of space syntax required in the project workflow, employing the full suite of DepthMapX's capabilities would be overkill.[113] Instead, an alternative software platform was identified. AGRAPH, the product of graduate students at the Oslo School of Architecture and Design, is a simpler, more straightforward program with lower technical requirements, making it ideal for the present study.[114]

For each site in the current dataset, the JPEG image of the building plan was imported into AGRAPH as a background image. From there, nodes were placed and edges were drawn, creating the structure of the graphs for analysis. Continuing with the example from Newport, this part of the process can be seen in **Figure 2.7**.

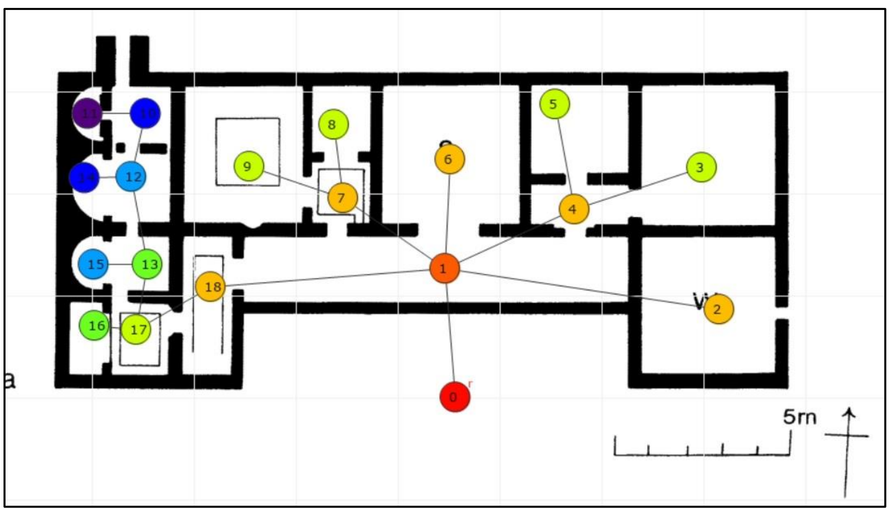

Figure 2. 7 - Newport Space Syntax Analysis

[112] In recent conversations with Prof. Lana Radloff of Bishop's University, the author found that the limitations of DepthMapX encountered in the course of the current project also impacted Radloff's own work applying space syntax to the harbor structures on the Greek island of Kos. Personal conversation with the author, 4 January 2019.

[113] DepthMapX contains a robust collection of analytical tools for applying more complex principles of space syntax analysis, such as pathing analysis and axial analysis, to architectural spaces. For the present study, the only necessary analyses is the creation of graphs and the quantitative analysis of those graphs.

[114] See Manum, et al. 2005. The software is freely available at: https://www.ntnu.no/ad/spacesyntax. AGRAPH requires only a JPEG image of the architecture in question, both simplifying the process of creating the network graphs for space syntax analysis and reducing the necessary digital space to store the images.

Calculations were run to produce the initial values of Mean Total Depth (TD) used in the remainder of the space syntax analysis. This data point, along with the number of identified nodes in the graph, were then used to calculate the remaining metrics.[115] Once the data was calculated and input into the spreadsheet for later use, the background image was removed and the graph was justified in AGRAPH to provide an illustration of the spatial network, should it be needed later. The justified graph for Newport is shown in **Figure 2.8**, with the graph justified in relation to the exterior of the structure. All the relevant data files and images were then saved in a folder together under the name of the site and, where relevant, phase of occupation.

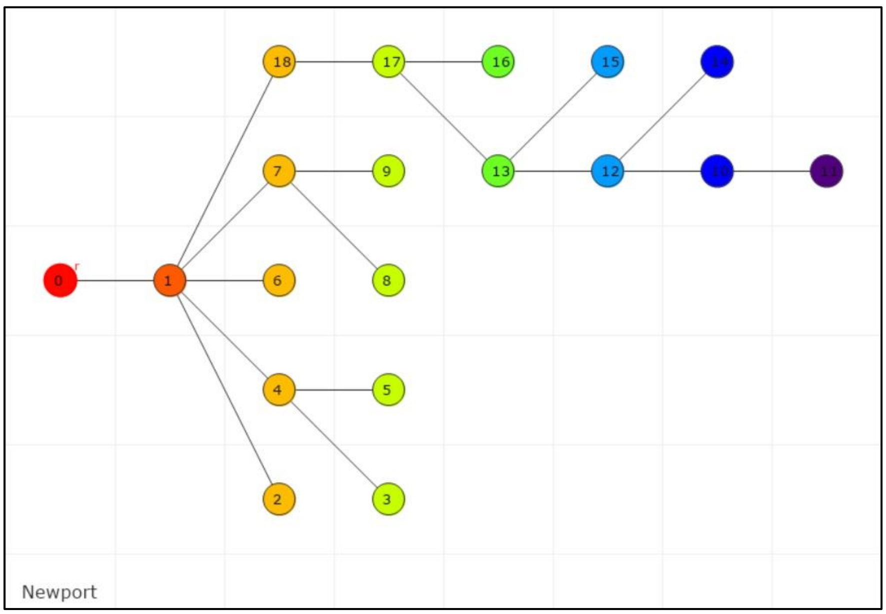

Figure 2. 8 - Newport Justified Graph

Rectifying the chronological element from the dataset proved to be a more involved process. Because the excavated data was pulled from a range of sites, each excavated by a distinct archaeological team and lead excavator, across a wide span of dates ranging back to the beginning of the twentieth century, there is no uniform system of recording dates of habitation

[115] For more on the issues encountered in the process of calculating the space syntax data from the graphs, see the below section on Limitations. All metrics are calculated to six decimal places, which was the default setting for many of the programs, and there is no apparent reason to change that particular setting.

across the data set. For example, the site of Voerendaal, in the Limburg region of the Netherlands, was excavated in the 1920s. The published information about the site does not include much detail regarding the secondary structures that would be expected at a rural site of its kind.[116] In contrast, the palatial villa at Fishbourne, in southern England, due to its ongoing history of archaeological and historical research, preserves a much greater degree of data regarding the structure and its surrounding landscape.[117] The lack of continuity is problematic in respect to quantitative analysis, where statistical comparison of data, often by chronological grouping, is made impossible without those discrete groups. In order to accommodate this prerequisite, the available information, sourced from the excavation reports and secondary literature, had to be massaged to fit into a series of artificial categories. The decision was made to describe a series of date ranges within the statistical analysis that successfully encompasses the entire range of occupation dates while simultaneously presenting that information with sufficient granularity for meaningful statistical description. Using inclusive date ranges, rather than shoehorning the available data into rigid, inflexible categories, allows for meaningful discussion of chronological trends, while preventing oversimplification.

The data, which was stored in an Excel spreadsheet during the data collection process, was then converted to a Comma Separated Values (CSV) table, the most commonly used type of digital file for many programs employed for data analysis, including ArcGIS and statistical software packages such as R, which is the software of choice for this analysis. Python was also considered as an option for data manipulation and analysis, due to the relative simplicity of its syntax and the availability of resources, both online and within the University of Virginia's

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[116] See Remouchamps 1923; see also Habermehl 2013, Data Appendix.

[117] See Cunliffe 1998.

Scholars' Lab community. However, prior familiarity with R, particularly in the context of archaeological data analysis, made R the logical choice. In addition, both R and Python allow for extensive modification to suit the user's needs, including packages for spatial and network analysis. The CSV table of Insular data was imported into a software program called RStudio, which provides a robust user interface for R functionality, including previews of data as well as debugging and error troubleshooting features.[118] Using add-on packages called "igraph," "matrix," "network," and "ggplot2," which enable the manipulation of data for the purposes of network analysis, the space syntax data could be manipulated in a number of ways to highlight salient comparisons within the data. There are 23 variables accounted for in the final data frame within R, including the calculated metrics for space syntax, observations concerning date ranges, the presence of architectural features, and location names. By comparing these pieces of data to one another, emergent patterns in the data could be highlighted.

Since space syntax forms the foundation for the site-level analysis of the archaeological material in the study, the regional comparison of the combined Insular and Continental data should be thought of as a network analysis of networks. Because the primary measure of integration from space syntax, real relative asymmetry (RRA), produces a decimal expression of that particular measure, the RRA numbers from the data can be used as attributes in a larger-scale network analysis. The area of network analysis of particular relevance to archaeological work deals with what are called "general similarity networks." General similarity networks are useful for the archaeologist because any kind of common attribute can be used as a criterion to connect to nodes. This characteristic gives similarity networks a flexibility that is useful in

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[118] RStudio is an example of an Integrated Development Environment, or IDE, which provides a single software environment for the majority of necessary functions for software programming in a given language, including source code editing, debugging, and compiling of the final software product.

archaeological work, particularly if subsets of data are allowed to be selected during the process of constructing networks from archaeological data.

With similarity networks, it is possible to describe a series of conditions using logical operators in order to approximate a certain level of similarity between archaeological sites. Wouter de Nooy and his colleagues refer to these constructions as "m-slices," where "m" defines that sought-after level of similarity.[119] For example, such a set of parameters could be written as: "connect all pairs of contexts that have at least *m* attributes in common, no matter the attributes."[120] At the basest level, similarity networks follow the premise that the higher the level of similarity, the more likely it is that two archaeological contexts are related to one another. For example, Fiona Coward employs similarity networks in her analysis of the ancient Near East, inferring social connections between sites on a regional scale from the co-presence of certain artifact types.[121] The strength of those ties was predicated on the number of co-present artifact types. Rather than relying on the output of network analysis to lead her to further assumptions, as some scholars, such as Søren Sindbaek, who employs similarity network in the context of Viking Age trade routes in Scandinavia, Coward instead relies on statistical testing of the network data in order to determine the significance of the temporal trends highlighted by the network data. The work of Coward and Sindbaek highlight the two major approaches that Östborn and Gerding see for employing similarity networks in archaeology. The first, more formal approach is Coward's, which looks for robust network structures tested using statistical comparisons to the null hypothesis. In other words, how does the real-life data compare to a similar network generated completely randomly according to normal or Gaussian distributions? In contrast,

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[119] De Nooy, et al. 2005.
[120] De Nooy, et al. 2005.
[121] Coward 2013.

Sindbaek takes a more exploratory approach, playing with similarity networks as a means of identifying interesting patterns in the data that can be followed up on with more robust statistical methods or further qualitative research. Both methods have their uses, and neither is more or less correct to employ than the other.

The main caveat to utilizing any networks in archaeology is to bear in mind that no single network representation can stand for the "true" state of the network.[122] Some connections or edges will be false positives or negatives, due to inconsistencies in the algorithm deciding where to make or omit those links based on the available information. In interpreting archaeological similarity networks, it is useful to keep in mind that the presentation of that network data is founded on incomplete data, and does not represent a hard and fast gospel for interpretation. Instead, it is best to think of networks as a useful tool to frame qualitative inquiry, rather than a derived quantitative expression of past truths from archaeological data. There will always be some degree of arbitrariness in network representation of the past, as we can never be sure if the data is a truly representative sample or not. When properly applied, the best outcome from archaeological network analysis is a tool that is simultaneously systematic and versatile. Such a tool can be used to formulate hypotheses about the data, but should not be taken as a concrete representation of past relationships.[123]

From the assembled data and the categorization of that data, an m-slice was developed to model similarity between domestic contexts. The framework for that construct is intended to check for combinations of attributes, and to use the co-presence of those attributes or variables as criteria for connection in the larger network. Creating the bounds of such an m-slice in R is fairly

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[122] Östborn and Gerding 2014, 83.

[123] See Ian Hodder's most recent monograph, *Entangled*, for a deeper discussion of truth, people, and the archaeological record; Hodder 2012.

straightforward, as the process defines certain restrictions on the data using basic logical operators such as AND, OR, and NOT, which are very commonly used in statistical computing. Ultimately, the definition for similarity decided upon for this study follows to the following pattern: A particular arrangement of architectural space can be considered similar to another if the two sites both have a mean real relative asymmetry (RRA) value within 0.25 of one another, and both contexts share a building type category. Sharing a typological category is an obvious criterion for similarity, and an RRA value within a quarter of a point indicates that the two structures share similar mathematical structures to their network graphs, but does not require a granularity that makes this particular exercise in data sorting meaningless. If the selection criteria are too refined, the data is sorted into so many separate groups of one or two buildings that wider comparison becomes almost impossible.

In order for similarity network analysis to work properly using the formal methods described by Östborn and Gerding and employed by Coward, there needs to be an additional set of data following a normal statistical distribution to compare the experimental data against. Because most archaeological attribute data conforms to patterns of binary numbers or categories, it is a fairly simple matter to convert existing data typologies to numerical form, with numbers standing in for particular categories. R allows for the generation of random data within certain parameters according to commonly found statistical distributions, so it was a fairly simple process to produce a new set of data to serve as a control group for comparison to the experimental data collected from archaeological publications.[124]

[124] The experimental data can be found in Appendices A and B.

2.4.3 Limitations of the Approach

Within the digital humanities, there is a current trend pushing for more openness toward perceived failures in scholarly knowledge production. The objective being to produce a more reflective generation of scholars who are operating in a mainly digital environment, accountable to a virtual audience as well as their immediate peers in the academy. In addition to greater transparency about limitations and shortcomings in research and scholarly thinking, there is also an interest in discussing the merit of where certain methodologies or technologies have fallen short in their implementation, and what might be done to adjust or adapt those shortcomings in the future, where possible.

In the process of space syntax analysis in AGRAPH, inconsistencies and errors in data outputs raised a red flag after the first half dozen or so instances, leading to a period of diagnostic computations both using the software and by hand to look for and identify the point or points of failure in the computational chain. As it turns out, the software was truncating the results from many of the calculations, leading to incorrect outputs as the false data was incorporated into later calculations. The issue was addressed by relying only on the certifiably correct data, the Total Depth (TD) calculation, and using that value to calculate the remainder of the metrics outside of the AGRAPH software, using a combination of Excel formulae and old-fashioned pen and paper scribbling. After correcting those calculations that were thus proved incorrect, space syntax analysis could continue.

While working with the resulting values produced by space syntax analysis of the Roman houses in the data set, the need to corral certain types of data into categories, such as dates and building types, remained a frustration. Where the archaeologist is accustomed to typologies and seriation of material culture, outliers exist which perplex the scholar and obfuscate the clear presentation of orderly data. Unfortunately, quantitative analysis necessitates the orderly presentation of data, so a degree of resolution to the collected information was lost in the cleaning process, as data was levered into place in order to avoid the angry red text of error messages during the second phase of analysis.

Similarly, 23 variables are a large number to account for in any scientific analysis, so a truncated list was necessary to prevent accidental errors in the course of analysis or to keep the data frame in RStudio from becoming too unwieldy to manipulate. Consequently, the most relevant columns of data are separated out and stored in a distinct CSV table, in order to facilitate easier analysis and parsing of data.[125] A major problem encountered in the process of data collection was determining when to halt the collection of data and begin the process of analysis. The instinct to keep amassing data was strong, and determining when enough data had been collected was not an easy task. Similarly, the flexibility of quantitative data analysis, particularly in a digital environment, allowed for almost endless manipulation and testing of the collected data. However, not every avenue of analysis necessarily led to meaningful results, and again, the instinct to keep experimenting and playing with data analysis and visualizations was strong. Ultimately, the greatest limitation or concern encountered in the course of this project was the open potential for data analysis using digital means. The available tools and methods for analyzing archaeological data are almost practically endless, and perhaps greater discipline earlier in the process of developing the underlying methodology would have been useful.

[125] The table of data created for analytical purposes can be found in Appendices A and B.

2.5 Conclusion

The matter of Roman housing in northwestern Europe is a topic large in scale, touching on a number of scholarly traditions, each with their own distinct methodological and theoretical histories of how the study of these domestic spaces has evolved over time. The quantity of data available to the modern archaeologists demands new and innovative approaches to grapple effectively with the material on such a large scale. Technology and techniques, such as space syntax and network-oriented analysis, offer innovative ways to address old and enduring questions about the ancient world.

By design, the methodological processes devised for this study take a multi-level approach to the archaeological remains of Roman domestic architecture. Grounded in principals of network analysis at both levels of examination, the analytical methods use networks implicitly and explicitly to examine the spatial arrangements of provincial residences. Expanding on traditions of network thinking from a variety of disciplines, the methodology pushes the boundaries of traditional archaeological thought, merging quantitative approaches in order to better understand the nature and patterns of the data analyzed in the course of the study.

The domestic architecture of the Roman north does not exist in a vacuum, but rather as part of a greater corpus of how Roman citizens, provincial inhabitants, and persons of all walks of life inhabited and shaped their residential environments in the first half of the first millennium AD. The following chapters will cover the domestic architecture for the Insular and Continental halves of the northwestern corner of the Roman Empire. The discussion and analysis of the data will begin with the British material, move to the data from mainland Europe, and conclude with a comparison the two sections. In contrast to the southern climes of the Roman world, the discussion now shifts to one of the most distant and northerly territories under Rome's dominion, the British Isles: the province of Britannia.

Chapter 3

Heated Floors at Home:
The Architectural Data from Roman Britain

3.1 Introduction

The introduction of Roman-style domestic architecture into Britain predates the Claudian invasion of AD 43. It is well-known that the Roman state had contacts with the inhabitants of the British Isles since at least the time of Caesar's twin expeditions to the isles in 55 and 54 BC, with broader Mediterranean contacts stretching back into at least the 4th century BC.[1] It is not unreasonable to conclude that patterns of living and architectural technologies filtered across the English Channel along with Roman trade goods. Regardless of the nature of that transmission, the landscape of domestic housing in Britain experienced a shift in the years leading up to and after the Roman conquest. Roman technologies of construction, architectural planning, and urban development became common practice, particularly in the southern and eastern areas of the island. Villas became commonplace, along with the attendant restructuring of the agricultural and rural economy. The question, then, is to understand the pattern to how those peculiarly Roman means of building and living spread into the conquered regions of the Empire. The following chapter will contextualize the data and its meaning within the wider scope of British archaeological research on the Roman house. Next, there is discussion of the data collection process, analysis, and finally, a presentation of the Insular data and the implications of that data for our understanding of Roman Britain.

The following caveat is needed before proceeding: it has been mentioned before, and will

[1] Herodotus 3.115; Herodotus refers to the Cassiterides, or "Tin Islands" off the west coast of Europe, most likely a nod to Mediterranean trade for Cornish tin, a key ingredient in the production of bronze.

be again, that post-processual critiques of computational approaches are nothing new to archaeology, but instead of revisiting the processual approach to universally modeling the past using computer-driven analysis, the present study aims to illuminate old arguments with new data, and to hang those interpretations on an armature assembled from observations derived from solid, tangible analyses of hard data. The following chapter will present the evidence for a less linear, more decentralized and fuzzier interpretation of how Roman architectural styles and spatial patterns came to be adopted in Britain following the Roman conquest. Perhaps most importantly, the hypothesis that there might be chronological patterns present in the large data set of architectural plans will be tested, with somewhat unsurprising results, namely, that there does not appear to be a strong correlation between spatial patterning trends and the chronological data. There are, however, other notable patterns concerning specific architectural features, as well as the location and structural type of certain early Roman contexts in Britain. This chapter will lay out the scholarly context, analytical processes, and the results of those analyses as a first step in looking at the architectural remains of Roman domestic life in northwestern Europe.

3.2 Roman Archaeology in Britain

The study of Roman material culture in Britain has a long a storied history, stretching back into the eighteenth century. Interest in the antique past in Britain can be traced back to the ever-so-venerable Bede, who begins his eighth century *Historia ecclesiastica gentis Anglorum* with Caesar's invasion of Britain in 55 BC.[2] Antiquarian interest persisted through the Victorian period, mostly out of curiosity and a desire to collect tokens of the past.[3] Despite the indelible mark these antiquarians made on the trajectory of Romano-British studies, their contributions,

[2] Bede, I.2.
[3] See MacGregor 2007.

with some exceptions, can hardly be considered serious scholarship. The rapid industrialization of the later nineteenth century uncovered many archaeological sites, including Caerwent, Wilchester, and Wroxeter. However, the archaeological excavations and data recovered would be, in the words of Martin Millett, "methodologically crude by modern standards."[4] A bright spot was the collation of much of this data into the *Victoria County Histories*, which formed the foundation for the modern study of Roman archaeology in Britain. This modern phase of study is often attributed to the work of Francis Haverfield and his influential role in British archaeology circles in the first quarter of the twentieth century.[5] In addition to numerous hands in early publications of excavations and scholarly writings, Haverfield is probably most known for his 1906 work, *The Romanization of Roman Britain*.[6] While critiqued for his simplistic view of the Romanization phenomenon by later scholars, Haverfield's ideas on cultural change being driven by change in the indigenous population, rather than due to a sudden implantation of Romans *ex nihilo*, shaped research and debate in the field for much of the twentieth century.[7] Haverfield himself died in 1919, shortly after the end of the First World War, which claimed the lives of a number of his students, and is considered by many to be a factor in his death.[8]

The generation of scholars who arose after the First World War were, like Haverfield, influential in their own right, and also largely Oxford-linked. R. G. Collingwood, who was in turn a student of Haverfield, produced the enduringly useful *The Archaeology of Roman Britain* in 1930, which set the template for many subsequent works on the province.

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4 Millett 2016, 23.

5 Mattingly 2006, 4. Mattingly refers to Haverfield as the "father of Romano-British archaeology."

6 Haverfield 1912. See Woolf 1998, where Greg Woolf suggests instead the existence of a fluid construction of Roman and Native identities, a concept that would appear impossible to Haverfield, a product of the 19th century traditions of British imperialism. Versluys 2014, 4.

7 Millett 2016, 22-23.

8 Webster 1991, 120; Freeman 2007, 348-424; Millett 2016, 24

Contemporaneously, Mortimer Wheeler made a name for himself with a number of notable excavations, such as Verulamium, which, due to his rapid rate of time-to-publication, had an immediate impact on contemporary thinking.[9] Wheeler was a practitioner of large-scale, systematic excavation, and his methods helped raise the standard of excavation methodology over the course of the century.[10] Collingwood made his own impact on the field, most notably through his students, who carried on his legacy of small-scale, question-oriented excavation. Notable among these students was Eric Briley, who established a meticulous use of small-scale excavation and epigraphic evidence to chart the history of Hadrian's Wall, work that his son, Robin Birley, continued.[11] The focus of Romano-British archaeology in the inter-war period was on military and urban sites, with little regard for the countryside. Exceptions were villa excavations such as Bignor and Folkestone, which were excavated in this period.[12]

Following the Second World War, Roman archaeology in Britain experienced gradual growth, fueled by rescue excavations of material exposed by bomb damage and through construction projects. Additionally, archaeology began to expand into the public sphere, through the aforementioned rescue projects and a growth in local interest in cultural heritage. Historic town damaged by German air raids produced archaeological excavations concerned with the earliest phases of occupation. Necessity, coupled with funding shortages for university-driven archaeology, gave rise to the archaeological volunteer, organized through local committees. John Wacher's excavations at Catterick and S. S. Frere's continued work at Verulamium are excellent

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[9] Millett notes Wheeler's work at Verulamium was published quickly enough to influence Collingwood's 1936 discussion of the Roman town in *Roman Britain and the English Settlements*. Millett 2016, 25; Collingwood 1936. Wheeler was also greatly assisted in his work by his wife, Tessa Verney Wheeler, whom Lydia Carr gives her due credit, noting that some contemporaries considered Tessa to be the superior excavator. Carr 2012.

[10] Millett 2016, 25.

[11] James 2002; Millett 2016, 25-26.

[12] For Bignor, see Winbolt and Herbert 1930. For Folkstone, see Winbolt 1925.

examples of this model. Research agendas grew out of these rescue projects, training interested volunteers in archaeological methods and cultural theory, as formalized field schools developed, such as Barry Cunliffe's project at Fishbourne and Martin Biddle's work at Winchester. In the north, Eric Birley's foundation of the annual *Limes* conference forged connections between British scholars and their Continental, mostly German, counterparts, creating the first network of scholars engaging with what would now be termed "frontier studies."[13] Martin Millett notes a "towering figure of the period" in Ian Richmond, a student of Collingwood's who worked with the Wheelers at Segontium.[14] Richmond produced the first post-war synthesis on Roman Britain in 1955, *Roman Britain*, becoming a fixture of the field for many years.[15] Richmond's student, Barry Cunliffe, influenced the next generation of students with his field schools at Fishbourne and Portchester, where he introduced an approach to Roman archaeology grounded more in anthropology than classics.

A further contribution of the post-war period was the third edition of the Ordinance Survey *Map of Roman Britain*, published in 1956 by A. L. F. Rivet, who shortly thereafter published *Town and Country in Roman Britain*, a groundbreaking volume that marked a shift away from the focus on urban archaeology in Roman Britain and an opening to study of rural life in the Roman province. Rivet's next publication, 1969's *The Roman Villa in Britain*, was the first work concerned wholly with the archaeology and history of rural elite settlement in Britain, and pioneered a number of subfields of villa studies, such as David Smith's contribution on regional artistic schools of mosaic production.[16] Continuing in the vein of Collingwood's grand narrative,

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[13] James 2002. Interestingly, Eric Birley also applied his knowledge of Roman epigraphy to his wartime work as a cryptanalyst at Bletchley Park, employing many techniques used to parse Latin inscriptions to crib data from German ciphertexts. Millett 2016, 27.

[14] Millett 2016, 28.

[15] Richmond 1955.

[16] Rivet 1969; Smith 1969; See also Smith's more recent summary of the state of mosaics in Roman Britain,

Sheppard Frere's *Britannia: A History of Roman Britain* holds a similar place as the definitive work for the post-war generation of Romano-British archaeologists.[17]

The next few decades were marked by a number of shifts in both the interpretation of and the theoretical approach to the material remains of Roman Britain. The year 1970 marked the first publication of the journal *Britannia*, headed by Sheppard Frere, and the trend of large, synthetic volumes, such as John Wacher's *Towns of Roman Britain*, continued.[18] Additionally, the 1973 discovery of the first writing tablets from Vindolanda injected a new corpus of textual evidence, transforming understanding of the Roman military.[19] However, a boom in large-scale rescue excavations resulted in a tectonic shift in the landscape of British archaeology, leading to the formation of a plethora of local, state-backed archaeology units, which in turn began to add massively to the material record of Roman Britain, for better or worse. The lack of an overarching authority meant that these rescue excavations were not tied to a universal process of recording or publishing, and the emphasis on excavation over interpretation led to a large portion of these sites going unpublished, with notable exceptions, such as Philip Crummy's work at Roman Colchester.[20] Despite relatively little impact on the understanding of Roman Britain's material culture, the sheer quantity of sites, particularly in rural contexts, finally eliminated the misconception of Roman Britain as an idyllic, wooded countryside dotted with urban centers and the occasional villa. The "New Archaeology," more commonly referred to now as the "Processual" movement, also had its impact on the archaeology of Roman Britain. Scholars such as Ian Hodder started to think of the province as an economic and social system in more

including the material from domestic contexts; Smith 1984.

[17] Frere 1967.

[18] Wacher 1974.

[19] See Bowman 1994.

[20] Crummy 1988.

anthropological and quantitative terms, prompting sharp backlash from the previous generation.[21]

The transition into the 1990s was marked by continued debate over the concept of Romanization, including Martin Millett's *Romanization of Britain* and the ongoing series of Theoretical Roman Archaeology conference volumes which treat the subject. The period is also marked by a certain degree of introspection. David Mattingly's *Dialogues in Roman Imperialism* and Greg Woolf's *Becoming Roman* stand as critiques of the Romanization concept more broadly, as well as reflections on the state of the field.[22] Archaeology itself has undergone the Post-Processual reaction and the Post-Colonial turn, both having theoretical implications for how the material from Roman Britain, as well as the history of its study, is considered within the broader context of Roman studies. Recent work with emergent technologies, such as geophysical remote sensing and the current wave of quantitative approaches, the present study included, have combined with the quantity of available data to make Britain one of the best-published and most visible provinces of the Roman Empire.

3.3 The Study of Domestic Architecture in Britain

Similar to the broader field of Roman archaeology in Britain, the study of Roman domestic architecture in the region has a deep and involved history. Given the close connection between the study of domestic spaces from Roman Britain, most notably the rich history of villa studies, there is significant overlap between the major names working on each. As discussed in Chapter 2, such overlap is due to the unique place Britain holds in the study of the Roman provinces. General surveys of Romano-British archaeology, such as Ian Richmond's

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21 Sheppard Frere's validictory lecture at Oxford in1987 being the most noted and visible example. Hodder and Millett 1980. On the "New Archaeology" and its impact on Classical Archaeology, see further Dyson 1993.

22 Mattingly 1997 and Woolf 1998; Freeman provides a good summary of the early state and origins of the Romanization debate, and serves as a good companion to Millett's overview in *The Oxford Handbook of Roman Britain*. Freeman 1997 and Millett 2016.

Archaeology of Roman Britain devote significant sections to the topic of villa studies, and the villa itself has come to act as a marker for a certain level of Roman culture on the island, almost regardless of the current state of scholarly discourse on the subject of Romanization.[23]

Following Richmond's grand work, *Archaeology of Roman Britain*, the next major contribution to modern studies of Romano-British domestic architecture was the edited volume by Leo Rivet, *The Roman Villa in Britain*, from 1969.[24] Despite its age, Rivet's book is still cited as an early authority and source for villa studies, particularly Ian Richmond's chapter on villa typologies. Building on Rivet's volume, John Percival's 1976 *The Roman Villa: An Historical Introduction*, sought to describe the villa as a concept across the Roman Empire.[25] Percival sticks to the definitions and typologies laid out in Rivet's work, noting that there are exceptions or outliers that would not fit the profiles laid out in Rivet's volume. Percival's writing is wide-ranging in terms of the sources it draws from, pulling primarily from archaeological material, but also examining art and textual sources. Percival approaches the Roman villa from a thematic point of view, first discussing the chronological origins and development of the villa as a building type, then shifting over to an examination of regional variations and divergences from the Italian model of villa plan. The rest of his book examines the socio-economic role of the villa within the agricultural system of the Roman Empire. Percival's approach, looking at one type of structure in a thematic way, is emblematic of British archaeological scholarship of the 1970s.

Shortly after Percival's monograph came the publication of *Studies in the Romano-British Villa*, edited by Malcolm Todd.[26] The volume presents a number of regional or site-

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23 Richmond 1930.
24 Richmond 1930; Rivet 1969.
25 Percival 1976.
26 Todd 1978.

specific chapters concerning the interpretation of villas in Britain. Also included are a pair of chapters on specific villa types, one by D. J. Smith on regional variation among winged corridor villas, and the other by John Hadman on aisled buildings.[27] The contribution with perhaps the greatest impact on future scholarship on Romano-British domestic spaces is J. T. Smith's discussion of the Roman villa as a key to understanding social structure.[28] Setting the stage for his influential monograph on the subject almost two decades later, Smith lays out his working definition for what constitutes a villa, which is actually quite a broad spectrum of architectural expressions, and sets forth three necessary conditions for the utility of existing villa plans.[29]

Following Percival and Todd's volumes, which set the grounding for formalized study of the villa in Britain, the next major wave of publications on the topic of domestic architecture arrived in the later 1990s. The first of this new wave was Ian Barton's edited volume on Roman domestic architecture, intended to provide a follow-up to Barton's previous edited work on Roman public buildings, attempts to produce a "rounded architectural picture" for the social strata of the Roman Empire.[30] The volume is divided into chapters based on the context of the residential architecture, urban or rural, as well as based on scale, with palaces receiving separate treatment from the average villa, for example. Perhaps of greater relevance to the study of villas in particular is J. T. Smith's volume, *Roman Villas: A Study in Social Structure*, in which he both discusses the history of villa studies and presents a comprehensive typology based on the use of space and principles of classical architecture. The book is an expansion of the earlier contribution to Todd's edited volume, and continues to serve as an influential component of the

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[27] Smith, D. J. 1978; Hadman 1978

[28] Smith, J. T. 1978.

[29] J. T. Smith's definition and conditions will be discussed in the following section on villa typologies and function. Smith is mentioned here to provide context for the broader study of Roman domestic architecture in Britain.

[30] Barton 1996, 1.

scholarly literature on the Roman rural house.

Shortly after Smith's volume, two more publications arrived to round out the modern corpus of monographs on Roman housing in Britain and the northern provinces. Simon Ellis's *Roman Housing*, published in 2000, is another volume that aspires to be a comprehensive overview of Roman domestic architecture, and it includes substantial attention to Britain.[31] Useful for his engagement with textual sources and for attempting to establish a definition for what a Roman house might be defined as being, Ellis' monograph functions as a useful synthesis of domestic styles across the Roman Empire. Published in 2002, Dominic Perring's *The Roman House in Britain* seeks to broaden the scope of previous scholarship on housing in Roman Britain, which had been primarily concerned with the rural villa.[32] Perring's approach is a good complement to Smith's prior monograph on the social function of the Roman villa more broadly, as Perring uses a similar lens to examine the reaction of indigenous Britons to Roman rule. Around the same time, Penelope Allison produced a summary of the current state of research on Roman domestic architecture.[33]

For the present dissertation, the most relevant and useful works have been J. T. Smith's *Roman Villas: A Study in Social Structure* and Dominic Perring's *The Roman House in Britain*.[34] Both authors approach the topic of Roman housing in Britain and, more widely, the northern provinces in general, through similar avenues ultimately grounded in anthropological thought.[35] Since the present study concerns itself with a new approach to quantifying patterns of space use

31 Ellis 2002.

32 Perring 2002.

33 Allison 2001.

34 Smith 1997; Perring 2002.

35 While Perring's volume is explicitly about the Roman house in Britain, many of his conclusions concerning the expression of social hierarchy and identity construction through architecture are applicable to the other Celitc regions of Europe that fell under Roman hegemony.

in the Roman house, especially as those patterns relate to the larger discourse on Romanization, Smith and Perring's publications are of particular relevance. The typologies and definitions employed by both are foundational for the categorization and analysis of Roman domestic spaces in the northern provinces.

3.4 Houses in Roman Britain: Sources, Typology, and Function

The discussion of Roman housing in Chapter 2 is supplemented here with a more detailed examination of Roman houses in the context of Britain. The early history of domestic housing studies in Romano-British archaeology, a subfield which developed fully in the middle of the twentieth century, is concerned primarily with the villa. Given the roots of Romano-British archaeology in the classical studies departments of Oxford and Cambridge, it is surprising that there are few useful references to the villa as a structural type in the corpus of Latin literature. The references that do survive cover a range of meanings and only a rough definition of what might constitute a villa. References in surviving Latin literature to villas in particular are wide-ranging and fall somewhat short of providing a clear definition. For instance, Livy describes Aemilius Mamercus's campaigns against the Sabines as destroying "not only the villas but the villages/towns too."[36] John Percival summarizes his own definition, based on a reading of the literary references, as "a villa is a place in the country, normally (but not always) associated with farming, sometimes with connotations of luxury or relaxation, and in most cases a single house rather than a group of them."[37] It is clear from the Latin authors that the villa is a country phenomenon and not an urban one, and the word "villa" is itself used regularly to refer to

[36] Translation is the author's. Livy, ii. 62, 4; Latin: "incendiis deinde non villarum modo sed etiam vicorum quibus frequenter habitabatur Sabini exciti cum praedatoribus occurrissent, ancipiti proelio degressi postero die rettulere castra in tutiora loca."

[37] Percival 1976, 13.

farmhouses by Roman authors.[38] Vitruvius' writings provide detailed, albeit idealized and hypothetical, information on the dimensions, technologies, and perspectives which combine to form the Roman house.[39] While Vitruvius provides certain invaluable details and insight to our understanding of certain principles of Roman domestic architecture, such as symmetry and proportion, at least from the point of view of one specific architect. Perhaps his most useful and enduring contribution has been Latin nomenclature for rooms and spaces, as was discussed in Chapter 2.

In this dissertation, the decision has been made to apply as uniform a typology as possible, borrowed from J. T. Smith, in order to regularize the data into usable categories.[40] While not entirely satisfactory, the decision to adhere to some manner of categorization makes sense in light of the choices that must be made in order for the data to be analyzed according to common statistical processes. Additionally, simplifying Smith's typology accidentally aligned the chosen categories and terms with those employed by the Historic England database of registered sites, which seems to base its own terminology for domestic structures off of Richard Hingley's *Rural Settlement in Roman Britain*.[41]

Importantly, Smith's typology is employed in the present study because of his approach and transparency regarding problematic aspects of categorizing villas from architectural features. Additionally, his work encompasses not only Roman Britain, but significant material from the Continent, as well. He lays out the foundations of his typology as a choice between two broad

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[38] See Apuleius' *Apologia*, 67, II, Columella's *De Re Rustica*, I, 6, 21, and Cato's *De Agri Cultura*, iv, I.

[39] Specifically, Books VI and VII of *De Architectura*. See also Allison 2001, 183 for more discussion of Vitruvius' contributions to modern scholarship and his relative value to understanding a Roman perspective on domestic spaces.

[40] See Smith 1997. A summary of the categories used in the present study is summarized below.

[41] Hingley 1989.

categories: the *hall* type and the *row* type.[42] From these, Smith subdivides into a number of variations, based on architectural proportions, the presence of certain types of rooms, and relative scale. Instead of importing Smith's typology directly, a modified, simpler version is used here, in order to streamline the data collection process and ensure structures fit in one of several categories. Structures with evidence of a single large interior space, sometimes with smaller adjacent rooms or evidence of aisles delineated by post-holes are categorized as *halls*. Because these buildings are relatively straightforward in terms of architectural layout, they tend to be smaller in size and have fewer rooms. Smith speculates that these residences might also have done double duty as agricultural buildings, with livestock sleeping inside with the nuclear family, similar to later medieval halls.[43]

Hall-type structures appear across the geographic and chronological extent of the Insular data, and the specifics of their quantity and comparison to the other categories of structure will be addressed later in the chapter. From within the Insular data, one of the better examples of a hall-type domestic structure in Roman Britain can be found at the site of Clanville, in Hampshire (**Figures 3.1** and **3.2**).[44] Divided into two phases of construction and occupation, the remains of the building at Clanville are typical of the hall- or aisled-type structure, which earlier archaeologists, such as Collingwood, refer to as having a "basilican" plan.[45] While the physical remains of the second phase of construction have been excavated, the layout of the earlier phase remains conjectural, reconstructed from a number of post-holes uncovered under the later stratum of occupation.[46]

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[42] Smith 1997, 23-45.
[43] Smith 1997, 23-28.
[44] Entries 28a and 28b in Appendix A.
[45] Collingwood 1930, 131.
[46] Morris 1979, 35. The figures in the text come from Figure 36 in Morris 1979.

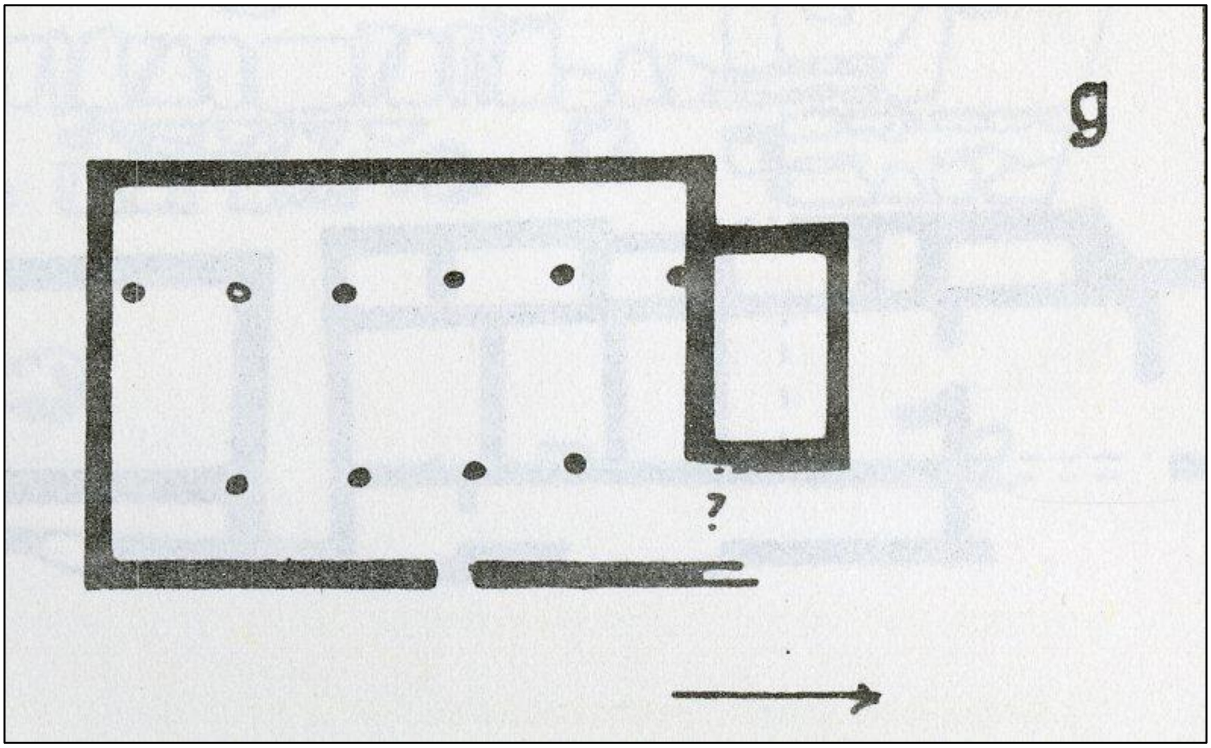

Figure 3. 1 - Clanville, Phase 1

At its most essential, the hall-type building is an open, central space, around which the main axis of the structure is arranged. In the simplest of layouts, such as Clanville's first phase (**Figure 3.1**), there is a lack of subdividing rooms, excepting, in this case, a single separate room aligned with the main axis. Early scholars viewed the simplicity of the hall-type plan as an indication of primitiveness, comparing the structural form to early Iron Age or Hellenistic rural homes.[47] Collingwood uses such comparative evidence to suggest a backwardness to the development of Roman Britain in relation to the rest of the Roman world.[48] In the case of Clanville, as at other sites with similar spatial arrangements, there is evidence for structural posts, which served primarily as a system for roof support. A secondary function may have been to delineate space, dividing the large central space into thirds, similar to the nave and aisles of a

47 Swoboda 1919, 115; Collingwood 1930, 130.
48 Collingwood 1930, 130.

monumental basilica.[49] Consequently, the triplex division of space crafted by the posts has been replicated, in this instance as well as all others where evidence of such posts is preserved, for the purposes of space syntax analysis.

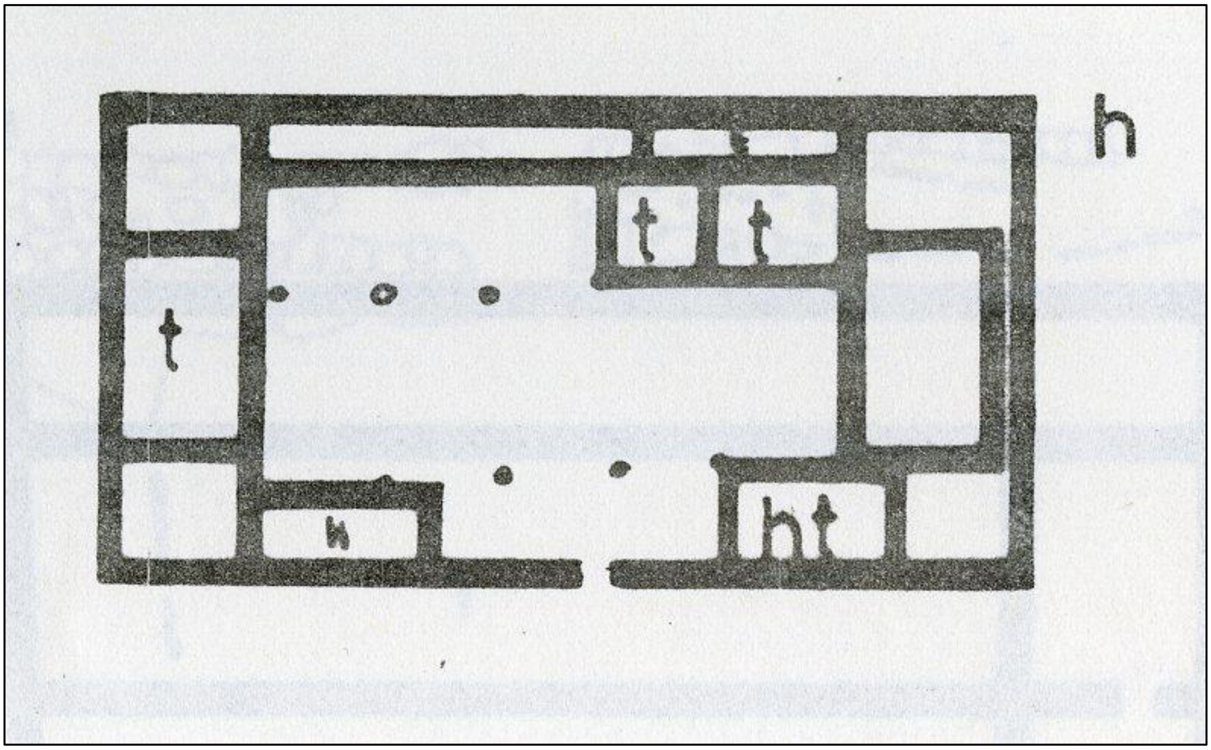

Figure 3. 2 - Clanville, Phase 2

For the second phase at the Clanville site, the spatial arrangement becomes more nuanced and detailed in its subdivision (**Figure 3.2**). While there remains a central room, with supporting posts replaced by stone columns, a number of ancillary chambers have been added to the layout, a number with the remains of tesselated pavements preserved, along with some indications that the space may have once possessed a hypocaust system. This further subdivision of space points to an increase in complexity in how the space is conceived and used. The overall dimensions of the structure measure 96 feet by 52 feet. While the context and function of the Clanville domicile

49 Vitruvius V.5; MacDonald 1986, 114.

is ultimately agricultural, the complexity of the architecture, and the presence of tiling and a heating system, points to a certain degree of wealth and sophistication on the part of the owners.

Larger in size and more varied in terms of room arrangement and complexity are categories of row houses, such as the *corridor* house, which is fronted by a long connective passage, which facilitates entry to the structure, movement between discreet collections of rooms, and presents a unified, broad facade. Typical of the corridor-type is the structure at Boxmoor, in Hertfordshire (**Figure 3.3**).[50] Located near the urban center of Verulamium, modern St. Albans, occupation at Boxmoor began in the first century AD, around the year 75, and continued into the middle of the fourth century.[51] At its height, the villa at Boxmoor possessed the expected sophistication of a Roman elite residence, namely tesselated mosaic pavements and sub-floor heating, evidenced by remains of a hypocaust system. The initial construction was a timber-frame house with wattle-and-daub walls. The initial spatial arrangement was small, but anticipated the later phases of expansion and development of the later, grander construction.[52]

The first phase at Boxmoor was supplanted by a number of later expansions and additions to the space, beginning with the monumental construction in stone just to the north of the original villa site. After forced abandonment of the first century habitation following a fire, settlement shifted in the Hadrianic period to the larger, stone-built house.[53] The height of occupancy and expansion at Boxmoor was in the second and early third centuries, after which it is likely that Boxmoor was absorbed into a larger nearby estate of Gadebridge.[54]

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50 Entries 12a through 12f in Appendix A.
51 Neal 1978, 40-52.
52 Plan of Boxmoor from Neal 1978, 42
53 Neal 1978, 40, 46.
54 Neal 1978, 50.

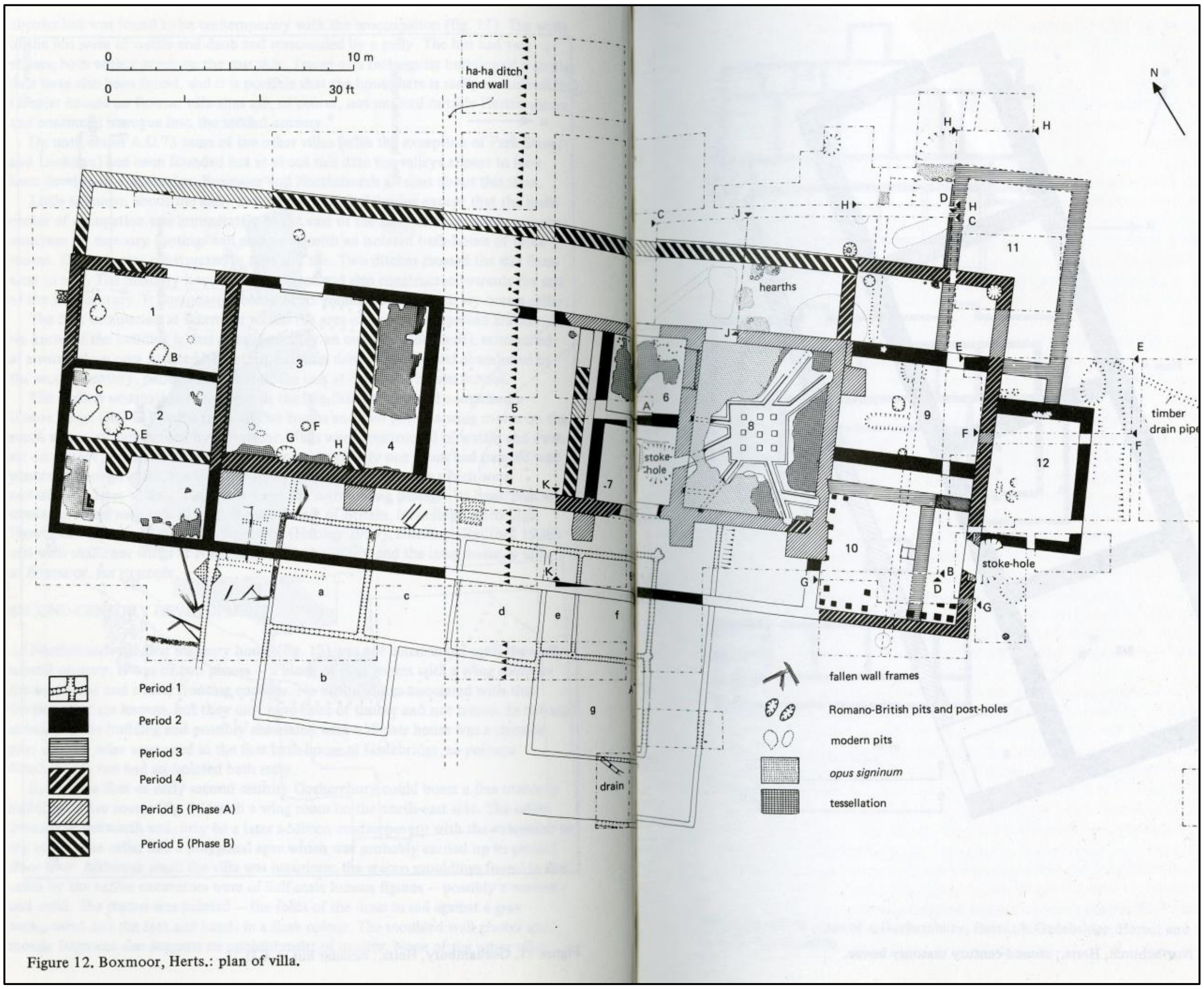

Figure 3. 3 - Boxmoor

As expected for a corridor-type residence, the salient feature at Boxmoor is the long access passageway running along most of the length of the both lengths of the structure. The corridors give name to the overall typological category, and serve as means of traversing both the north and south sides of the building. There is evidence for a hypocaust system, which, combined with tesselated and *opus signinum* flooring attest to the status of the occupants.[55] After the height of its occupation, the villa at Boxmoor entered around a century of decline. Not necessarily

[55] Earlier phases of construction, such as the first, preserve evidence of earlier, beaten earth floors.

reflected in the spatial arrangement, the reduced archaeological recovery rate of coins and other diagnostic small finds points to a steady decline and eventual abandonment by the end of the fourth century.[56] The villa at Boxmoor is representative of the corridor building type in Roman Britain. While the earliest, timber-built phase hints at developments to the type, namely the inclusion of wings to one or both of the short ends of a corridor villa, the later phases of stone construction represent the typical corridor house found in Britain.

A subset of corridor house deemed important enough for its own category is the *winged-corridor* type, which adds one or two protruding towers or rooms to either end of the front passageway. An example of such additions to the corridor type is the villa at Witcombe, Gloucestershire (**Figure 3.4**), sometimes referred to as “Great Witcombe.” Witcombe, occupied from the late third through fourth centuries, represents the fully-realized manifestation of Roman elite domestic architecture.[57] Based around the compact core of the corridor-type, a winged-corridor villa adds a wing to one or both short ends of the rectangular structure. The effect created by the projecting wings is to frame a large, open space in front of the structure’s facade, similar to a courtyard missing one of its sides. It is not unusual for one of these wings to contain a bathing suite, as is the case at Witcombe.[58]

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56 Neal 1978, 52.
57 Entries 54a and 54b in Appendix A.
58 The plan of Witcombe is from Wilson 1970.

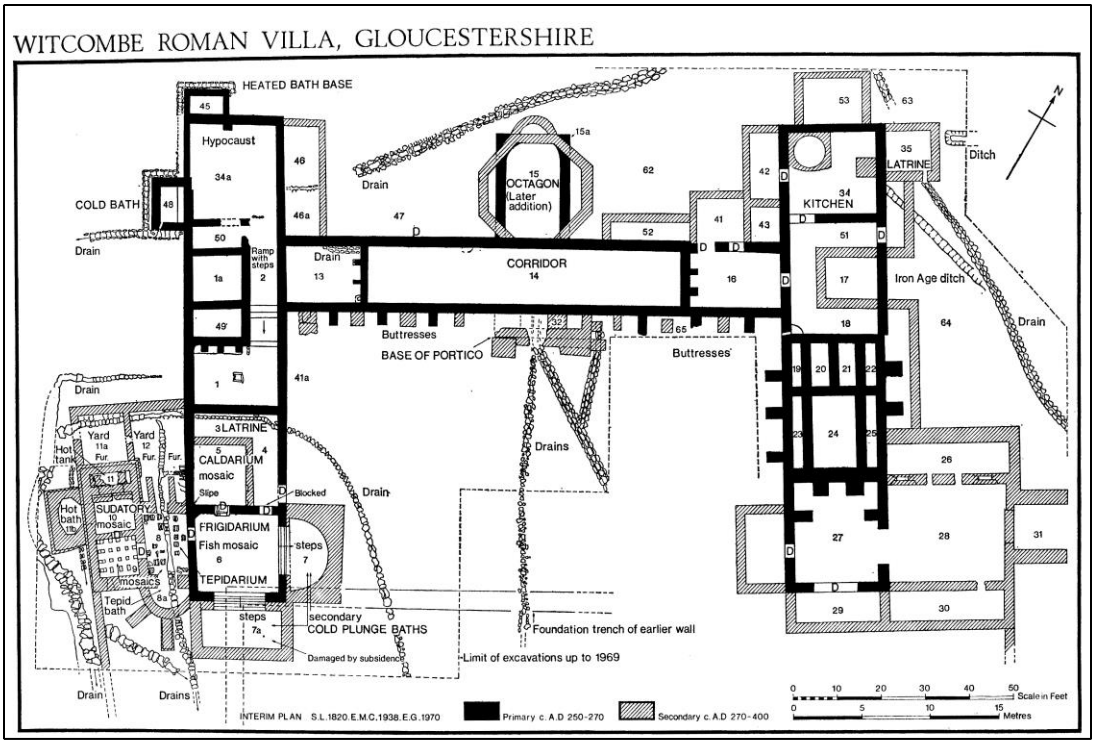

Figure 3. 4 - Witcombe Roman Villa

The excavated plan of the villa at Witcombe highlights two phases of construction, beginning circa AD 270. Unlike some examples of the winged-corridor type, where the wings are later additions to a central corridor-type structural core, in this instance, the wings are present from the first identifiable phase. Later additions to the complex take the form of slight expansions, the enlargement of the portico, and the addition or enlargement of the bathing suite on the south-west side of the structure. Perhaps the most salient architectural addition at Witcombe is the octagonal room off of the central corridor. The space is identified as a reception room, and is not entirely unique to Roman Britain. The villa at Keynsham, for example, has a similar space attached to the larger structure, only with six sides instead of eight.[59] The physical extent and presence of bathing suites, dedicated reception spaces with innovative and relatively unusual architectural plans, along with decorations such as mosaic flooring and wall-paintings, point to

59 Ellis 2002, 67.

Witcombe, and other large winged-corridor villas, as representatives of the rural elite domestic experience in Britain. The size and sophistication of these structures are clearly built and occupied by wealthy persons, and present an image of inclusion and belonging within Roman provincial society.

While these structural categories are primarily drawn from rural evidence, the urban sites in the dataset also merit their own categories, where appropriate or deviant from the rural patterns. Urban residences which inhabit a smaller portion of a larger city block are often referred to by scholars as *insulae*, although the specific residences included in this study can be sorted into categories of hall or row type domiciles, based on salient architectural features. An example of such an urban home is found at the site of Caerwent, ancient Venta Silurum, in Monmouthshire, Wales (**Figure 3.5**).[60] In Insula I of the town, a residence was excavated whose plan centered on a central courtyard. Bordered on three sides by passageways, the courtyard resembles similar open spaces at more southern locales, such as Pompeii. Whether or not the courtyard at this residence in Caerwent served a similar function, for gardening, leisure, and possibly dining, is unclear.[61] What is apparent from the physical remains is a fairly compact domestic space, organized around an open court, with a number of rooms radiating off of the central space. The exact function of many of the rooms remains unknown, but it is likely for some of the spaces to have served a commercial function, given the comparative evidence from Pompeii, and the proximity of the Insula to the main thoroughfares through the settlement.[62]

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[60] Entries 19a and 19b of Appendix A.
[61] Wacher 1998.
[62] Collingwood 1930, 109; the plan shown is from Frere 1984; For the evidence from Pompeii, see Pirson 2009.

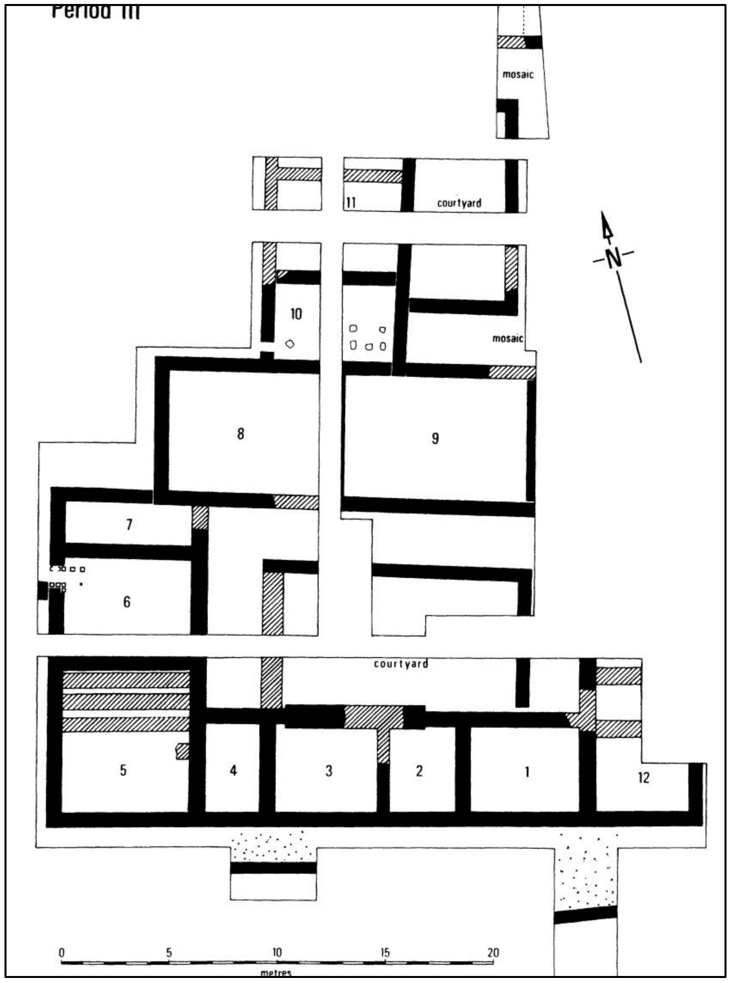

Figure 3. 5 - Caerwent, Insula I

Those urban homes which closely resemble rural villas that exist in the northwestern provinces are sorted into an appropriate preexisting categorization. Large rural complexes, usually created by connecting multiple wings arranged around central corridors, arrange themselves in most cases around a prominent central courtyard, presenting a handy designation for the type. The use of the term “courtyard” in the present study is something of a misnomer in architectural terms. Not infrequently in Britain, there is preserved evidence at rural sites for multiple structures, usually a larger, residential building and one or more smaller, agricultural, industrial, or storage spaces. Space syntax methodology has no problems with multiple structures, and for the purposes of data collection, complexes with more than one structure are often classed as possessing a “courtyard” in the data collection spreadsheets. This designation indicates the presence of an exterior space, separate from the space outside of the total complex. An example of such an arrangement is the rural villa complex at Sparsholt, in Hampshire (**Figure 3.6**).[63] The agricultural compound, which has been analyzed both as a complex and with the main residence structure treated on its own, consists of a main corridor villa which fronts onto an enclosure. On the two flanking sides of that open space, a structure identified as a barn, and an aisled building of assumed agricultural function sit opposite one another.[64] There is evidence of an earlier, potentially Iron Age, aisled structure under the Roman-period complex, possibly hinting at occupation of the later complex by indigenous persons who have assimilated to or adopted Roman means of living. The identification of the northern structure as having an agricultural function is complicated by the presence of sub-floor heating and a bathing suite.[65]

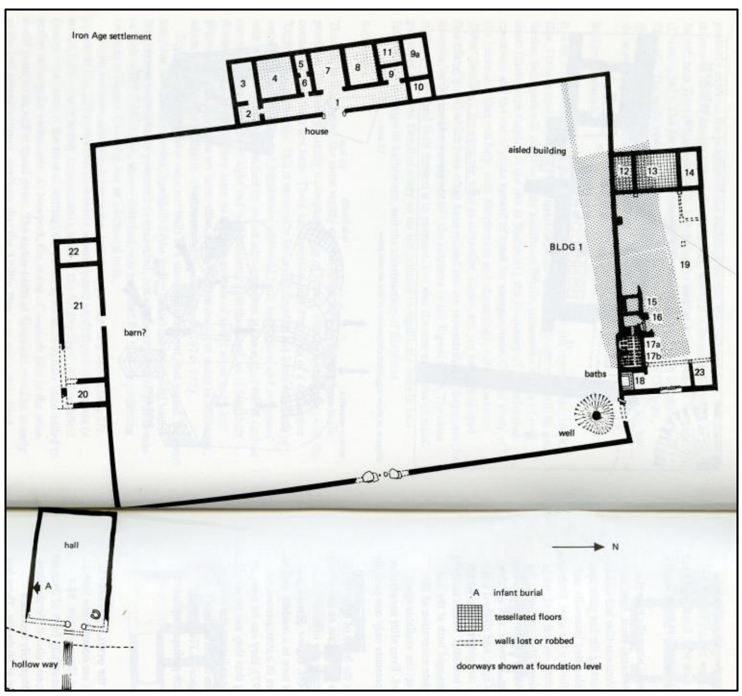

Figure 3. 6 - Sparsholt

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63 Entry 95 in Appendix A.

64 Frere 1973, 317-319; Johnston 1978, 80-81.

65 Plan from Johnston 1978, Fig. 25.

These categories of ancient domestic structure are by no means a nuanced or refined as Smith's typology. In the case of the latter, however, the express purpose of a detailed categorization was to tease out subtlety to the social presentation of status through architecture, while the present methodology concerns itself with a more quantitative approach. In cases where more than one structure was present, as is the situation a multiple rural complexes, the structural type for the largest, and therefore most prominent and presumably important and residential, building is used for the entire site.

3.5 Space Syntax Analysis

The data on the Roman domestic architecture in Britain is scattered across monographs, journal articles, databases, and site reports, presenting a seemingly daunting task to collect it all together. The first step in the data acquisition process was to determine what criteria to use in selecting sites for inclusion. Understandably, sites identified as villas or other domestic contexts through the presence of *tessarae* from mosaics, bits of painted wall plaster, or other decorative ephemera were excluded due to a lack of extant architecture. Similarly, several sites with preserved bathing wings or bath buildings, but no other pieces of the villa were excluded as well. Also excluded were sites identified solely through aerial reconnaissance, as the plans were often too faint to discern spatial arrangements for syntactical analysis.[66]

For villas in Britain, the starting point for identifying an initial list of potential sites was Eleanor Scott's *A Gazetteer of Roman Villas in Britain*.[67] Although somewhat dated, Scott's publication, made freely available online by the author, collates many of the identified villas in

[66] Also, it should go without saying that sites with no published plans were excluded on the basis that space syntax analysis would be impossible.
[67] Scott 1993; Scott's publication is available from her personal website, https://eleanorscottarchaeology.com/gazetteer-of-roman-villas-in-britain

Britain in one place, along with bibliography for each. The inclusion of selected sources for each location greatly shortcut the search for usable site plans. Additionally, the online database for Historic England provided a more up to date source for sites that were registered as historic landmarks in the England, and queries of that database assisted in crafting the initial list of locations from Scott's gazetteer.[68] For the material from Wales, a similar database, Coflein, was consulted.[69] Both online databases contained information on chronology, sources, and timelines of excavation and occupation, which proved valuable in later analysis. From these sources, the initial collection of domestic contexts, both rural villas as well as urban spaces, totaled 495 sites. These 495 locations formed the core of what would become the Insular dataset, found in Appendix A.

Working from the foundation provided by early identification, the next step in the data collection process was a comprehensive search through archaeological journals for domestic site plans that fit the established criteria. As part of the data collection process, several other metrics were sought for each location in the dataset. In addition to the building plans themselves, dates and locational data were also collected, for the purpose of comparing the quantifiable spatial metrics each building plan across time and space. Significant architectural features that might affect the spatial arrangement, such as courtyards, hypocausts, and entryways, were noted alongside the other data. The quantity of discreet entry points into a structure, along with the number of courtyard spaces, could influence how the quantified spatial data was interpreted. The presence or absence of hypocaust systems could similarly impact later analysis, as specific areas for heating furnaces change the overall arrangement of rooms in a structure, given that the

68 The database can be found at: https://historicengland.org.uk/listing/

69 The Coflein data base is located here: https://www.coflein.gov.uk/

heating systems are not intended to be accessible from the interior of the Roman house, in many cases. Cognizance of these architectural features was important for later production of space syntax graphs and analysis.

Through the process of data collection, the initial site list of 495 domestic contexts in Britain was whittled down to a collection of 106 distinct locations, some having multiple phases of occupation and/or construction, which are treated as distinct structures in the dataset, in order to affect a diachronic approach to the data. These sites were selected because they matched the criteria laid out in Chapter 2. The collected architectural plans were then ready, barring some minor image clean-up, such as cropping and rotating, for analysis.

3.5.1 Data Sources and Data Set

The data collected for the Insular portion of the dataset encompasses 170 unique, identifiable phases of construction and/or occupation from 106 sites across the modern nations of England and Wales. While the data in its entirety is available in Appendix A, a summary of relevant information is presented here. With the sites selected and information collected, following the parameters previously discussed, a picture of the Insular portion of the data set emerges. Spread across the geographic extent of modern England and Wales, the assembled data set represents a cross-section of the Roman occupation of what was then referred to as Britannia. The following table summarizes these locations, as well as the number of individual sites and contexts from each region that appear in the dissertation data. The region names were selected from the Council for British Archaeology's (CBA) regional archaeology groups, as those archaeological designations best encapsulate distinctions between the areas of modern England and Wales.[70] Using contemporary administrative boundaries was deemed to be too disconnected

[70] The CBA website, with a list of the regional groups, is found here: http://new.archaeologyuk.org/join-a-cba-

from the material culture and historical traditions of each region, and were therefore discarded as an option in favor of the CBA regions. In some cases, as with the North region, no archaeological sites were included in the present study, so those particular regions have been excluded. In some cases, regions have been merged to provide a more concrete picture of the geographic distribution of sites.

The East region includes the modern counties of Cambridgeshire, Essex, Hertfordshire, Norfolk, and Suffolk. The Midlands region combines several sub-regions, East, West, and South, and includes archaeological material from Leicestershire, Derbyshire, Lincolnshire, Nottinghamshire, Rutland, Buckinghamshire, Northamptonshire, Oxfordshire, Herefordshire, and Staffordshire. The South East and Greater London includes Kent, Surrey, Sussex, and the greater London area. Wales includes all counties and municipalities of modern Wales, including Caernarfonshire, Monmouthshire, Cardiganshire, Clamorganshire, and Cardiff. Wessex, like its historical namesake, appears to have expanded to absorb a great number of its neighbors, and conventionally includes archaeological sites from Berkshire, Dorset, Hampshire, the Isle of Wight, Wiltshire, Devon, Gloucestershire, Bristol, and Somerset, as well as a number of other locales not represented in this dataset, such as the Channel Islands.[71] Finally, Yorkshire and the Northwest includes material from Cheshire and two of the four Ridings of Yorkshire, the North and the East.

group/

[71] Although, in this case, the modern region of Wessex, however broadly defined by archaeologists, has not extended to control Northumbria, as accomplished by Æthelstan in AD 927; Foot 2011, 20.

CBA Region	Number of Sites	Number of Contexts
East	13	26
Midlands	19	37
South East and Greater London	13	19
Wales	6	10
Wessex	50	72
Yorkshire and the Northwest	5	6
Total	**106**	**170**

Table 3. 1 – Regional Distribution of Archaeological Sites and Contexts

From **Table 3.1**, it is apparent that the majority of sites in the data set fall in the southeast of England, in the region most often associated with Roman civilian settlement.[72] In addition to representing a comprehensive geographic span, the selected sites also cover a wide chronological spectrum, from the early first century AD through the end of the fourth century, around the time of the Roman withdrawal from the province. While providing a comprehensive capture of the chronological and geographic extent of the Roman domestic habitation of the province was a consideration during the data gathering process, it was not the sole motivating criteria for site collection. In order to be considered for inclusion in the data set, a site needs to fulfill a number of requirements. The primary need for each and every site was for a published site plan, with a certain degree of completeness. In order to be considered for inclusion, a full ground plan of the domestic space needed to exist in available, published form. In some cases, partial architectural plans were included, from cases where enough of a complex was excavated to extrapolate the remaining, unknown portions of the site, based on understood principles of symmetry and known patterns of rooms in Roman domestic architecture. In most cases, there were sufficient architectural remains either surveyed or excavated to exclude any particularly fragmentary sites from the data set. Enough sites only needed a partial wall reconstructed in order to finish their

[72] As opposed to the military settlements, in the form of forts and their associated *vici*, which are found primarily in the north and west. De la Bedoyere 2006, 102.

plans for a sufficient sample of sites to be assembled. The existence of an intact ground plan is essential for the proper employment of space syntax access analysis. Access analysis is predicated on preserved points of connection between spaces in a complex, in this case, doorways. Finding extant evidence for thresholds and doors in archaeological contexts proved more difficult than finding substantial evidence for walls and floors.

Apart from available architectural plans with concrete chronological information, there were few criteria which informed the process of site selection for the data set. In order to craft a truly representative cross-section of the available domestic sites in Britain, there were no quotas for sites based on building type, site location, or time period of occupation. To filter sites based on any of these values would have unfairly biased the collected data, rendering any pattern analysis essentially meaningless. In order to take the process an additional step in the direction of statistical rigor, a system of random sampling from a larger body of sites would have been preferable, but ultimately impractical given the demands on time already imposed by the data collection process.[73]

Similar to the broad regional representation present in the data set, each of the building types traditionally used to describe Romano-British domestic spaces is also exemplified in the assembled data. The distribution of these structural categories are summarized in **Figure 3.7**, and the specific numbers briefly discussed. 44 of the contexts fall into the *hall* type, the simplest of architectural arrangements. 50 phases of construction would be categorized as *corridor* structures, with a further 57 adding projecting additions to become *winged-corridor* complexes. Finally, 19 of the phases take the form of *courtyards*, typically the grandest and largest of domestic spatial arrangements.

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[73] Given more time, and a much larger assemblage of data, statistical sampling could be re-introduced as a means of upping the rigor of the analytical process.

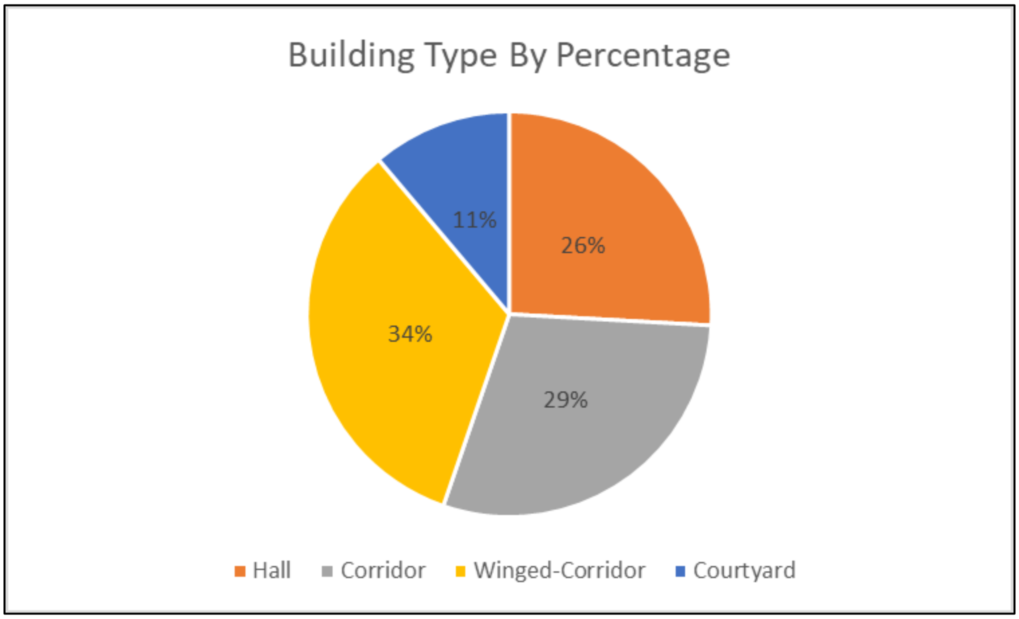

Figure 3. 7 – Building Types by Percentage of the Data Set

There is likewise a broad chronological distribution to the dates of occupation for the sites and phases in the study. In order to make the dates more manageable and to accommodate varying practices of archaeological dating, which range from using numismatic evidence to more modern scientific analysis of pottery fabrics, the chronological information was assembled in two parts, a beginning date of occupation, and an end date of occupation. While somewhat messy and difficult to fit into discreet and clean ranges, such distinction does afford the advantage of increased granularity to the information, allowing for a more refined examination of site appearance and disappearance from the archaeological record. For instance, the earliest concrete date for a site in the Insular data is AD 43, which predates the Claudian invasion of Britain by roughly a decade. However, upon reflection, the presence of Roman-style construction and patterns of space use are unsurprising given the wider context of the site and the state of Roman international relations at that particular point in time. This site at Fishbourne in the south of England, again the earliest in the study from Roman Britain, is actually also somewhat bigger than might be expected given its early date and the inclination of most archaeologists to conflate an earlier date with simpler material. The site is the so-named "proto-palace" at Fishbourne, long associated with the British tribal entity known as the Atrebates, through the later, Flavian period construction on the same site.[74]

With nineteen spaces in the complex, and a surprisingly mild Real Relative Asymmetry (RRA) value of 1.27, the early occupation phase at Fishbourne appears quite similar to other, later sites found in Roman Britain. What this site represents, with its seeming adoption of Roman means of construing and inhabiting space, is early, pre-conquest cultural exchange between an indigenous group and the Roman Empire across the English Channel. While cross-Channel trade was well-established by this particular point in time, the adoption and implementation of such a large-scale, monumental example of Roman architectural technologies, points to a transactional relationship deeper than the simple movement of portable trade goods across the furthest borders of the Roman Empire.

Eighteen other phases of occupation at Romano-British sites, for a total of 19, appear in the archaeological record during the first century. Some, such as the Fishbourne proto-palace, are quickly replaced by later, grander designs within the same century, or early into the next. Others, like the site of Beddington in Greater London, produce evidence of constant use well into the end of the 4th century, until around AD 400.[75] 52 occupation phases originate in the second century. This number represents a sharp increase from the first century, more than likely due to formal Roman occupation of the province. The strong trend of Roman-style domestic construction continues, with 58 contexts dating their foundation to the third century. After the third century,

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[74] Cunliffe 1971, 145-450.
[75] Frere 1982b.

new construction enters a decline, with only 41 examples present in the sample. While it is important to consider the initial dates for each phase of occupation and construction, the timeline in which those same contexts are abandoned or replaced is equally important, as such information presents a clearer picture of the duration each location was inhabited and used. Out of the entire Insular data set, only sixteen structures were abandoned or replaced in the first century AD, including the proto-palace at Fishbourne.

Another building, at Holcombe in Devon, is a small, two-room hall-type residence, part of a rural agricultural landscape. The early first century phase is dated based on a few numismatic finds, and does not align with the second phase of occupation, which dates to the middle of the second century. It seems probable that there is a gap in the chronological information for one or both of these phases, possibly increasing the extent of the earliest occupation into the second century. Regardless, the fact still stands that first century abandonments or updates of monumental, stone-built residential properties in Roman Britain are an extreme outlier, indicative that the earliest Romano-British residences took form as wood-framed structures that survive ephemerally in the archaeological record. A total 51 known locations are replaced, abandoned, or modified by the end of the second century. The increase over the first century, combined with the similar increase in second century foundations represents more intensive building program accompanying the rising Roman presence in the new province. The 47 third century abandonments, compared to the 58 new occupation phases in the same time span, point to a trend of a greater rate of replacement than of domestic context loss. This trend, in turn, indicates continued increase or maintenance of the Romano-British population of the province, before the decline of the fourth century. Finally, the 56 fourth century abandonments outstrip the corresponding number of new foundations, which includes only 41 contexts. The negative ratio produced by a comparison of these values leads to a conclusion that the population of Roman Britain was either unable or unwilling to to engage in the construction of new or expanded dwellings, instead remaining in present accommodations or relocating to other areas of the Empire.

The overall picture of Roman-style habitation in Britain between the first and fourth centuries AD is one of a sudden boom in monumental construction in the second century, dominated by buildings arranged around an organizing, connective corridor. These structures, which appear across the chronological span of the data set, account for 63 percent of the sites and archaeological contexts surveyed for the study. The trend of monumentalization, of constructing new residences in stone or expanding existing locations, continued into the third century before entering a period of decline in the fourth century. After the fourth century, formal Roman governance in Britain officially ends, sometime in the fifth century, although the particulars of the situation remain a subject of scholarly debate.[76] The impression of Roman domestic habitation painted by the assembled data is one of steady adoption of Roman architectural technologies and modification of Roman spatial organization in ways that are distinct from common examples from around the Mediterranean basin. The domestic architecture of the northwestern provinces, specifically, in this case, in Britain, appears to be internally consistent within a spectrum of accepted building styles and spatial arrangements. As with all archaeology, however, the devil is in the details, or, in this case, the data, which is where the discussion will

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[76] The crux of one of the major debates revolves around a potential copiest error in the *Rescript of Honorius*, the primary source for the traditional Roman withdrawal date of AD 410. In some interpretations, Honorius is not addressing the cities of Britannia, but instead the cities of the Bruttii, in southern Italy (Brettia vs. Brettania, in fifth century Latin). See Birley 2005, 461-463. The second major debate revolves around Mommsen's statement that 'it was not Britain that gave up Rome, but Rome that gave up Britain' (Mommsen 1885, 211). While Mommsen's position has remained the scholarly consensus, there are some scholars, such as Michael Jones, who instead take a contrary position, that the inhabitants of Roman Britain entered a period of revolt, effectively expelling the Romans. See Jones 1998. Other scholars, such as J. B. Bury, take issue with the chronology, citing evidence for Roman involvement in the province post-410. See Bury 1920.

now turn.

3.6 Data Analysis

Having described the data and its origins, the discussion now turns to the results of the analytical processes. Of the 106 sites in the Insular portion of the data, 33 include remains of more than a single structure, representing outbuildings of various function, including separate bath structures and presumed agricultural structures and servant or slave dwellings. This accounts for 31.13 percent of the total. 47 of the 170 total contexts, or 27.65 percent, have evidence for more than one entrance, although this number includes complexes with more than one structure, as well as hypocaust systems, which often have a separate exterior entrance for access to the heating furnace. A total of 37 sites or phases have at least one courtyard as part of the architectural arrangement, comprising 34.91 percent of the Insular data. Only 14 locations, or 13.21 percent, are from an urban context, which perhaps speaks more to the nature of archaeological recovery in the region and publication of material from urban sites than to patterns of Roman settlement. In addition to these basic descriptive statistics, there are a number of interesting metrics for certain subsets of data, which were pulled from the larger corpus in R and analyzed separately. Specifically of interest were subsets of data regarding sites with evidence for hypocausts, rural sites, urban sites, and sites with only a single structure.

	More Than One Structure Present	More Than One Entrance	Courtyard Present	Urban Context
Number of Contexts/Sites	33	47	37	14
Percentage of Total	31.13	27.85	34.91	13.21

Table 3. 2 – Insular Data Subsets

Of the locations with extant remains of hypocausts, whether pillars of tiles, pieces of mosaic flooring in a sunken, sub-floor pit, or the remains of a furnace system, the mean number of standalone structures sits at around 1.5, with a mean of around 26 discreet convex spaces, including the exterior.[77] The mean Real Relative Asymmetry (RRA) value, the space syntax calculation that speaks to how integrated or symmetric a spatial complex is in relation to other locations of differing sizes, came to roughly 1.3. The mean number of entrances is around 1.8, which makes sense in the context of the data, given that many hypocaust systems have a separate exterior entrance to the furnace area that is not connected to the larger spatial arrangement of the domicile. The mean number of courtyards is around 0.5. Compared to the larger Insular dataset as a whole, the numbers appear to be somewhat comparable. The average number of structures overall is round 1.4, with a mean number of convex spaces of 19. In this respect, locations with hypocausts tend to skew higher, which makes sense considering a certain degree of architectural sophistication, and therefore wealth, is required for the presence of a hypocaust system, so the structures would tend to be larger. The mean Real Relative Asymmetry is around 1.25, just slightly lower than the hypocaust subset. The average number of entrances is about 1.5, and the number of courtyards is 0.3.

For rural sites, the average number of structures is around 1.4, with a mean number of spaces at around 19, due to a number of relatively small structures balancing the larger palatial villa complexes in the data, such as Fishbourne Palace. The mean Real Relative Asymmetry sits at around 1.25, with an average of 1.6 entrances and 0.3 courtyards per site. In comparison, the urban sites understandably have a lower number of average structures per location, at 1.1, which can essentially be rounded to 1 for all intents and purposes. Interestingly, the average number of spaces is also close to 19. The mean number of entrances is lower, at 1.2, while the average

[77] The calculated metrics are: mean number of structures = 1.531646, mean number of spaces = 26.21519. These numbers have been rounded for inclusion in the text, and will be summarized in **Table 3.2** at the end of the section.

occurrence of courtyards is higher at exactly 0.5, which may be a result of a smaller number of urban sites in the data. Those sites with only a single structure, which comprise the majority of the data, have a lower average number of spaces, at around 16.5, while the mean Real Relative Asymmetry stays roughly the same at 1.21. The mean number of entrances is close to 1, at 1.1, as the data is not skewed higher by the presence of multi-structure residential complexes. The average number of courtyards is likewise close to 0, at 0.2, as very few single-structure houses in Roman Britain preserve evidence for courtyards, at least compared to the number of standalone structures of a hall type.

	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA
Insular Data	1.376471	19.02353	1.558824	0.3	1.246297
Hypocaust Subset	1.531646	26.21519	1.873418	0.468354	1.324432
Rural Subset	1.397436	19.00641	1.589744	0.282051	1.249887
Urban Subset	1.142857	19.21429	1.214286	0.5	1.206293
Single-Structure Subset	1	16.51095	1.131387	0.197080	1.211531

Table 3. 3 – Space Syntax Results for the Insular Data

From these descriptive statistics, there are a number of decisions to be made concerning the proper application of network analysis methods to the collected data. As previously noted, correlation coefficients were calculated for the variables measured in the data set. The intent behind this process was to look for statistically-significant patterns between variables that occur over and over in the data. The results of this correlation analysis are summarized in the heatmap chart below in **Figure 3.8**. In the graphic, the measured variables are placed on each axis and the correlation coefficient between variables is represented visually by color, with red indicating stronger correlation, and blue representing less-strong correlation.

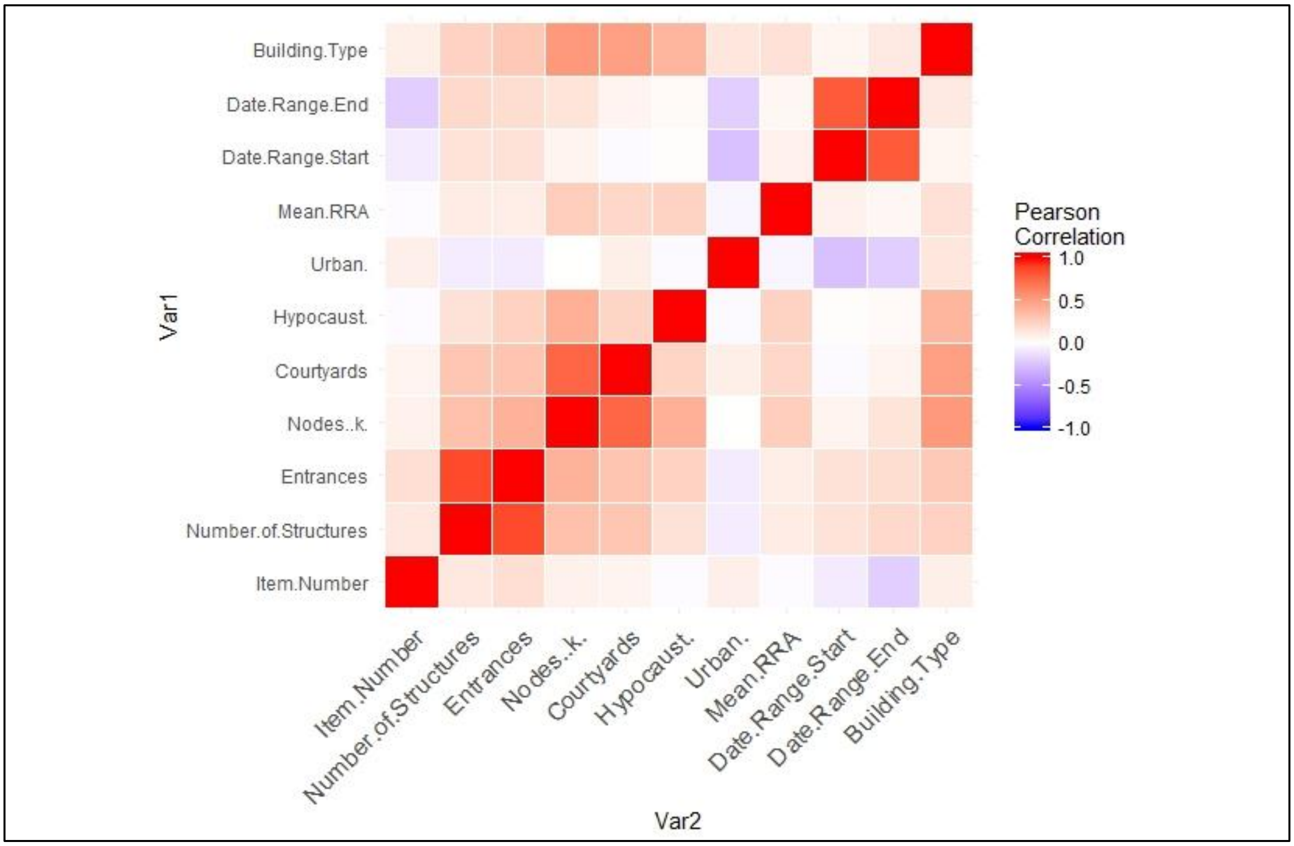

Figure 3. 8 - Correlation Analysis Visualization

What the heatmap, **Figure 3.8**, shows about the data is that while there does appear to be some degree of correlation between variables such as building type and mean measures of Real Relative Asymmetry (RRA), that correlation does not appear to be very strong. The strongest correlation appears between the beginning and end of the date ranges for each context. Such correlation is most likely due to regularized use of date ranges in the process of converting vaguer terms to concrete, numerical dates as part of the data cleaning process. Consequently, such correlation should not be taken as indicative of anything meaningful. Of perhaps more relevance to the discussion of architectural space, there does appear to be strong correlation between the number of entrances identified in a spatial complex and the number of structures. The correlation makes some degree of sense, in that it should be expected for the number of entrances to increase as more buildings are added to the arrangement. Since the mean number of entrances per structure in the British contexts is around one and a half entrances, skewed by large structures with multiple entrances (the mean number of entrances in single-structure cases is close to one), it makes sense for these variables to correlate strongly.

While it might be somewhat disappointing for there to be a lack of strongly correlated variables, such as mean asymmetry and building type, for instance, there are some slightly correlated variables worth mentioning. Building type and the number of nodes in the spatial arrangement have some degree of correlation. This relationship might indicate a connection between building size and type, as more complex building types, such as courtyard villas, have more discreet spaces present in their arrangement than simpler structures, such as hall-type buildings. Tangentially related to building type and the number of spaces is the apparent relationship between building type and the number of courtyards. As courtyards are only present in specific types of domestic architecture, in this case, courtyard villas and some winged-corridor structures, the relationship between these variables is logical.

There seems to be slight correlation between the number of nodes and the mean asymmetry values for the spatial arrangements, as measured through access analysis. There is some sense to this, as graphical complexity increases with the number of objects in a network. Certainly the structures with the greatest number of discreet rooms, such as the early period of Fishbourne Palace, are some of the most complex spatial arrangements in terms of their relative asymmetry. However, there is also not a clear linear relationship between the number of nodes and the asymmetry of the spatial arrangement. The later, Flavian stage of Fishbourne's occupation has a lower asymmetry value and a larger number of rooms. Also, there appears to be no correlation between the chronological data and the spatial arrangements measured by space syntax's real relative asymmetry value. The implications for this in terms of broader understanding of the spread of Roman cultural mores and building practices are more fully discussed in the following section.

Another comparison to consider is how the Insular data on spatial arrangement tests against the null hypothesis of randomness. From the collected data parameters for the entirety of the dissertation data set, totaling 357 archaeological contexts, a randomized set of mean RRA values was generated to serve as an experimental control, representing the null hypothesis of randomness. Using a mean value of 1.237078 and a standard deviation of 0.3018019, a table of random values was created in R for comparison to the experimental data. In R, the Insular RRA data was graphed as a histogram, representing frequency of distribution for the RRA values. Against this was plotted the histogram for the random data. The two histograms are compared in **Figure 3.9** below.

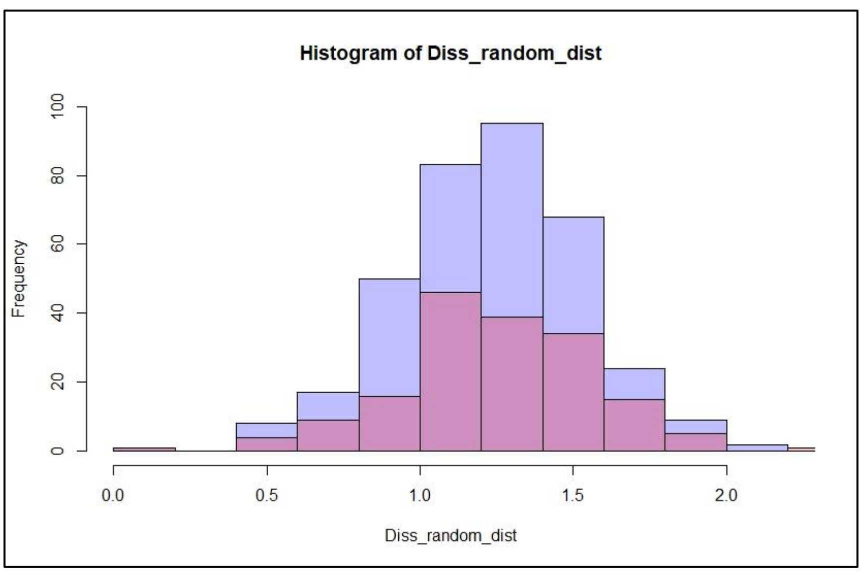

Figure 3. 9 - Comparison of RRA Value Histograms

The randomized control data is colored blue, while the Insular data is colored purple. From the histograms, it is clear that there is a deviation between the two sets of data. The real-world data trends closer to values of 1, while the mean for the random data is closer to the 1.2 number from the overall dataset. Compared, the real-world data does not match the expected statistical model. There could be several meanings for this discrepancy. It is possible that such a deviation is accounted for by the nature of archaeological data, and the applicability of models to such incomplete data. Divergence from expected patterns is not uncommon in archaeology, and it is possible that the available data from Roman Britain skews that pattern for a number of reasons, ranging from what material has been excavated and published, to more "meaningful" interpretations related to the nature of Roman building practices in Britannia. It is possible that the spatial patterning of domestic structures in the Insular data deviate from the expected distribution, derived from the entire data set, because the material from Roman Britain does not, in fact, match the larger picture of Roman domestic space in northwestern Europe. To be entirely confident in that conclusion requires comparison to the material from the Continental data, which is discussed in the following chapter.

Using the similarity criteria discussed previously, a number of slices of the Insular data were performed in R, in order to examine the material in a more granular fashion. While most discussions of network analysis utilize some manner of traditional graphical representation of nodes and edges, over a certain size threshold, such "spaghetti plot" representations of networks become essentially meaningless for interpretive purposes, as little valuable information can be derived from the mass of dots and lines. Instead, meaningful conclusions can be derived through close examination of the data in tabular form or as matrices, where patterns and relationships are more easily parsed. Using the similarity criteria discussed previously, the Insular data was separated into further subsets of similar archaeological contexts, with similar relative asymmetry values and building types. It is in examining these clusters of related architectural spaces that meaningful conclusions can be reached.

3.7 Cluster Patterns and Interpretation

From the Insular data slices, along with the broader correlation tests and descriptive statistics performed as part of the data analysis, the prevailing trend among the domestic remains of Roman Britain examined in the course of this project is that there does not appear to be a pattern to the presence of certain architectural types and quantified spatial arrangements over time. There is no strong, clear evidence for an evolution of architectural form from least to most complex, nor does there appear to be any causal link between time and an increase in spatial complexity, as measured by space syntax analysis. Instead, the strongest quantifiable connections from the assembled data is between certain architectural features and mean RRA values, representative of spatial arrangement. This correlation, while not strongly hinted in the coefficient analysis, is perhaps unsurprising to the observer familiar with Roman architectural practices.

The presence of a hypocaust system in a Roman house, for instance, often has some measurable impact on the spatial layout of the house.[78] While not tied to any one type of domestic structure, hypocausts are nevertheless more prevalent in larger, more complex Roman structures, and less often found in hall-type buildings. Of the contexts in the Insular data, only eight locations of the hall-type building classification have evidence for a hypocaust, out of 79 total spatial arrangements where hypocausts appear. Similarly, some domestic hypocausts appear relatively early, in the 1st century AD, but these examples are also in the minority, occurring in only seven of the 79 heated contexts. The bulk of the sub-floor heating that is preserved archaeologically begins to appear in the second and third centuries, after the initial period of

[78] See Basaran 2007 for more specifics on the hypocaust as an architectural phenomenon.

Roman occupation and settlement. Another architectural feature with a relatively strong correlation with a specific building type is the courtyard, which, naturally, appears most readily in buildings described as "courtyard" dwellings, due to the salient presence of one or more courts in their architectural plan. Courtyards make appearances in other types of domestic structure, but less frequently.

Examination of the setting of these Romano-British dwellings also produces interesting patterns. Of the 14 contexts identified as urban in character by their excavators, almost half originate in the first century AD, perhaps indicative of Roman urbanization efforts in the south of England shortly after the Claudian conquest. It should be noted, however, that almost 85 percent of these first century urban contexts come from a single location, the site of Silchester in Hampshire, on the southern coast. While not necessarily reflective of broader trends of Roman urban settlement in the early centuries of occupation, especially given the tumultuous history of early Roman centers, such as Colchester, the presence of so many dwellings from a single settlement does speak to the level of preservation and recording present at Silchester. Some of the Silchester houses are on the small side, numbering only 7 rooms, while the largest is quintuple that size, with 36 discreet spaces. Such range in the sizes of spatial complexes present at Silchester, along with the presence of three of the four structure types, lacking only the hall type, points to a certain degree of diversity present in the urban population of the site. Of the other, later urban sites in the British Isles, the full spectrum of building plans are present, and the occupation dates of those phases points to no clear chronological pattern to when certain types of structures appear. Domiciles of the corridor, winged-corridor, and courtyard variety are all present in the 1st century AD at Silchester, while a hall-type building appears in the second century at Cirencester. Clearly, there is no chronological element to when certain types of

Roman living spaces are adopted in Britain.

Within the Insular portion of the data, it is apparent that there is no evidence from the architectural remains for a linear evolution of spatial house typologies in Roman contexts. There are, on the other hand, a number of interesting points of correspondence between certain structure types and occurrence in urban settings, as well as the presence of certain architectural features, such as hypocausts and courtyards. While there is no discernible pattern to the chronological aspects of the data, that very fact is important to consider. Because the Roman occupation of northwestern Europe, and the British Isles in particular, comes at a relatively late time in the span of Roman culture and architecture, it is reasonable to conclude that Roman architectural practices and technologies, broadly speaking, will have reached a fairly mature stage by the time of major adoption of Roman house styles in Britain. It follows, then, that a typological evolution of Roman housing types should not necessarily be expected to appear archaeologically, as there would be no need to adopt Roman modes of construction in a piecemeal fashion. Architectural arrangements and other spatial expressions of Roman cultural practices could be adopted whole-cloth, acting as readily-accessed means for local elites to broadcast their new-found *Romanitas*.

One of the most salient results of the analysis of the space syntax data is the relatively early appearance of domestic hypocaust systems, which appear in the 1st century. The traditional interpretation of Roman housing in Britain posits an early adoption of Mediterranean-style peristyle villas, with large, open gardens common in Italy and similar climates.[79] Over time, climactic conditions drove a move away from open, airy courtyards and toward more enclosed spaces with sub-floor heating in order to live more comfortably at northern latitudes. Based on

[79] De la Bedoyere 2006, 196-197.

the assembled data, it appears that while some sites follow more open, courtyard-style architectural plans, such as in the case of the large, axially-arranged villa at Fishbourne in both of its major occupation phases, the prevailing trend does indeed favor more enclosed, corridor-centric spatial arrangements. These corridor buildings tend to enclose the majority of the house, with access to various clusters of rooms provided by one or more long corridors on the front and/or back sides of the structure. However, the adoption of such adaptations does not mean open spaces simply disappeared or were not used by the inhabitants of Roman Britain. Such evidence might simply indicate a shift toward more practical architecture, taking the form of a more decentralized phenomenon than the concrete, linear evolution traditionally represented in scholarship.

The lingering question is how best to address or interpret these results? Do the data support a new model for how Roman cultural practices were assimilated in Britain, or does the evidence simply merit inclusion into existing narratives and discussions? The information derived from the mass quantitative analysis of Roman domestic spaces points to an adoption of Roman cultural practices to a certain degree, reflected in the use of Roman architectural forms and building technologies. While the physical evidence certainly points to Roman-style living spaces being adopted across Roman Britain, in most cases, it would be impossible to understand the identities of the builders and occupants of these domestic sites without a close reading of all forms of available material culture, a time-consuming process beyond the described scope of the current study.

3.8 Conclusion

The chapter began with a contextualization of the present study into the historical narrative of Romano-British domestic architecture. Based on the work of generations of previous scholars, the application of space syntax methodology, combined with network-oriented thinking, aims to examine the available archaeological information on the Roman house in Britain through a new, computationally-focused lens. The second part of the chapter discussed the application of those quantitative approaches to the assembled data, including the analytical processes and the results of those methods.

Essentially, the space syntax analysis alone provides no clear path to a satisfying conclusion about how Roman patterns of domestic architectural space came to be adopted by the inhabitants of the British Isles. While seemingly disappointing in its lack of finality, the information derived from systematically approaching the corpus of spatial data from Roman Britain using network-based methods does provide a framework for qualitative interpretation. From the data, it is perhaps going too far to say that this study reinvents the understanding of how Roman building types and technologies entered the provincial lexicon, as it were. The quantitative analysis certainly sheds new light and understanding on aspects of domestic architecture in Roman Britain, not least because of new techniques and tools which facilitate the amassing and analyzing of large numbers of architectural plans from multiple sources. Being able to speak to a sizable quantity of evidence, whether representative of an even larger corpus of material or not, is important to understanding broader trends at a provincial or regional level. While previous generations of scholars have accomplished projects of such a scope before, such as J. T. Smith's examination of the Roman villa, or even Theodor Mommsen's monumental work on Roman inscriptions in the 19th century, the modern conveniences of technology in the digital age greatly facilitate both the collection and analysis of large data sets, in turn accelerating the pace of scholarly discourse and advancement.[80]

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[80] Smith 1997; the reference to Mommsen is to his work in founding the *Corpus Inscriptionum Latinarum* in 1853 with an aim at a comprehensive survey of Latin inscriptions.

Even though there is no clear pattern to speak of in relation to the chronological development of Roman domestic architecture in Britain, based on the data analyzed, or if there is a pattern, it is so faint as to not appear in the analyses performed in the study, the lack of a pattern is just as valid from an analytical point of view. It means the traditional interpretation professed by the early stalwarts of Romanization, such as Mommsen and Haverfield, falls apart, just as the late-twentieth century critiques figure-headed by Greg Woolf argued. The analysis of the British archaeological data, from 170 separate archaeological contexts and 106 distinct sites, does not support any sort of systematic adoption of Roman domestic architectural styles over time. Instead, the evidence seems to suggest a localized, piecemeal assimilation of Roman spatial arrangements, beginning in the first century AD and intensifying through the second and third centuries, as Roman influence grew and political control over the island province solidified. Early adopters of Roman house types, such as the unusually early builder of the Roman palatial villa at Fishbourne, who Barry Cunliffe names as one Tiberius Claudius Togidubnus, were more than likely, as Cunliffe suggests, conspicuously displaying the favored material manifestations of their powerful Roman patrons.[81] Additionally, the data suggests an adoption of hypocaust heating as a means of localized adaptation to the local climate in a relatively piecemeal fashion, again in contradiction to conventional narratives, which describe a more linear development of the practice.

The information presented here, produced quantitatively from the amassed archaeological data, does not by any means stand as a static representation of the past or for ancient ways of living. The visualization and analysis of the Insular data, as well as the various derived subsets of that data, should be taken as a framework to provoke further thought about the situation in

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[81] Cunliffe 1971, 49. Cunliffe cites Tacitus' *Agricola* as part of the evidence for this particular identification. Tacitus, *Agricola* 14.

Roman Britain. More importantly, the regularization and quantification of the archaeological information, which the most ardent post-processualists would argue unfairly sanitizes and de-humanizes our understanding of the past and its peoples, allows for ready comparison to similar material from other regions of the Roman Empire, such as the Continental areas of northwestern Europe, which will be given similar treatment in the next chapter. Rather than seeing quantitative results as a means to uniformly describe or model human behavior in the past, or, conversely, to eschew all such systematic, data-driven analysis as being too objective, the computational approaches applied in this data analysis should instead be seen as an opportunity to readdress old questions about the ancient world, particularly its more marginalized or “frontier” regions, and to drive the formulation of new interpretations, using the data as a springboard, rather than as a concrete statement of truth. The next chapter will treat with the material from the Continental portions of northwestern Europe which are part of the study region, the ancient provinces of Gaul and Germania.

Chapter 4

Living on the Frontier of Empire: The Architectural Data from Continental Europe

4.1 Introduction

Unlike the Roman incorporation of Britain into the Empire, contacts with the populations of Gaul and Germania began occurring prior to the first century BC. While formal Roman governance of southern Gaul is traced back as far as the first century BC, the present study is concerned with more northerly climes, which were only formally incorporated into the Roman Empire following Caesar's campaigns in the middle of the first century BC. Portions of the later German provinces were added later, during the Augustan period.[1] The material assembled for the Continental portion of this dataset concerns these areas.

The structure of this chapter will closely follow that of the preceding discussion of the Insular data for Roman-style houses from Roman Britain. The first part of the chapter will contextualize the present study within the broader tradition of archaeological research in the modern countries that now occupy the ancient area of the northern Roman Empire in Europe. These nation-states include France, Germany, the Netherlands, and Belgium. Each of these nations has a discreet history of archaeological research, and it is important for the framing of the current dissertation to briefly review those scholarly histories, where applicable. In the second part of the chapter, the data collection process will be briefly reviewed, along with the analysis of that data, followed by a presentation of the results and implications. The subsequent chapter, Chapter 5, will treat the Continental data in comparison to the Insular data, and employ network analysis methods to search for broader patterns at a regional level.

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1 Wells 1992, 129.

As with the previous chapter, which covered the material from Roman Britain, this chapter should be prefaced with a reminder of some thoughts concerning computer-driven analyses in archaeology. The post-processual criticism of overly-data driven methods in archaeology is, by this point, unsurprising. Instead of a return to the processual search for universal models for human behavior buried in the material record, the present study seeks to shed new light on old arguments using statistical approaches to the archaeological data. Situated in the context of the Roman Empire, and the more specific context of northwest Europe in the first through fifth centuries AD, this approach aims to inject quantitative evidence into what has, and continues to be, a fundamentally qualitative discussion of Romanization in Roman Europe. What follows is a presentation of evidence for a less linear, decentralized picture of how Roman architecture and spatial patterns of living came to be adopted in the region of northwest Europe.

4.2 Roman Archaeology in Northwest Europe

Compared to the archaeology of Roman remains in Britain, the excavation and study of Roman material culture in northwestern Europe is relatively disjointed. National traditions in archaeological thought and practice dominate the discourse, and those works that do engage with material on a regional scale tend to be products of Anglo-American institutions and scholars. However, interaction with archaeological theory has begun to appear in European archaeology, particularly as digital technologies and methodologies allow scholars to revisit prior lines of inquiry and topics of interest, where earlier methods were unable to grapple with the size and scale of the evidence needed to properly address those ideas and issues.[2] And while archaeological traditions are still anchored to national traditions and university systems, the

[2] See, for example, Collar, et al. 2015, where the authors address specifically the application of network analysis methods to a number of archaeological projects, noting in particular the scale and scope of each project in comparison to past investigations of similar material.

advent of the Internet as a virtual venue for scholarly exchange and discourse has led to a proliferation of interest in new theoretical models and digital approaches to archaeological materials coming out of European universities.[3]

Compared to the Anglo-American tradition of archaeology driven by theoretical models and thinking, the Continental schools of archaeology are very much grounded in nation-specific trends and schools of archaeological thinking. Bolstering this approach are strong national traditions of development-driven rescue archaeology in the aftermath of the Second World War.[4] Each modern nation-state in the region of study, the Roman Northwest, contains its own tradition of archaeological research, shaped by events and history toward a certain outlook on the material remains of the past. Understandably, the German and French traditions have received much attention, given the two nations' extended involvement in European intellectual movements and geopolitics, not to mention the impact of colonialist phases on scholarly thinking in regards to the material past. The trajectories of the German and French schools of archaeology have received scholarly attention, often in English-language publications seeking to understand a certain degree of disinterest in archaeological theory found in both nations. The history of Dutch and Belgian archaeology has, comparatively, received less attention in the academic literature.[5]

German archaeological thinking, as noted in the earlier literature review, is traditionally characterized as avoiding archaeological theory on idealistic grounds rooted in the politics of the 1930s and 1940s. The early decades of the twentieth century are the period most-discussed in the histories of archaeological thought in Germany, and for good reason. The rise of national socialism went hand-in-hand with the early development of archaeological thinking in

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3 See Brughmans 2013b and Romanowska 2015.

4 See Bradley 2006, 2-5.

5 Pieter van de Velde notes the conspicuous absence of Dutch archaeologists from both Trigger and Hodder's summaries of broader archaeological history. Trigger 1989; Hodder 1991; Van de Velde 1994, 9.

Germany.[6]

The conventional starting point for discussing archaeological thinking in Germany begins with the work of the 19th century prehistorian Gustaf Kossinna and his idea of *siedlungsarchäologische Methode*.[7] Kossinna's ideas had later influence on Anglo-American archaeology, filtered through Vere Gordon Childe, and also on the national socialist archaeology of the 1930s and 1940s.[8] As discussed in the literature review in Chapter 2, the Nazi manipulation of archaeology as a means of propaganda and justification for racial science in Hitler's Reich, led to a decline in interest in classical archaeology, attended by a corresponding increased interest in prehistoric, or Germanic, archaeology.[9]

The post-war period, German archaeologists distanced themselves from prehistory, with its tainted association with Nazi ideology, instead focusing their efforts on the Paleolithic or the more technical sub-disciplines of archaeology. A lack of experienced archaeologists, along with wartime disruption of the education system, also furthered to distance German archaeology on a whole from its immediate antecedent. With the advent of the New Archaeology in the 1960s and 1970s, West Germany archaeologists steered away from the theoretical debates of their Anglo-American contemporaries and turned to more technically- driven archaeological pursuits. The full extent of the trajectory of German archaeology is more fully described in the literature review, but to briefly summarize here, the disengagement from theory which characterized much of the twentieth century has begun to give way to new generations of scholars who are beginning to engage with archaeological theory.

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[6] See Marchand 2003 and Maner 2018.

[7] "Settlement-archaeological method." Velt 2000, 44.

[8] Childe adopted Kossinna's ideas about settlement typology and distribution mapping as a means of illustrating the extent of various prehistoric ethnic groups and cultures identified archaeologically. See Childe 1926.

[9] See Marchand 2003. See also Maner 2018 for a more recent discussion of archaeology and cultural history in Germany.

In comparison to the German tradition, the other major Continental school of archaeological thought relevant to the present study, the French, is similarly marked by a disengagement with archaeological theory. Likewise discussed in the literature review, the French tradition of archaeology begins in the Enlightenment and the Napoleonic expedition to Egypt. Lacking the interest in European prehistory that underpinned early German archaeology, French archaeology of the 19th and early 20th century was rooted in the classical tradition.[10]

Like much of Europe, the discipline of archaeology in France suffered during the Second World War, but emerged free of the ideological strain of East and West German archaeology. According to Serge Cleuziou and his collaborators, twentieth century French archaeology strove to perfect the technical aspects of archaeological excavation and survey.[11] To that end, techniques such as aerial photography were rapidly adopted by the French.[12] Another key component identified by Cleuziou and his co-authors was a lack of interaction with and exposure to the work of American, and to a lesser extent, British, contemporaries, meaning French archaeologists were relatively removed from the ongoing archaeological debates driving the innovations in Anglo-American archaeological theory of the mid-twentieth century.

Where French archaeology is lacking in regards to the adoption and innovation of theory, French archaeologists have pushed forwards in other areas, such as the collation and curation of archaeological data and the publication of that information. The late twentieth century in French archaeology is marked by the creation and expansion of the *Carte archeologique de la Gaule*, an archaeological inventory of sites, published and unpublished, from the Iron Age to the early

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[10] Hodder 1991; See also Woolf 1998.
[11] Cleuziou, et al. 1999, 99.
[12] For one of the most influential works on French aerial archaeology, see Agache 1978.

Medieval period.[13] Understandably, such a resource has proved invaluable for the present study.

While representing a smaller portion of the dataset than the German or the French material, the Dutch and Belgian material is no less important. Dutch and Belgian archaeology truly flourished in the post-war period of the 1960s and 1970s, escaping earlier antiquarian traditions interested in curiosities and the classical past.[14] This interest in rural settlement arose from a post-war boom in construction and a need for proper landscape survey prior to development. Excavations, led by large institutions like the University of Amsterdam and National Museum of Antiquities in Leiden, drove a series of large-scale, long-term research projects dedicated to individual monumental sites of Roman occupation.[15] The Dutch and Belgian archaeology of the twentieth century is closely linked to the commercially-driven contract and rescue archaeologies that developed in a similar fashion in much of Western Europe and Britain in the post-war period.[16]

Mainland European archaeology, distinguished from the Anglo-American tradition, is emerging from the relative theoretical darkness of the twentieth century. Developments in computational approaches and the growth of the archaeological sciences have contributed to fresh ideas about the applicability of anthropological theory and models to the material remains of the ancient past. Astrid van Oyen's work with network theory to model the diffusion and spread of Roman amphora types, for example is one such recent example of this new wave in European archaeological scholarship, as is Iza Romanowska's research into agent-based

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13 As a series, CAG is headed by Michel Provost and published by the Académie des Inscriptions et Belles-Lettres. The series website is located here: https://www.aibl.fr/publications/collections/carte-archeologique-de-la-gaule/?lang=fr

14 Habermehl 2013, 20.

15 Habermehl 2013, 20-22. Habermehl is critical of some of this early archaeology's focus on monumental stone foundations, and goes so far as to categorize all of the sources used in his study by their relative degree of utility to his study and the comprehensiveness of their methodology.

16 Van de Velde 1994, 6.

modeling.[17]

4.3 Domestic Architecture in Northwest Europe

Much of the Roman domestic architecture from Northwestern Europe is treated in the same scholarly works which engage more broadly with the specifics of Roman housing. As with the study of the Roman house in Britain, there are few useful references from the surviving ancient literature. As with the British material, J. T. Smith's writing on the Roman villa provides a valuable discussion of architectural plans from the western half of the Empire.[18] The discussion of Roman houses in the western portion of the Empire, excluding the more specific interest in Roman Britain, which has been primarily propelled by British scholars, mainly engages with the rural villa. Diederick Habermehl's monograph specifically looks at the rural villa, as does the earlier publication by Ursula Heimberg.[19] While the mainstays of Roman domestic architecture, such as Percival and Rivet, remain prevalent in discussions of the Roman house in northern Europe, there are a number of scholars whose research remains specific to the Continental material.

In the archaeology of the early twentieth century, the emphasis in villa studies was on the archaeology of monumental stone constructions, not on the ancillary buildings of the often multi-structure rural complexes. A side effect of this emphasis was to essentially remove the earlier, less-monumental phases, often constructed primarily of wood, from the discussion. Consequently, scholars tended to interpret spatial function, and therefore meaning, through a decidedly Roman lens, presenting a colonialist view of the past, divorced from any possibility of incorporating indigenous European agency in the process of Roman cultural diffusion, or

17 See Romanowska 2015 and Van Oyen 2016.
18 Smith 1997, specifically, the second part of the volume, dealing with the types of villas found in the provinces.
19 Habermehl 2013; Heimberg 2002/2003.

Romanization. An example of the scholarship typical of the time is Karl Swoboda's *Römische und römanische Paläste: eine Architekturgeschichtliche Untersuchung*, published in 1919.[20] Regarding the typical Roman atrium house common in Italy, Swoboda writes, "this type was devised in Italy and from here its distribution found in the provinces."[21] Swoboda's book is typical of the beginning of the twentieth century, with the focus on Rome as the primary driving force behind the spread of Roman material culture to the provinces.[22] There were, however, some individuals who recognized a degree of agency for the native populations in the remains of domestic architecture from the Roman provinces in northern Europe.

In 1921, at what was arguably the height of the imperialist streak in Roman archaeology exemplified by Haverfield and Swoboda, Franz Oelmann was one of the first to notice and acknowledge an important distinction regarding the numerous *Hallentyp* structures, those arranged axially around a large central space, with smaller rooms arranged around the sides (see **Figure 4.1**).[23] Prior interpretations had assumed the large open central spaces common to these domestic buildings was a manifestation of the typical open atrium found in Mediterranean contexts. Instead, Oelmann suggested these central spaces were not courtyards, but instead roofed halls, with a central hearth, similar to Iron Age domestic structures.[24] In Oelmann's interpretation, the roofing of the space would render the open-court theory impossible.

Oelmann was the earliest German excavator to recognize pre-monumental phases of domestic architecture constructed of wood beams, and to link those early phases archaeologically

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[20] Swoboda 1919.

[21] Swoboda 1919, 78. Translation by author. The original German is: "…dieser Typus sich in Italien gebildet und von hier aus seine Verbreitung in die Provinzen gefunden habe."

[22] See also, Haverfield 1912.

[23] On these structures in general, see Oelmann 1921. For a more recent discussion of Roman domestic structures in Germany, see Heimberg 2002/2003.

[24] Oelmann 1921, 64-73.

to subsequent, stone-built structures.[25] The implications of this connection between construction or occupation events were wide-ranging, because it moved the concept of the villa from being emblematic of the colonizing Romans, but instead perhaps an icon of the involvement of indigenous populations in negotiating their own identities under the Roman Empire. Oelmann's ground-breaking innovation to the study of domestic architecture in the Roman north heralded a wave of discoveries similar to his initial excavation work at Mayen, in the Rhineland-Palatinate of Germany.

At Cologne, Fritz Fremersdorf identified early, wood-framed phases of construction at excavations in the 1920s.[26] Over the next few decades, similar evidence was encountered by archaeologists in Britain and the Netherlands.[27] Additionally, de Maeyer identified distinctions from Italic domestic structures in the same period, another first in the scholarly literature regarding provincial Roman housing.[28] From these initial forays into the exploration of Roman provincial housing, the field continued to follow a similar path to that of their British counterparts. The work of John Percival and A. L. F. Rivet in the middle of the twentieth century served as the main syntheses for villa studies on both sides of the English Channel.[29] Both authors contextualize the Roman villa in socio-economic terms, and discuss the importance of the villa as an agent of change in the developing rural economy of the northern provinces. Edith Wightman, in her study of Roman Belgium, furthers the discussion, noting that a developing provincial economy, driven by increased military demands for goods, growing urban

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[25] The phenomenon was most famously highlighted by Oelmann in his excavations of the villa at Mayen in the 1920s. See Oelmann and Mylius 1928.
[26] Fremersdorf 1933.
[27] In Britain, at Ditchley in 1935 and Park Street in 1943. In the Netherlands, at Kerkrade-Spekholzerheide in 1950.
[28] De Maeyer 1937.
[29] Percival 1976 and Rivet 1969.

populations, and increased taxation, would naturally lead to a production of wealth surplus, which would in turn be reinvested in housing.[30] Wightman also distinguishes between villas established with luxury, and those which accumulated their luxury over time, her argument driven by the premise that multiple phases of enlargement and reconstruction would not have been funded solely by capital derived from land holdings.[31] Together, the three scholars propelled villa studies into discussion surrounding the socio-economics of the monumental house, standing as the indicator of provincial wealth.

More recently, as technology and archaeological methods and practices have improved and advanced, the emphasis has turned to look at Roman settlement more broadly, moving beyond the monumental villa to include discussion of secondary structures and landscape. The emphasis on archaeological survey over the last few decades has increased the amount of information available about rural life in the Roman provinces. Beginning with Roger Agache's publication on rural contexts from the Picardy region, which concentrates on the development of Roman rural settlement complexes from prior centers of indigenous settlement.[32] Consequently, the late twentieth century scholarship on Roman provincial housing, particularly villas, presents itself as a reaction to counterbalance the scholarship of the early twentieth century. The Roman aspects of provincial structures was downplayed, while greater weight was placed on the development of provincial complexes from indigenous precursors.

The work of Jan Slofstra, and his term "proto-villa," garnered considerable interest from his contemporaries in the early 1990s.[33] Presented as an "architectural expression of the status of

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30 Wightman 1985, 110-115.
31 Wightman 1985, 111, 113.
32 Agache 1978.
33 Slofstra 1991.

second-rate native chiefs who were not wealthy enough to build a Roman-style villa," the term has been adopted to describe those structures which show some characteristics of Mediterranean villas, but not enough to be fully categorized easily into existing typological categories.[34] Slofstra's argument is supported by K. H. Lenz, who argues that it is unlikely for provincial villas to derive from Italic patterns.[35] Slofstra's definition has been criticized by some, such as Habermehl, who considers the term to have an essentialistic view of the villa, divorced from context, but the idea of the "proto-villa" has caught on, nonetheless.[36] Notably, there was one scholar in this period who was actively pushing back from the Roman side of the issue. W. Gaitsch's research on the archaeology of Roman villas in the area of the Hambach forest paints a picture of a landscape settled by colonists *ex nihilo*, connected to the foundation of the Roman colony at Cologne.[37] Gaitsch interpreted these Roman settlers as military veterans, but others, such as Ursula Heimberg, have disagreed, preferring to see the inhabitants as civilians from Gaul.[38] Heimberg's reading of the evidence might be supported by wooden, possibly pre-Roman phases of occupation at domestic sites in Continental Europe, such as the possible wooden structure at Grémecey.[39]

However far the study of Roman domestic architecture in northwestern Europe has come, the lag in publication, along with the vagaries of preservation, has resulted in a dearth of available architectural plans which present the entirety of rural villa complexes, has perhaps resulted in a sample of architectural plans that is not wholly indicative of what these rural

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34 Slofstra 1991, 163.
35 Lenz 1998.
36 Habermehl 2013, 27.
37 Gaitsch 1986.
38 Heimberg 2002/2003.
39 Percival 1976, 136; Gaitsch 1986, 400-402; Heimberg 2002/2003, 100-103.

domestic complexes were truly like. The present study is bracketed theoretically on one side by the Anglo-American debate on the nature of Romanization, and on the other by recent data produced from intensive landscape and survey archaeology in northern France, the Netherlands, and western Germany The current project aims to combine these strands into a more comprehensive view of domestic architecture in the northern Roman provinces.

4.4 The Roman Domestic Structures of Northwestern Europe

Like the Roman-style house in Britain, much of the focus in Northwestern Europe has been on the Roman villa. Such an emphasis is understandable, given the monumental nature of many of the archaeological remains of such structures, as well as the relative prominence such complexes appear to have had in the larger socio-economic systems of the Roman Empire in the West. To reiterate John Percival's definition of a Roman villa, presented in the previous chapter, "a villa is a place in the county, normally (but not always) associated with farming, sometimes with connotations of luxury or relaxation, and in most cases a single house rather than a group of them."[40] Again, it is clear that the villa in the Roman provinces is a rural one, as supported by the Latin authors. However, where some of the surviving descriptions from the Latin corpus might have relevance to Roman Britain, fewer discuss life on the Continent, in Gaul and Germania.[41]

The modern scholarship, on the other hand, provides a more detailed presentation, sourced from archaeological remains and almost a century of debate and discussion. The discussion of Roman domestic architecture in Continental northwestern Europe shares much of its bibliography with those working on the Roman domestic architecture in Britain. The

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[40] Percival 1976, 13.

[41] The clear and obvious exception being Caesar's *De Bello Gallico*, which does not so much describe daily life so much as provide detailed accounts of the Romans dismantling Iron Age society in the region.

comprehensive volumes dissecting Roman housing, particularly the villa, such as John Percival's and the edited volume by A. L. F. Rivet, lay the groundwork for discussions of Roman provincial house typologies.[42] Similarly, J. T. Smith's more current publication on the Roman villa is also used to examine and sort the remains of Roman houses into typological categories. As with the evidence from Roman Britain, it is clear that the Roman-style house in the northern provinces, namely along the Rhine and in the loess geologic region in the north of France and the Low Counties, strays from established Mediterranean designs. Whether for climactic adaptation or cultural reasons, the domestic buildings do not look like the typical peristyle or atrium houses common to Roman Italy.

Where the study of the continental Roman-style house deviates most from the Romano-British scholarship, however, is in the terminology and categories that are employed to sort and describe the physical layouts. The distinctions between architectural types, whether arranged around a large, open hall, around a long corridor, or around a central courtyard, are the same. The difference is in the terminology that is employed, along with what specific archaeologists decide in regards to where to sort individual sites or structures, as there are numerous variations. Ursula Heimberg lays out the German categorization quite clearly in her article in the *Bonner Jahrbuch*, presenting the *Hallentyp***,** a structure arranged around a large central hall, along with several other categories.[43] Notable among these classifications is the repeated use of the architectural term *Risalit*, which can refer to both buttresses and projecting towers.[44] In the case of Roman villa architecture, the term is used to describe structures with projecting towers, what J. T. Smith and Anglophone scholars refer to as the *winged-corridor* arrangement, a long

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[42] Percival 1976, Rivet 1969.

[43] Heimberg 2002/2003.

[44] See the projecting towers in **Figure 4.1** for examples of a risalit in its guise as projecting towers from an architectural facade.

corridor running the length of the structure, with projecting wings on one or both ends, often with rounded facades. Fortunately, the German terminology maps well to existing English categories, making for easy concordance between published plans and discussion. Dutch scholars normally employ either the English or German vocabulary, while the French tend not to reference villa architecture in terms of typological categories.

Like the material from Roman Britain, the architectural remains from the Continent fit into one of the two broad typologies defined by J. T. Smith, the *hall* type and the *row* type.[45] The hall type describes any structure oriented around a large, central axial space, which can also include what are sometimes referred to as *aisled* buildings, where the central space is broken up by columns to create aisles, similar to a traditional Roman basilica. The four main categories which describe Roman domestic architecture in the provinces are defined by major architectural features, which dictate the arrangement of space. There are those locations which are comprised of a number of rooms or discreet spaces arranged around a large open space in the center, most frequently referred to as a *hall*. These structures are often considered to be the least sophisticated manifestations of Roman domestic stone-built architecture, and frequently have fewer internal spaces or divisions compared to the other types.

One such example of a Continental hall-type is found at Grémecey, in the Moselle region of France (**Figure 4.1**).[46] At Grémecey, excavators uncovered a monumental, stone-built structure with evidence for agricultural production nearby.[47] It is surmised that the villa structure functioned as part of a rural agricultural unit, a single-family farmstead common in the western

45 Smith 1997, 23-45; also, see the previous chapter.
46 See entry 157 in Appendix B.
47 Percival 1976, 135.

Empire, which Percival identifies as a common, traditional Roman domestic unit.[48] Unlike the examples from Roman Britain, where a hall-type structure is superseded by a corridor or other type of spatial arrangement, at Grémecey and a number of other Continental sites, such as Mayen in Germany, the addition of additional complexity, such as a frontal corridor or additional spaces on the sides of the building, does not remove the central hall from the spatial organization.[49] Consequently, it seems as if there is a retention of the hall as an architectural and social space, perhaps indicating a lingering importance borrowed or continued from indigenous Iron Age tradition. At Grémecey, there is the expected large open space in the center of the structure, but there is also the added corridor and flanking room to the southern side of the building, along with a descending staircase into a cellar.[50] There are a number of rooms surrounding the central hall, and evidence for a side entrance to the west.

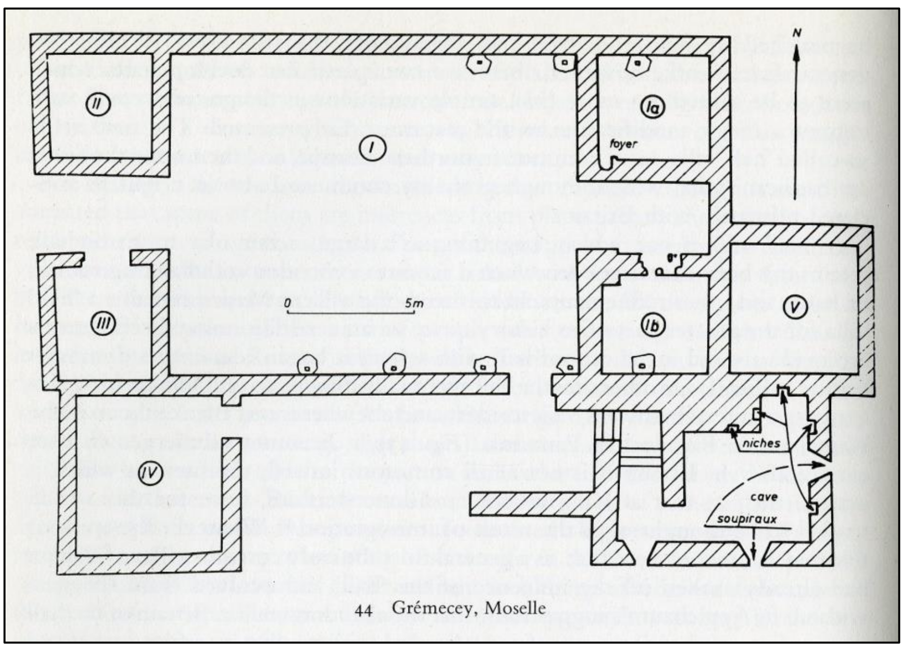

Figure 4. 1 - Grémecey

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48 Percival 1976, 135. See also Perring 2002, 10-14. Perring also considers the farmstead to be a crucial unit of Roman rural settlement in the western Empire. For a brief discussion of rural farms in the Roman west, see Taylor 2007's introduction.

49 See Swoboda 1918; Oelmann 1921; Oelmann 1928.

50 The plan is drawn from Percival 1976, Fig. 44.

The retention of the hall as a functional space is perhaps clearer at Bollendorf, in the Rhineland.[51] At Bollendorf, the initial period of occupation, in the second to early third centuries AD, takes a form very similar to that found at Grémecey, a central hall with ancillary spaces around it, a frontal corridor space with additional flanking rooms. In the middle of the third century, a secondary corridor is appended to the northeastern side of the structure, to the rear, and modifications are made to interior of the northwestern side of the residence. A hypocaust is installed, as well as a subdivision of rooms to take advantage of that internal heating system, potential evidence for a bath.[52]

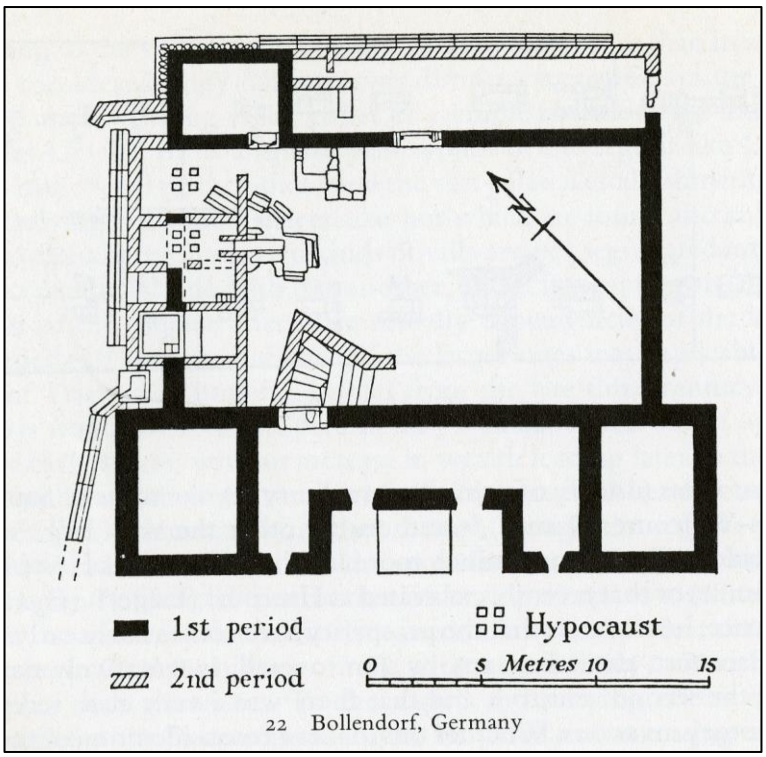

Figure 4. 2 - Bollendorf

Both Grémecey and Bollendorf are rural sites, identified as agricultural in character and

51 Percival 1976, 82. See entries 156a and 156b in Appendix B.
52 The plan is from Percival 1976, Fig. 22.

function. Grémecey's occupation dates to between the second and third centuries. Bollendorf was in use for slightly longer, from the first through fourth centuries. At both sites, the date ranges were established from coin finds and pottery seriation.[53] The pair follow similar designs and arrangements, with developments around a central hall space as time progressed. As the Moselle is a tributary of the Rhine, the two are found in similar geographic surroundings. The major difference between the two sites is the preserved evidence for a potential earlier, wood-built structure at Grémecey, evidenced by post-holes around the edges of the central hall.

The next categorization is the *corridor* type, which includes all structures with one or two salient passageways along the long side of the structure. The corridors serve to provide access to a number of separated clusters of rooms, which might include a suite of heated spaces, provided by a hypocaust system. A rural villa found in the Hambacher Forst in Germany, Hambach 512, is archetypal of the corridor type (**Figures 4.3** and **4.4**).[54] Existing in two major phases of construction and occupation, the Hambach villa underwent a period of expansion and remodeling. The first phase, dated to the late first and early second centuries AD, could be confused for a hall-type structure, with a large, central space dominating the floor plan, and smaller rooms off of that space. What classifies the building as a corridor-type is the presence of an integrated, frontal corridor, rather than a later addition or extension.[55]

The Hambacher Forst, in the Nordrhein-Westfalen region of Germany, is home to a multitude of Roman settlements and villas, and has consequently attracted scholarly attention to speculate on the nature of their occupants, as previously discussed. From the original corridor-type core, the Hambach 512 structure expands in the late second century, replacing the existing

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[53] See Percival 1976, 82 and 136.

[54] See entires 111a and 111b in Appendix B.

[55] Plans of Hambach 512 are from Heimberg 2002/2003.

structure with a larger, expanded version of the corridor plan, with larger rooms, a central space, reminiscent of a smaller hall-type structure, and a protruding suite of rooms off one corner of the building.

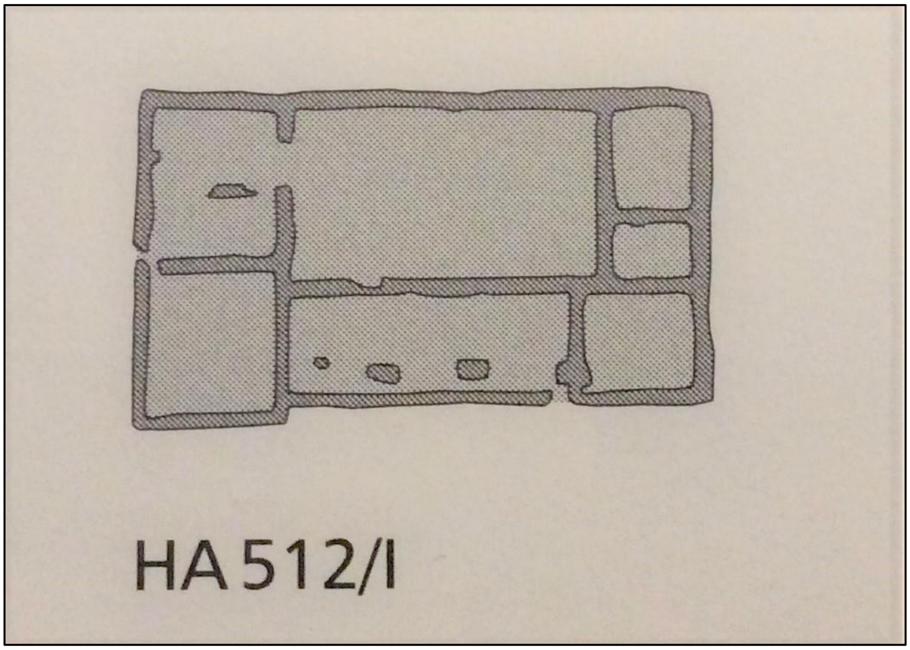

Figure 4. 3 - Hambach 512, Phase I

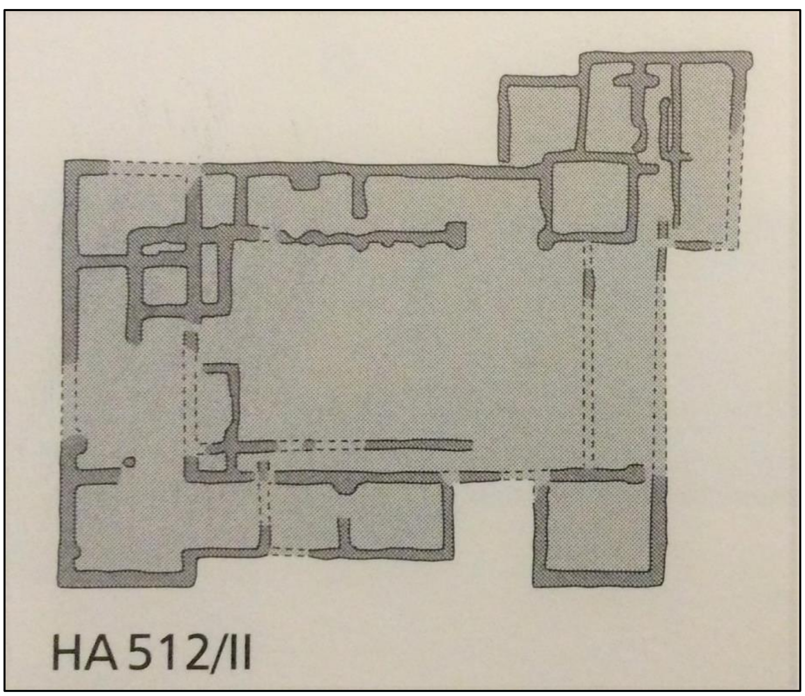

Figure 4. 4 - Hambach 512, Phase II

Another example of the corridor-planned residence is found at Presles, in Ahuy in the Bourgogne-Franche-Comté archaeological region of France (**Figure 4.5**).[56] Like the first phase of the Hambach 512 villa, the Presles site is a fairly compact arrangement in a rural setting. As described and reconstructed by Devevey, the residence presents a corridor-fronted facade, flanked by risaliths, or towers, fitting Ursula Heimberg's definition of a *risalt-typ*.[57] Advancing into the structure, the remainder of the rooms branch off of either the front corridor, or from a smaller passageway perpendicular to the building's frontage. Additionally, there is a cellar under the northern side of the structure, accessed via stairs on the portico.[58]

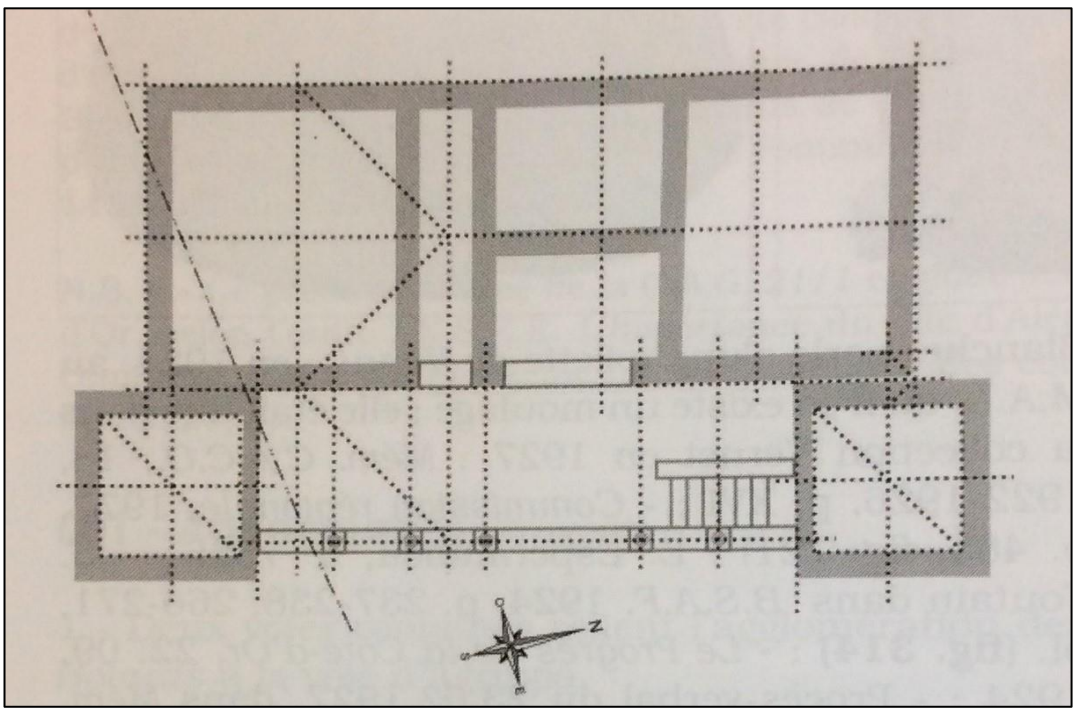

Figure 4. 5 - Presles

There is a subcategory, the *winged-corridor*, which adds one or more wings to the ends

56 See entry 44 in Appendix B.
57 Devevey 2008; Heimberg 2002/2003.
58 Plan from CAG 21-1, Fig. 316.

of the structure, projecting out from the front plane of the facade. The final classification employed by the present study is the *courtyard*, which, to no surprise, incorporates those sites arranged around one or more central open courtyards. Perhaps one of the most striking courtyard villas in the Continental data set is the fourth century palatial complex at Pfalzel near Trier, often referred to as the Palatiolum (**Figure 4.6**).[59] Constructed in the mid-fourth century, much later than many of the other sites in the study, the Palatiolum at Pfalzel is constructed primarily with defense in mind.[60] The overall arrangement of the structure is a large square, oriented around a central courtyard. There is one main entrance in and out of the complex, and no evidence for windows or other openings on the ground floor. The overlapping fields of view afforded by the projecting rooms at the corners further cements the hypothesis that the structure was built with fortification in mind.[61]

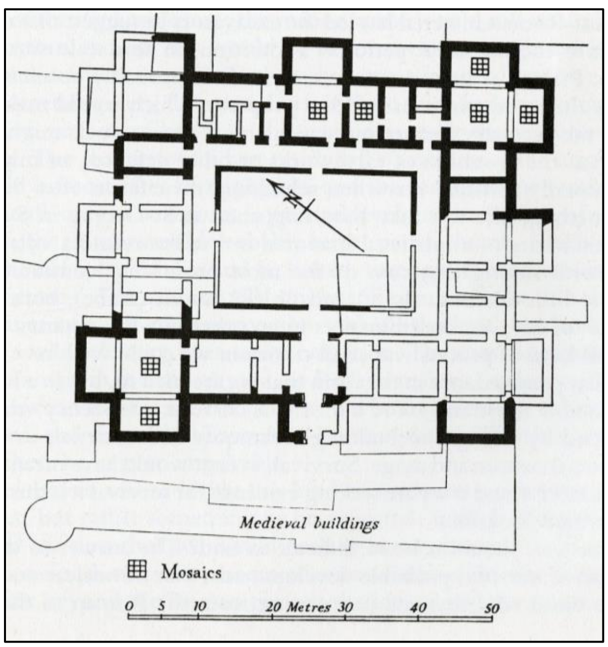

Figure 4. 6 - Palatiolum, Pfalzel

59 Percival 1976, 176. For more, see Gilles 2008, 54. See entry 159 in Appendix B.
60 Percival 1976, 176-177.
61 Plan from Percival 1976, Fig. 50.

It is highly likely that the Palatiolum, or little palace, was an imperial property, due to the size and necessary expense needed to construct and maintain a residence of that scale in the middle of the fourth century AD, a tumultuous period in late Roman history.[62] The nature of the fortifications, stone rather than a wooden palisade or earthwork enclosure, lend further credence to that hypothesis. The complex is symmetrical along two perpendicular axes running through the middle, and contains the expected mosaics and architectural detailing for a complex of this scale and socio-economic status. While the remainder of the courtyard structures in the study data are certainly not of a scale and social status as the imperial residence at Pfalzel, the unique character of the structure is interesting, as is its fairly late date of construction and occupation. Were the building not so singular, it might merit a category of its own, distinct from the more modest rural villas or urban dwellings. However, due to its arrangement around the central courtyard, which clearly dictates the spatial pattern of the complex, the Palatiolum at Pfalzel is included in the courtyard category for the purposes of the present study.

These categories function as convenient ways to sort and compartmentalize the structures into subsets for analysis. Each specific context in the study data, whether urban or rural, can be sorted into one of the four categories based on architectural characteristics. While not strictly necessary, sorting the sites in the data set enables a more refined examination of quantitative trends and patterns, and allows for a more nuanced discussion and interpretation of the results. Further, such typological sorting presented the potential for patterns to relative complexity to emerge, such as if certain types of structures appeared or disappeared from the chronology at certain points, indicating a progression, or lack thereof, of relative architectural complexity.

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[62] See Heather 2007, chapters 3 and 9.

4.5 Space Syntax Analysis

Like the architectural plans from Roman Britain in the Insular dataset, the images used to assemble the Continental corpus were sourced from monographs and major journal publications. Unlike Britain, however, there is not a single, comprehensive database, or any online database at all, for that matter, which houses data on registered archaeological sites. Fortunately, a relatively recent publication by Diederick Habermehl collects a number of the sites from the Netherlands, Belgium, and northern Germany into a single location, complete with bibliography.[63] As Habermehl is interested in tracing the development of the villa type in northwestern Europe, he is not necessarily concerned with sourcing complete architectural plans. Habermehl's appendix, however, is a good place to start. Another monograph which collects a number of relevant sites into a single location, complete with plans, is Lőrinc Timár's *The Spread of the Roman Domus-Type in Gaul*.[64] Unlike the data published through British archaeological journals, a fair number of the journals and site reports from France, Germany, and the Low Countries were not readily available in digital form. In some cases, as with the *Köln Jahrbuch* and *Germania*, certain volumes were available through online repositories, but other volumes were not, necessitating in-person consultation and review.

Concerning the geographical scope of the dataset, the initial scope, as envisioned at the inception of the project, was to include material from "the northern provinces." Over time, this fairly nebulous definition evolved into a firmer idea of what geographical features would dictate the limits of the data collection. Some scholars, such as Diederick Habermehl, define their data

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63 Habermehl 2013. See also Bromwich 2003 for the Roman remains of northern and eastern France and Knight 2001 for a broader overview of Roman remains in modern France. See Cämmerer 1976 for discussion of Roman Baden-Württemberg. Wells 1998 provides a relatively more recent discussion of archaeological research in northern Germany.

64 Timár 2011.

collection regions in terms of natural soil geography.[65] Hamermehl, whose research is some of the most current on the topic of Roman domestic settlement in northern Europe, defines four of his five subregions in terms of their soil morphology. The exception is the Picardy region of northern France, encompassing the French departments of Nord, Pas-de-Calais, Somme, Oise, and Aisne. Habermehl's area of study encompasses 270 archaeological sites, but is centered solely on the northern areas of continental Europe. In defining the scope of the present study, it was decided to bound the Continental data region using pre-existing archaeological regions, along with natural geographic boundaries. Therefore, the southern limit is marked by the French administrative boundary between the Loire Valley and Burgundy on the northern side and Aquitaine and the Rhone Valley to the south. The western edge is bounded by the English Channel. The Dutch coast on the North Sea along the Rhine-Meuse-Scheldt river delta marks the northern edge. The Rhine River serves as the eastern border for the data collection area.

The main publication on French archaeology consulted for this project was the *Carte archéologique de la Gaule* (*CAG*), mentioned above, a geographical appendix of identified archaeological sites in France, sorted into volumes alphabetically by region and locality.[66] From the available volumes, eight regions of northern and central France were identified as potentially containing relevant information. These regions, as demarcated in the map in **Figure 4.7** include: Normandie, Hauts-de-France, the Grant-Est, the Íle-de-France, Bourgogne-France-Comté, Bretagne, the Centre-Val-de-Loire, and the Pay-de-la-Loire.[67]

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[65] Habermehl 2013, 18.

[66] The closest comparison that springs to mind is the *Corpus Vasorum Antiquorum*, an ongoing project dedicated to the inventorying and description of Greek painted pottery housed in global museum collections. More information about the *Corpus Vasorum Antiquorum* can be found at the project's website: https://www.cvaonline.org/cva/default.htm

[67] For more details, see the map in Figure 4.7 from the website of the Académie des Inscriptions et Belles-Lettres, which presents the extent of each archaeological region. The website can be found here: https://www.aibl.fr/publications/collections/carte-archeologique-de-la-gaule/?lang=fr

Figure 4. 7 - Archaeological Regions of France

In total, 55 volumes of the *CAG* were consulted. In the initial survey of the volumes, any reference to domestic housing plans were flagged. This selection was culled during the process of scanning and digitization, omitting sites identified solely through aerial photography, of which there are many in France, as well as locations with no secure chronology or architecture which was too fragmentary or damaged for space syntax analysis to work properly. The *CAG* publishes preliminary archaeological data in many instances, information usually referred to as "grey literature" by archaeologists and other data-producers in government and government-funded jobs, and thus proved to be valuable resource as part of the data collection process.[68]

For Germany, material was sourced from three major archaeological publications, the *Köln Jahrbuch*, the *Bonner Jahrbücher*, and *Germania*. Unlike the *CAG* for France, there is no central repository which indexes archaeological material from Roman Germany. Instead, each of these journals were searched volume-by-volume for relevant architectural plans. In some cases, this process was expedited by a table of contents or index, which allowed for articles to be triaged for information.[69] In comparison to the French sources, there are relatively few plans of domestic architecture to be found in German archaeological journals. One bright exception was an article from the 2002/2003 volume of the *Bonner Jahrbücher* by Ursula Heimberg, titled "Römische Villen am Rhein und Maas," which included plans for almost 100 Roman domestic contexts between the Rhine and Meuse Rivers.[70] From this corpus, 19 site plans were selected for incorporation into the Continental dataset.

For the Dutch and Belgian material, a greater reliance is placed on information presented in scholarly monographs, which are the primary vector for archaeological material. Again, Diederick Habermehl's monograph, based on his doctoral dissertation completed in 2011 at the Vrije Universiteit Amsterdam, was a valuable source, due to his own data appendix, which included citation information for all of his listed sites. From his lists, a corpus of sources was compiled and consulted in order to not only accumulate data for the dataset, but to overlap as much as possible with Habermehl's own analysis, in order to strengthen and add to both case

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68 See Lawrence 2015.

69 Or, in the case of the *Bonner Jahrbücher*, the journal did not include a table of contents until 1865.

70 Heimberg 2002/2003. German Maas = Meuse.

studies. In addition, the journal *Talanta* was searched for any and all references to Roman domestic architecture, although few useful references were located.[71]

As with the Insular data, the criteria for inclusion into the dataset were fairly strict. Sites with extant architecture were included, excepting cases with more fragmentary preservation or only certain peripheral structures still standing. Sites identified solely through non-invasive means, such as ground-penetrating radar or aerial reconnaissance, had to be omitted from the final assemblage, at least until an alternative means of quantifying spatial arrangement to space syntax could be developed and tested. This exclusion is particularly unfortunate for the French material, as there is a deep corpus of identified sites and reconstructed villa plans derived solely from aerial photography of the French countryside. As with the material from Roman Britain, it should be understood that the Continental side of the dataset is in no way viewed as a complete, settled collection, and can and will be added to over time as more sites and data become available.

Unlike the British material, geospatial information regarding sites on the Continent is less readily uncovered. Lacking a centralized repository, such as the website for Historic England mentioned in the previous chapter, the coordinate data, if it has been published, must be collated from individual sources or publications. In some cases, geospatial data has been impossible to locate from available print or online sources. Due to the inability to locate such data by the time of writing, the decision has been made to remove the geospatial visualization component from this project for the time being. The original intent was to project the final network visualizations onto a map using GIS software, but the lack of readily available coordinate data made that option increasingly difficult to achieve as the data collection process went on.

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[71] Not to be confused with the journal relating to applied chemistry, this particular *Talanta* is the publication for the Dutch Archaeological and Historical Society.

4.5.1 Data Sources and Data Set

Once the material for the Continental portion of the data set is assembled, a wider impression of the region emerges. Drawn from areas of the modern nations of France, Belgium, Germany, and the Netherlands, the data presents a cross-section of the Roman inhabitation of the northwestern region of mainland Europe. The Continental data includes 187 unique, identifiable phases of building construction and occupation from 159 sites. As with the Insular material, this number is the product of curation of a larger corpus of sites, which included 460 locations. These sites span the modern areas of Belgium, the Netherlands, the northern half of France, and the Rhine region of Germany. The assembled data for the Continental portion of the data is summarized in Appendix B. While the material from Roman Britain is conveniently compartmentalized to the modern island nations of England and Wales, the corresponding sites from the Continent are less constrained, geographically speaking. The following table summarizes these sites by regional location, as well as the individual contexts. The names for the regions are a mixture of governmental administrative areas and archaeological districts, depending on the specific country in question.

For France, the selected archaeological regions incorporated into the present study are all drawn from the northern half of France, and are based on the existing framework utilized for the organization of the *Carte Archéologique de la Gaule*. The eight regions from France are noted in the above section. For the German material, the archaeological literature refers to commonly-used municipal regions. The same is true for the material from the Low Countries. The regions included are Baden-Württemberg, the Rhineland-Palatinate, Nordrhein-Westfalen, and Limburg. Brought together, the Continental data set is comprised of 187 contexts across 159 sites.

Region	Number of Sites	Number of Contexts
Normandie	2	2
Hauts-de-France	15	24
Grand-Est	26	29
Île-de-France	7	7
Bourgogne-France-Comté	48	51
Bretagne	9	12
Centre-Val-de-Loire	18	18
Pay-de-la-Loire	10	13
Baden-Württemberg	2	2
Rhineland-Palatinate	7	8
Nordrhein-Westfalen	12	17
Limburg	3	4
Total	**159**	**187**

Table 4. 1 - Regional Distribution of Archaeological Sites and Contexts

From the table, it is clear the majority of sites in the Continental study region come from a selection of regions around the Rhine river region, the zones of Grand-Est and Bourgogne-France-Comté in particular. As the Rhine and its tributaries functioned as a major economic and transportation artery into central Europe, it is not surprising to find a large number of Roman residences clustered in that area. Additionally, given the Rhine valley's importance as a major trade and economic zone, the concentration of modern archaeological work that accompanies construction also explains the weight of evidence from that particular area. Along with the wide swath of territory covered by the sampled archaeological sites, there is a significant chronological span represented. Beginning in the first century AD and running through the middle of the seventh, the assembled sites present an image of the chronological and geographical extent of Roman domestic life in northwestern Europe.

While the presentation of such a picture was certainly one of the goals of the study, there were other criteria which motivated the data collection process. First and foremost, the primary criterion for inclusion in the study set was the existence of a published site plan, to a certain extent of completeness. Where necessary, partial plans were considered, but there needed to be enough architectural remains preserved to extrapolate with confidence the remainder of the ground plan based on principles of symmetry and patterning found in Roman domestic architecture. An example of such a location is the site of Villa de Kéradennec, in the Bretagne region of modern France, shown in **Figure 4.8** below.[72]

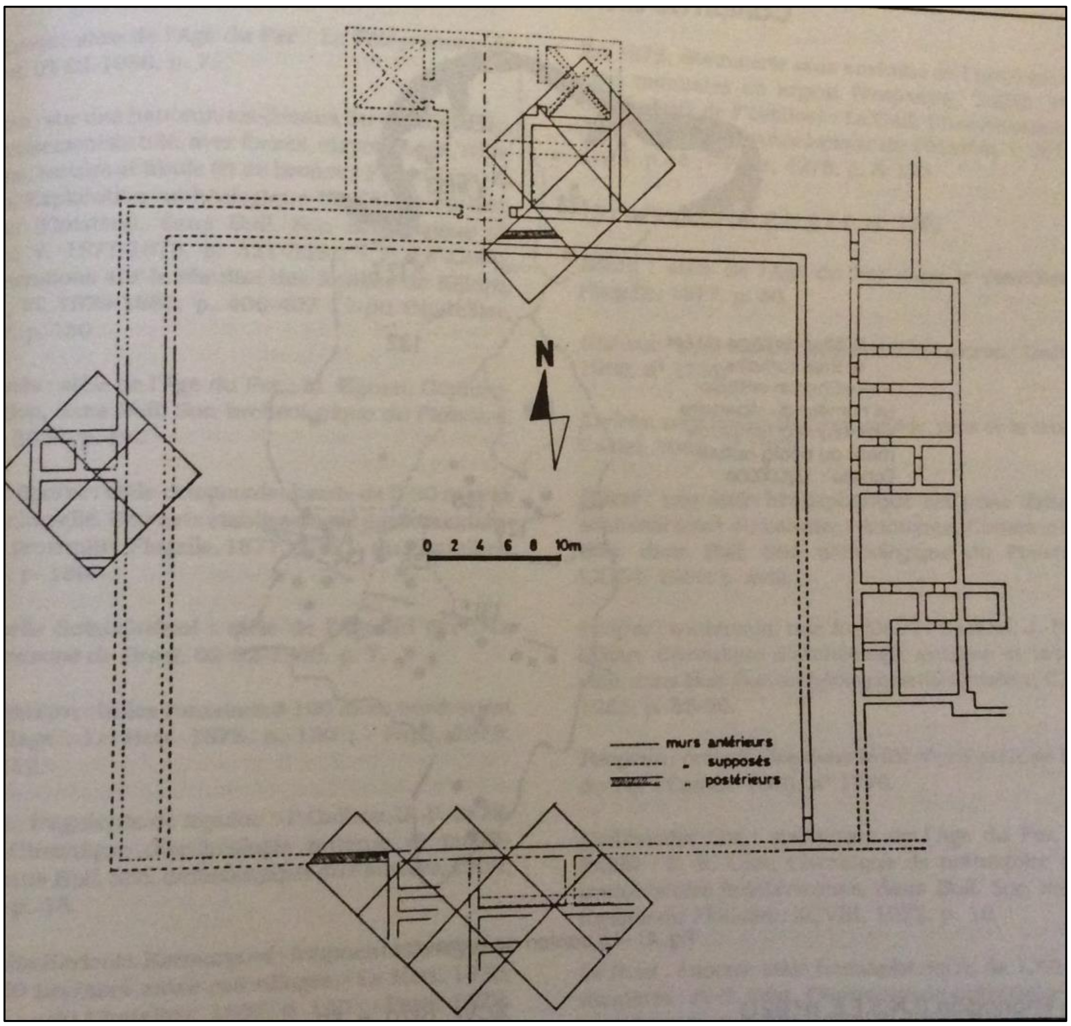

Figure 4. 8 - Villa de Kéradennec

At Villa de Kéradennec, a courtyard villa dating to the end of the third century,

72 Plan from Galliou 1989, 107. See entry 99 in Appendix B.

excavation uncovered the partial ground plan of the villa complex. The remaining portions of the structure were reconstructed using principles of symmetry used in Roman architecture to draft the remainder of the structure. From the excavated portion of the main residential structure, on the northern side of the open court, it is clear to see where the excavators felt sufficiently confident to mirror the plan of that particular building across the main axis.[73] The same process was applied to reconstruct the extent of the courtyard itself, based on the excavated portions of the main residence and the three ancillary structures.

The need for an extant ground plan was propelled by the requirements of space syntax access analysis, which is predicated, in archaeological applications, by the existence of connective architecture, such as doorways, between rooms in a structure, as discusses in Chapter 2. In order to be as representative as possible of the available, published data, no quotas were used regarding building type, site location, or time period. Filtering sites based on specific variables would potentially have polluted the resulting data set, biasing the data. For instance, requiring a specific number of first century sites in the data set would have not presented a true impression of the actual available data. Similarly, a requisite number of sites from the East Midlands or a certain amount of courtyard villas would have provided an equivalent bias. Additional further steps to ensure statistical rigor could be taken, such as random sampling from a larger body of sites, but will have to wait for future implementation once a large enough body of domestic sites can be collected.

Each of the building categories used to describe Roman provincial domestic architecture on the Continent makes an appearance in the assembled data, with the distribution of those categories summarized in **Figure 4.9** below. Thirty-seven of the construction phases are

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[73] Galliou 1989, 106-108.

classified as *hall* type structures, often considered the most straight-forward of architectural arrangements. A further 73 contexts are described as *corridor* type, attended by 41 of the *winged-corridor* variety. Lastly, 36 locations are *courtyard* type buildings, usually the largest and most ornate of Roman domestic spaces.

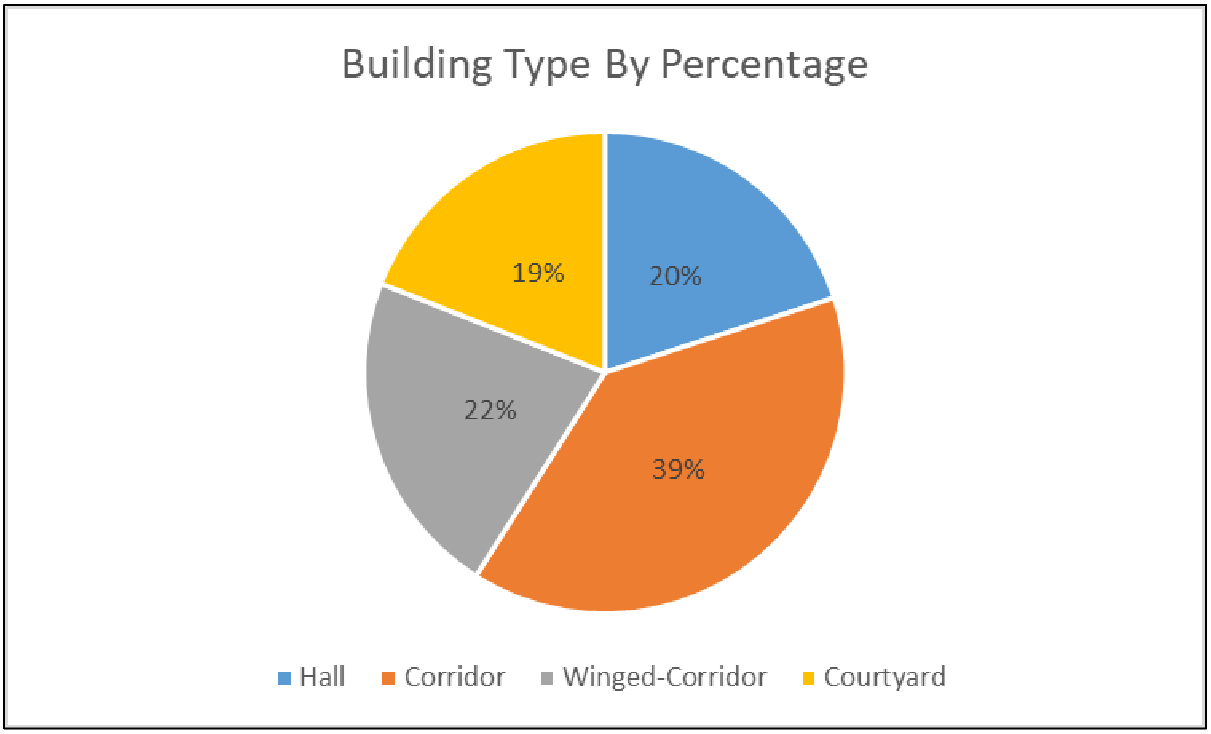

Figure 4. 9 - Building Types by Percentage of the Data Set

The data have a similarly broad distribution in terms of the chronological information. For purposes of conformity and clarity in the data, the temporal information was collected in two parts, the beginning and the end of each phase's occupation. Because the method for dating archaeological contexts in these regions is quite varied, ranging from numismatic evidence to radiocarbon dating, in some cases, the precision of available dating information is equally diverse. In many cases, only the approximate century or centuries were available to date the occupation of a particular site. Having the start and end dates for each construction phase does afford one benefit, however. With both ends of the chronological spectrum, it is possible to discuss trends of site foundation and site abandonment or revision with some degree of precision, which can illuminate temporal trends of settlement.

The earliest sites in the Continental data set appear in the Augustan period, around the turn of the millenium. There is earlier evidence of Roman influence and habitation in the region, but, unlike southern Gaul and areas of modern Switzerland, monumental stone construction does not appear archaeologically until around the 1st century AD.[74] The relative instability of the northern regions of Europe leading into the Augustan era explain the lag in the emergence of wide-spread stone-built construction. Sixty-two sites manifest in the archaeological record during the 1st century AD, averaging around the middle of the century. Similar to the situation in Roman Britain, the domestic contexts of first century northern Europe are diverse in character and scale. Averaging an RRA value around 1.2, the early phases in Continental Europe are fairly close to the overall trending average. Given the wide range of sizes among these early spatial complexes, such conformity to the broader trend is interesting. Some sites are as small as six or seven space farmhouses, such as Salweise near modern Aachen, while others, like the villa at Grimault, France, come close to 60 rooms. The number of sites appearing in the first century, compared to the Romano-British data, is far larger. Such an increase, 62 compared to only nineteen, can be attributed to the later date of conquest for Britain, whereas the areas of mainland Europe included in the study were much earlier additions to the Roman Empire, excepting, perhaps, portions of the Rhineland. However, only seven of the 62 first century locations are located in modern Germany.

Eighty-one sites date their occupation to the second century, only a slight increase over the first century foundations. The third century adds a meager 38 foundations to the data set. The

[74] Timár 2011, 55.

fourth century contributes even less, with only six contexts dating their origins to that period. Compared to the British dates, the founding dates at Continental locations are front-loaded to the first two centuries of the Roman Empire. Such a pattern indicates either a flurry of settlement activity followed by a period of inactivity in terms of new construction or expansion of existing sites, or perhaps is an indication of some degree of decline. In order to reach the most informed opinion, it is best to also consider the end dates for these same archaeological contexts. Only a dozen sites mark their endings in the first century, and all but two are replaced by larger structures on the same location. Replacement points to a continuity of occupation early in the Roman period, at least as far as these sites are concerned. Two of the structures, Maisons 1 and 2 in Insula 15 at Amiens, undergo two separate phases of construction and remodeling in the first century, in both instances not increasing in size, but in spatial configuration.[75] Twenty-nine locations mark the end of their occupation in the second century. Twelve of these phases then give way to later modifications and continued occupation, but the remaining seventeen appear completely abandoned by the end of the second century. In the third century, there is a jump in the number of abandonments, with 98 contexts falling out of use. The fourth century adds a further 45 locations. Three locations show extended use into the fifth century and beyond, with the imperial residence at Pfalzel preserving evidence of occupation into the middle of the seventh century. Of the remaining phases abandoned in the fifth century, both are found in modern France, and are sites occupied continuously by residents accustomed to Roman-style stone construction from the middle of the first century AD. The pattern of abandonment and site reuse, characterized by the sharp increase in the third century, fits well with traditional interpretations of the historical record, with the widespread instability of the central Roman government in that

[75] See Pichon 2009, 57-58.

same period century, exemplified by the secessionist Gallic Empire, which was centered in northern Europe, with its capital in modern Cologne.[76] Due to instability and uncertainty in the third century and beyond, the drastic increase in site abandonments found in the data fits the events of history.

The impression of Roman domestic architecture in northern Europe presented by the assembled data is one of strong growth and expansion in the first and second centuries AD, followed by a period of potential sharp decline in new construction, ending in a definite decline from the fourth century onward. Some of these early sites are supplanted by later, grander phases of construction, while others appear to remain essentially unchanged for centuries, at least as far as their gross architecture is concerned. The Roman habitation of the region, as showcased in the collected data, is an image of the steady, strong adoption of Roman architectural practices and technologies in ways distinct from common examples further south and in closer proximity to the Mediterranean basin. Based on the archaeological data, along with interpretation of that material by scholars like Ursula Heimberg and Diederick Habermehl, the common impression is that the Roman domestic structures coexist for a time alongside indigenous styles of construction.[77] After an initial period of growth and relatively prosperous expansion and development, the region underwent an equally stark phase of instability and a correlating decline in the appearance of new residential construction and occupation. Properly contextualized, the discussion must now turn to the details and analysis of the assembled data.

76 Ancient Colonia Clauida Ara Agrippinensium, on which, see Eck 2004, 242-272.

77 Heimberg 2002/2003 and Habermehl 2013.

4.6 Data Analysis

As with the preceding Insular data chapter, this section will address the second stage of data analysis, concerned with examining the collected access analysis data using network analysis methods. Derived from mathematical graph theory and social network analysis, the methods employed for the Continental data follow the same outline for generating general similarity networks outlined in Chapter 2.

Of the assembled 159 sites in the Continental data, only 14 have evidence for more than a single structure, including outbuildings and separate bathing structures. This accounts for 8.81 percent of the total. Fifty-six contexts, or 29.95 percent, have evidence for more than one entrance, including sites with more than one building or hypocaust systems, which often have a separate exterior entrance for access to the *praefurnium*, or heating furnace. Sixty-five phases have one or more courtyards, comprising 40.88 percent of the data set. Only 18 locations, or 9.63 percent, are from an urban context. Like the Insular data, it might be that such a statistic speaks more to the nature of the archaeological survival of material from urban contexts than to patterns of Roman settlement. In addition to these descriptive statistics, there are a number of interesting subsets of the data, separated from the larger corpus in R and then analyzed separately. Specifically, these subsets are sites and phases with evidence for hypocausts, rural sites, urban sites, and sites with only a single extant structure.

	More Than One Structure Present	More Than One Entrance	Courtyard Present	Urban Context
Number of Contexts/Sites	14	56	65	18
Percentage of Total	8.81	29.95	40.88	9.63

Table 4. 2 – Continental Data Subsets

In the case of contexts with extant remains of hypocausts, either in the form of tile pillars, sunken remains of mosaic flooring, a sub-floor pit, or evidence for a furnace system, the average number of standalone structures is around 1.2, with a mean number of convex spaces, including the exterior, of around 26.05. The mean Real Relative Asymmetry (RRA) value, derived from space syntax access analysis and used to describe the relative integration and symmetry of a spatial complex in relation to other complexes of differing sizes and layouts, is roughly 1.3. Surprisingly, the average number of entrances is slightly lower than anticipated, at around 1.64, but this number is still higher than the average for the Continental data as a whole. With many hypocaust systems having a separate entrance to the furnace area, unconnected to the wider spatial arrangement of the domestic space, it should not be considered unusual for residences with hypocausts to contain evidence for a greater number of entrance points to the exterior. The average number of courtyards sits at around 0.5.

Compared to the larger Continental data viewed as a whole, there are some slight variations in the metrics. The overall number of structures is around 1.1, so in that respect, phases with hypocaust systems appear slightly more likely to have more than one structure, but not really to any meaningful extent. The mean number of convex spaces for the Continental corpus is 19.58. Here, the domestic spaces with hypocausts deviate to a fairly substantial degree. The explanation for such a discrepancy could relate to the additional rooms or bathing suites that often accompany such technology.[78] Additionally, the wealth needed to construct and maintain a private hypocaust system would understandably go hand in hand with the section of Roman society capable of living in relatively large (i.e., more than a few rooms) homes.[79] The mean

[78] MacDonald 1986, 210-211.
[79] MacDonald 1986, 210.

number of courtyards for the entire Continental data set is around 0.4, which is again slightly lower than the subset of sites with hypocausts. Similar to the phenomenon of the number of rooms, it is likely that this slight discrepancy could be attributed to the larger size and complexity of domestic contexts with hypocausts present. The mean RRA measure for the Continental data is around 1.23, again slightly lower than the same measure in the hypocaust subset. The average number of entrances is around 1.5.

For those sites from rural contexts, defined as sites located outside of the bounds of an urban settlement, the mean number of structures is around 1.16, slightly, but not necessarily meaningfully, higher than the Continental average. The average number of discreet spaces is closer to the average at 19.84, dropping closer to the expected level after the sharp spike observed in the hypocaust subset. The mean real relative asymmetry value is likewise closer to the overall average, at 1.22, with the only deviation in value occurring in the tens of thousandths decimal place. The mean number of entrances also closely aligns with the collective average at 1.56, although the average number of courtyards is slightly lower at 0.36.

In comparison, the urban sites sit at the lowest possible value in terms of the number of discreet structures or residences at 1. This is due to the compact nature of the urban environment, in relation to rural contexts, and consequently, due to the identification of excavators at urban sites such as Vertault and Amiens, it proved quite simple to distinguish specific urban domestic spaces from one another using the available published plan drawings. The average number of spaces, or nodes, in one of these urban domiciles is relatively low, at around 18, a value attributed to the constraints of the urban environment on the space and size of city residences. The mean RRA for urban contexts is around 1.23, very close to the overall value for Continental sites. The average number of entrances is fairly low at 1.3, and the number of courtyards is similarly low at 0.8. Again, these depressed values are in all likelihood primarily attributable to the nature of the urban landscape.

The single structure residences unsurprisingly have only a single structure on average. The mean number of nodes is close to the overall average at 19.25, as is the mean real relative asymmetry measure of 1.219. Because single structure contexts comprise over 92 percent of the Continental data set, it is unsurprising that the single structure sites would trend close to the overall averages. The mean number of entrances is, however, slightly low at 1.37, as is the mean number of courtyards at 0.375. These deviations are likely due to larger sites with multiple structures facing onto courtyards or farmyards, such as La Touratte in the Centre-Val-de-Loire and the Villa de Routis in the Pays-de-la-Loire, pulling the average slightly higher.[80]

The picture painted by these descriptive statistics is of a relative degree of complexity linked to the presence of certain architectural and technological features. Hypocausts and courtyards tend to appear in relatively larger spaces, with a corresponding drop in cohesion and integration, reflected in the larger RRA values. The average number of courtyards and multi-structure contexts is relatively low, especially compared to the Insular material examined in the previous chapter. Chalking the difference up to a lack of archaeological evidence either in excavation or publication is tempting, but will be further discussed in the following chapter, when the two halves of the overall data set are compared more fully to one another. As with the Insular data, there are a number of analytical decisions to be made from these statistics regarding the application of network analysis methods to the data.

[80] Provost, et al. 1988d, 40; Provost, et al. 1992, 220

	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA
Continental Data	1.139097	19.58289	1.529412	0.433155	1.228697
Hypocaust Subset	1.195402	26.04598	1.643678	0.5287356	1.304017
Rural Subset	1.1625	19.84375	1.5625	0.36875	1.228046
Urban Subset	1	18.03704	1.333333	0.814815	1.232551
Single-Structure Subset	1	19.25	1.369048	0.375	1.219242

Table 4. 3 - Space Syntax Results for the Continental Data

Another measure applied to the collected data was, as mentioned previously, correlation coefficient analysis. This process searches for what it perceives and defines as statistically-significant patterns between variables in a data set based on an established statistical measure to quantify that comparison, in this case, Pearson's correlation coefficient. The results of the analysis are summarized in the heatmap chart below, Figure 4.10. In the graphic, the relevant measured variables are placed on each axis and the correlation coefficient between those variables is represented visually by color, with red indicating a strong correlation between variables, and blue standing for the other end of the spectrum, where correlation is less strongly detected.

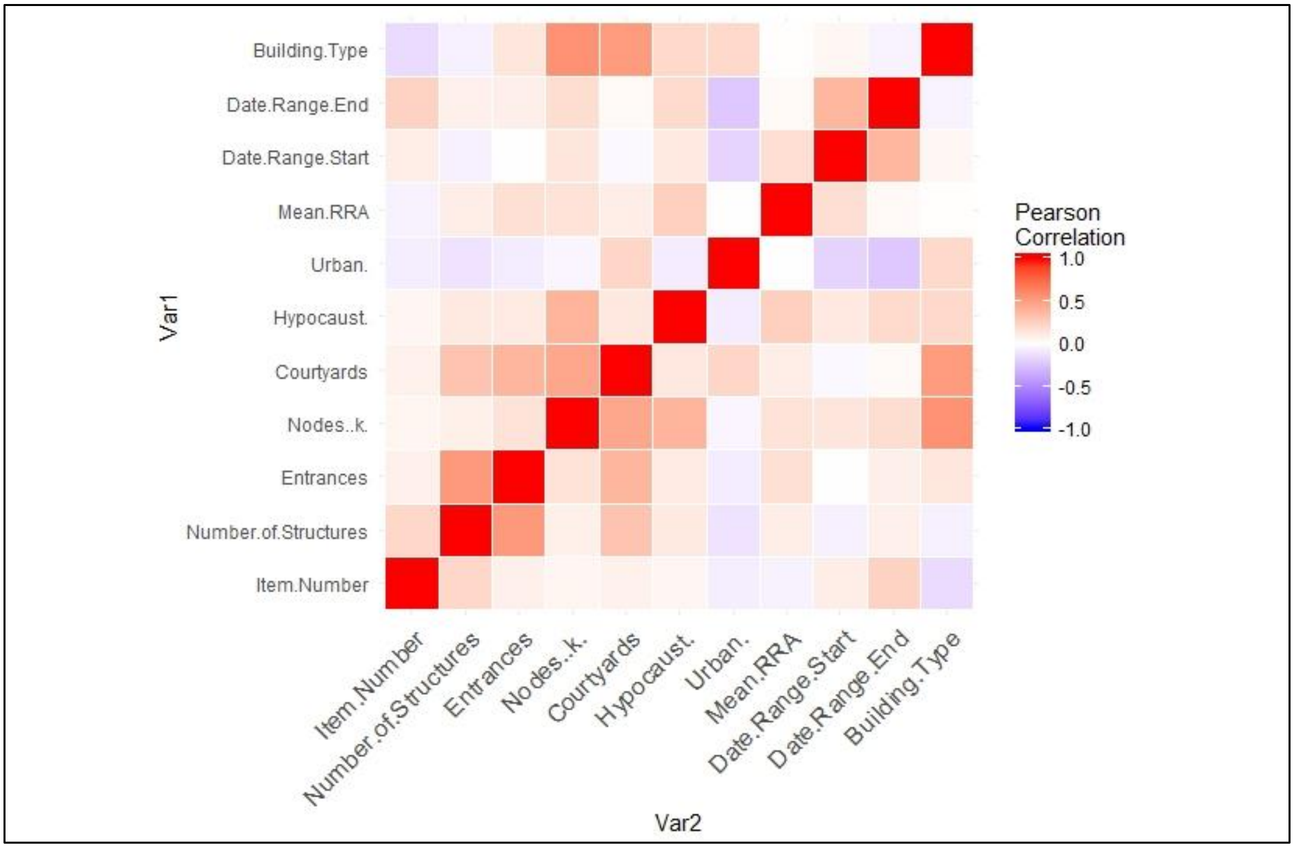

Figure 4. 10 - Correlation Analysis Visualization

The heatmap, Figure 4.10, illustrates a number of interesting patterns and trends among the variables in the data. For instance, there does appear to be a slight degree of correlation between building type and the corresponding measure of real relative asymmetry (RRA), but that connection does not appear to be very strong. Interestingly, there does appear to be quite a strong correlation linking building type to both the number of nodes (or discreet convex spaces) and the number of courtyards. There is likewise a similarly strong tie between the number of spaces and the number of courtyards. These three variables appear to be bundled together, given the relatively strong correlation between them. The implications for the close connection between this triad of variables are that there seems to be a trend to the size and complexity of the building types used to categorize the sites in this study. The correlation means that as the number of spaces in a complex increases, as does the likelihood that a particular building will be in a certain typological category. In short, there is a pattern in how many rooms or spaces are present in a given type of structure. Similarly, there is also a trend to whether a courtyard is present in particular types of buildings, namely, those centered around one or more courtyards as a central feature.

There is also a logical correlation between the number of domestic structures identified at a site and the number of entrances. The relationship between these variables makes sense, as the number of entrances should be expected to increase as more structures are included in the spatial arrangement; although in the case of the archaeological contexts from the Continent, the sample size of those with more than one structure is fairly small.

A slight correlation exists between the number of nodes in a given spatial arrangement at a site and the mean asymmetry values. Mathematically, this is logical, as the complexity of a graph tends to increase as more objects are added to the network. It also follows that as the number of rooms in a building increases, so too does the relative sophistication of the architectural arrangement. However, the slight degree of measured correlation indicates that such a connection is not strongly indicated, but does exist to a certain degree.

The relationship between the chronological markers, the beginning and end dates identified from the archaeological record, and the relative spatial patterning and integration is almost nil, according to the correlation analysis. Such a lack of strong correlation perhaps has implications for the broader interpretation of Roman cultural diffusion in the provinces, which will be discussed more fully later in the text. There is a minor positive correlation between the start dates and end dates, but this is most likely due to a common range of dates used to describe the temporal spans of many archaeological contexts where the publications simply list entire centuries. Thus, many of the spatial arrangements examined in the course of the study have start dates which closely link to certain end dates, as they bookend frequently used spans of time.

Another analytical tool to consider is how the spatial data from Continental Europe lines up against the null hypothesis of randomness. The entire collected data set, from both sides of the English Channel, was used to generate a random table of values for mean RRA, prescribed by certain parameters. From a mean value of 1.237078 and a standard deviation of 0.3018019, the random set was generated in R to serve as a control group to compare the experimental data against. The random data was produced to match a normalized statistical distribution, commonly referred to as a bell curve. In R, the Continental data was graphed as a histogram, in order to visually represent the frequency of distribution for the RRA values. The histogram depicts a broader pattern to the spatial arrangements of the Roman domestic spaces which comprise the study group. Against this experimental data was plotted another histogram, this time presenting the random data from the null hypothesis control group. The two histograms are compared in **Figure 4.11** below.

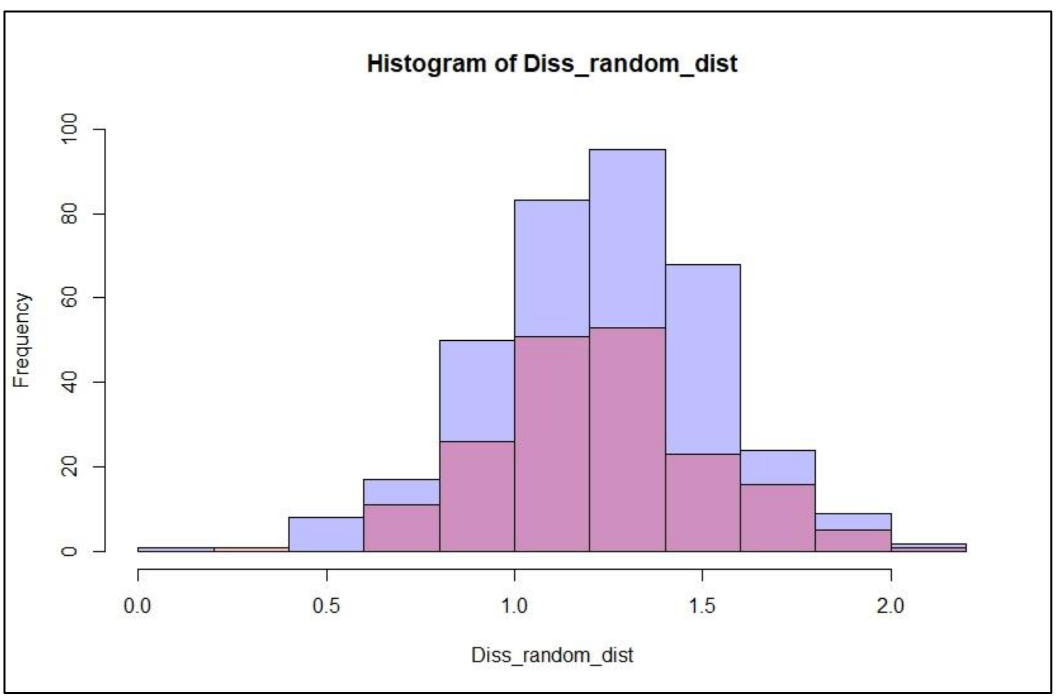

Figure 4. 11 - Comparison of RRA Value Histograms

The randomized control data is colored blue, while the Insular data is colored in purple. From the histograms, it is apparent the two sets of data align closely. The mean RRA number for both the real-world data and the control data of the generated statistical model both trend close to values of 1.2. The lengths of the bars in the overlapped histograms differ due to the randomized control data containing more values than the experimental subset.[81] While the overall curves of the paired distributions are similar, there is a sharper drop-off at the upper end of the experimental, real-world data. Such a drop indicates that there are fewer examples at the higher end of the RRA range, proportionally, than should be expected based on the statistical distribution. Either there are fewer instances of larger, more complicated domestic contexts, i.e., those with more spaces and less symmetry and integration, or the experimental data does not properly capture the full extent of Roman domestic structures within the study area. It is apparent from the histograms that the Continental data aligns fairly closely with the expected statistical distribution, with most of the RRA values falling between 1.0 and 1.5. It will be interesting, then, to compare the two halves of the complete data set, Insular and Continental, to see where exactly the two deviate, statistically.

Using the similarity criteria discussed in the Analytical Processes subsection, a selection of slices were made through the Continental data in R, to more closely examine the material. While the most common expectation from network analysis is a graphical representation of the network structure comprised of nodes and edges, over a certain size, such twisted, convoluted plots come to lose their interpretive meaning, since little meaning can be derived from the tangled mass of lines and dots. A more useful tool for interpreting network data is the matrix or

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[81] The randomized distribution contains the same number of entries as the entirety of the experimental data set, 357.

data table. A data table provides an easy to read format for comparing raw data from the entire data set or its subsets. A mathematically-derived matrix, representing similarity or adjacency, is a better interpretive method for visualizing large network data sets.[82] Using the criteria for similarity laid out previously, the data was further spread into subsets of related contexts and chronological periods. It is from these clusters, or neighborhoods of similar spaces can be considered and meaningful conclusions reached.

4.7 Cluster Patterns and Interpretation

Based on the slices of data taken from the Continental subset, along with the correlation tests and descriptive statistics run as part of the larger analysis of the data, a trend emerges among domestic structures from northern Europe. Like the Insular data, there does not appear to be a clear chronological trajectory to the spatial patterning of architectural space in the Roman provinces of northwestern Europe. Nor is there any quantitative indication that there is an evolution of form from least to most complex. These patterns, or lack of a clear progression, indicate that the introduction of Roman-style architecture for housing did not necessarily follow a slow arc of development, and could be adopted on a case-by-case basis. The strongest connections identified by the quantitative analysis connect specific architectural features, such as hypocausts, with measured values of spatial layout, represented by mean RRA values. However, the correlation between spatial patterning and architectural object is not a strongly indicated is it was in the material from Roman Britain.

Of the locations with the remains supporting the presence of a hypocaust system, for instance, there is a pattern relating the presence or absence of sub-floor heating and structure

[82] In the mathematical terminology employed in network analysis, “adjacency” refers to whether or not two nodes are connected in the network structure, or, in other words, adjacent.

type. Of the 87 total contexts with hypocausts, 13, or about 15 percent, fit the categorical definition of a hall-type building. This result points to an expectation that hypocaust systems are more likely to be found in structures from J. T. Smith's row-type, as those domestic spaces are generally more complex in terms of layout and the number of rooms than halls, and would therefore have enough space to accommodate a hypocaust system. There is also a pattern to the appearance of the hypocaust chronologically. 24 phases with hypocausts date to the first century AD, marking around 27 percent of the total. The bulk of the hypocausts appear archaeologically around the second and third centuries AD, well into Roman occupation and administration of the region. Also showing strong correlation between building type and architectural feature is the co-presence of courtyards with courtyard-type buildings. Open spaces do appear in the architectural plans of other structure types, such as winged-corridor villas like Villars in the Bourgogne-Franche-Comté region of France.[83] But in these instances, the presence of projecting risalths, or towers in the wings of the building, override identification with the usual courtyard villa, which ascribes more closely to Mediterranean peristyle houses, albeit with a more closed-off, bounded interaction with the interior court, a concession to climate.

There are also patterns which emerge surrounding the rural or urban setting of the residences in the data. A total of 27 contexts which appear in urban environment, namely in nucleated urban centers, and only eight are reliably dated to the first century AD. The remainder date to the second and third centuries, some representing later phases of the first century occupations, such as the latter two phases of La Maison des Escargotiers at Mâlain.[84] It is quite possible that due to the fragmentary archaeological records at many urban sites in northern

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83 Bigeard 1996, 71.

84 Provost, et al. 2009a, 486.

France, the Netherlands, and western Germany, the archaeological remains that to survive might not be representative of a greater whole. Take, for example, the situation at Amiens, which contains the preserved plans for four Roman residences from a single city block, Insula 15. The excavators note the lack of good preservation in much of the rest of Roman Amiens, due to extensive damage caused during the First World War.[85] Ten of the 27 have hypocausts, indicating that interior heating was not necessarily limited to rural homes without easy access to a public bathing facility. Of the urban sites, the only structure types present are halls and courtyard-type buildings, a surprising regularity, compared to the wide range of building types found at urban sites in Roman Britain.

The lack of chronological patterning to the data about domestic spatial arrangements, while seemingly disappointing, is in actuality a salient point of data in its own right. Due to the relatively late date when northwestern Europe was incorporated into the Roman Empire, compared to regions in southern Europe and around the Mediterranean, it is not unreasonable to conclude that Roman practices of domestic construction and planning would have matured by that time. What needs to be accounted for, then, is the role of the indigenous population in negotiating the adoption of Roman building practices into a native context. However, expecting to find a typological evolution of Roman architecture in the archaeological record may be asking for too much. Instead, the emphasis should be on the appearance of Roman architectural styles in conjunction with earlier patterns of space use, as the Iron Age inhabitants of the region utilized space in a different way than their Roman neighbors.[86] The main distinction, apart from the differing construction technologies, one based on wood-framing, the other on stone, is the

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[85] Pichon 2009.

[86] See Harding 2009 for an overview of Iron Age housing. While focused on the British evidence, he does discuss Continental comparanda. Heimberg 2002/2003 also discusses Iron Age antecedents to Roman houses in Europe.

different conceptions of space and its division for use. Iron Age peoples, living as they did in round houses, devised a system of spatial division based on a circular model, with the main living space in the center of the structure and ancillary functions relegated to the periphery. Compared to rectilinear Roman structures, the next step in the discussion would be to look for deviations from traditionally “Roman” patterns of space use in provincial housing, distinctions which might point to alternative ideas about how space is viewed and utilized.

4.8 Conclusion

Again, while the lack of clear morphological change over time is on its own a frustration, the systematic approach to the spatial data of Roman-style houses through quantitative methods provides a new armature for interpretation. While dictating any sweeping change to the existing paradigm based on this data might be an over-reach, to say the least, there are, however, some conclusions that can be drawn or posited based on the analysis of such a large corpus of archaeological material. The ability to point to such a large and diverse quantity of evidence, pulled from an entire region of the Roman Empire, is important to understanding a wider picture of the past and to advancing the application of computational approaches to archaeological material.

From the collected data, it is apparent that any interpretation of how Roman practices and material culture came to be adopted in the northern provinces must reject any sense of a linear, unidirectional adoption on the part of the indigenous population. Such a statement is not anything particularly new. Scholars such as Greg Woolf and Peter van Dommelen have already argued against the traditional core to periphery model for cultural change in the western provinces of the Roman Empire.[87] Likewise, suggesting a greater focus on indigenous agency in

[87] See Woolf 1998 and Van Dommelen 2014.

the Romanization process is not particularly ground-breaking on its own. However, the ubiquity of Roman house types distinct from Mediterranean patterns does suggest that the scholars who argued for native adaptation of Roman building styles, such as Slofstra, Habermehl, and Lenz, were correct in their close reading of architectural details and arrangement. The data analysis supports their conclusions with evidence drawn from a much larger range of locations. While Ursula Heimberg includes an impressive number of rural villas in her examination of provincial house types, her study is limited to Roman Germany. J. T. Smith's examination of villas from across the Roman West is similarly limited in the number of sites he can reasonably discuss and handle without quantitative analysis. The Continental data supports a line of reasoning which draws a connection between Roman provincial housing and their Iron Age antecedents. The people living in the Roman provinces were adapting their familiar patterns of living and the use of space to the new architectural technologies introduced by the Romans.

Take, for example, the commonly found corridor type of structure, both with and without the added wings on either end. Initially, such residences appear Roman, as they possess a greater internal division of space, and are rectilinear in their overall plan. However, in many cases, there is an overall circular arrangement to the passages and connective spaces in the plans, with one or more corridors on the outer edges of the spatial arrangement, facilitating movement of people and goods around a residential core suite or suites of spaces. While not necessarily identical to the circular division of space found in the Iron Age round-houses of Britain or the oblong domestic structures of the western Rhine Valley, such an arrangement is distinct from the usual model of the Roman atrium house, with its visual axis running straight through the front door to the back of the home, aligned along the most important and visible rooms.[88] In provincial houses

[88] Harding 2007, 27. Examples of Iron Age domestic settlement in Gaul can be found at Acy-Romance, in the Aisne valley. Published plans of the domestic structures can be found in Bradley 2012, 178. Unsurprisingly, some of

of all types, there is less openness to the spatial layouts, favoring instead a more enclosed, inward-facing arrangement, as at Grémecey (**Figure 4.1**), sometimes with a fronting portico, like the structure at Bollendorf (**Figure 4.2**), but never with a clearly visible axis of sight through the architectural space.

The next step in the analytical process is to compare the Continental data to the Insular material from Roman Britain, in order to highlight similarities and differences between the two halves of the data set. It is from this larger, regional examination of the entire corpus that broader conclusions about the process of cultural adoption and assimilation, or "Romanization," can be properly addressed. The next chapter will compare the statistical and spatial data from Roman Britain and the Continent as a means of drawing overarching conclusions about the state of Roman domestic life in the northern provinces, if, in fact, "Roman" is the proper term to use in describing the inhabitants of the region. The benefit of computational approaches to archaeology truly lies in harnessing legacy collections of excavated data and using those data to formulate or inform new interpretations of past phenomena.

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the best preserved examples of the Roman atrium house can be found at Pompeii, such as the House of the Faun, which was itself subjected to space syntax analysis by Mark Grahame in the late 20th century. See Grahame 1997 and 2000.

Chapter 5

Housing in the Roman Northwest: Data Comparison

5.1 Introduction

Beyond the analysis of data from Roman Britain and the Continent, the true value undertaking a regional, quantitative survey of domestic architecture in the Roman provinces lies in the capability to analyze and compare data across a broad span of time and space, thanks primarily to the assistance of computing power to quickly and efficiently organize, sift, and process data. Additionally, much of the previous work to employ space syntax methodologies to archaeological materials and sites have focused their attention to a specific structure or area, such as Mark Grahame's research on the houses at Pompeii.[1] While there is certainly merit to the close reading of architectural spaces using space syntax principles as a framework, part of the merit in large-scale quantitative analysis is that the sample size of the data corrects for inconsistencies or outliers, statistically speaking. Consequently, the pursuit of a large enough sample size to truly employ meaningful statistical methods of comparison was paramount in designing the present study.[2]

Following the previous chapters' examination of the data in two halves, one for the material from Roman Britain, the other for the Continental provinces, the next step in the analytical process is to compare the two sets to one another, and also to treat both halves of the data set, previously analyzed separately, as a unified whole. As with the treatment of the two

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1 Grahame 1997 and Grahame 2000.

2 This sentiment was echoed by Eric Poehler in conversation with the author on 26 April 2019. Poehler noted the analytical potential for space syntax analysis, but lamented the lack of a large-scale employment of the technique to archaeologial material.

halves of the data set, the unified corpus will be examined in its totality, presenting a number of descriptive statistics about the assembled information. Next, a correlation analysis will be presented, in order to highlight potentially significant patterns among the variables in the data. As before, the analysis and distribution of spatial arrangements will be compared to a randomized data sample in order to test against the null hypothesis.

5.2 The Combined Data Set

Considering the combined data set does, in fact, combine the two halves of the collected information on Roman domestic architecture in northwestern Europe, it logically follows that that unified manifestation of the data should present itself as a merged form of the two previously described and discussed assemblages. This is indeed the case. Comprised of 357 distinct construction phases or contexts gathered from 265 sites, the data represents the remains of Roman domestic architecture from the region of northwestern Europe. The inclusion of such a large and regional data set lays the groundwork for locating and understanding patterns at a wide enough resolution to draw substantive conclusions about the state of domestic living in the northern Roman provinces.

Of the sites and contexts in the data, 52 present concrete evidence for more than a single structure, or 14.57 percent of the overall whole. This includes external bathing suites, ancillary farm and storage structures, along with small shrines and gatehouses at some of the larger villa complexes. It might be expected, given the number of identified villa sites included in the data, for there to be more evidence of secondary structures in the published archaeological record. However, as noted with the Continental material, there is a dearth of information regarding those structures, either due to vagaries of archaeological preservation, exacerbated by human intervention in the landscape, or simply because of disinterest on the part of excavators.

Among the collected data,103 contexts preserve remains of more than a single entrance, representing a salient architectural feature which modifies quite substantially how individuals would interact and treat with the spatial arrangement of these domestic structures. This subset represents 28.85 percent of the total. Explanations for a structure having multiple entrances include secondary servant entrances, access points for hypocaust systems, and external commercial spaces, in the case of some urban properties.[3] Another architectural feature with significant impact on spatial arrangements is the courtyard, of which 102 contexts, or 28.57 percent, preserve evidence. The courtyard, where present, is usually a central organizing feature of a domestic space, not uncommon to Roman domestic architecture more broadly considered.[4] In the north, however, cooler temperatures and prevailing climatic conditions limit the utility of the courtyard as a space in a Roman-style home, at least from a purely functional point of view.

Finally, only 32 locations are situated in urban environments, only 8.96 percent of the total. The reasoning for this is attributable mainly to archaeological recovery rates and the availability of excavation data. Due to a long history of constant use and occupation of urban centers in Europe from the end of antiquity through the present, excavation of urban centers remains a difficult undertaking. As a result, there is little information about these urban dwellings available, in comparison to the wealth of information regarding the rural settlement landscape, a much easier area to operate in, archaeologically-speaking.[5]

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[3] See Berry 2016; For specific notes about servant entrances, see Meyer 1999.
[4] See Berry 2016.
[5] See Chapter 4 on survey and Chapter 5 on excavation in Hester, et al. 2016.

Combined Data	More Than One Structure Present	More Than One Entrance	Courtyard Present	Urban Context
Number of Contexts/Sites	52	103	102	32
Percentage of Total	14.57	28.85	38.49	12.08

Table 5. 1 - Subsets of the Combined Data Set

For comparison to these descriptive statistics about the overall data set, it is useful to return to those same details about the Insular and Continental halves of the data. To start, there are some significant deviations within the data from Roman Britain. The percentage of contexts with more than a single structure is almost double in Britain, compared to the data set as a whole, while almost quadrupling the percentage found on the Continent. The underlying causes of such a drastic discrepancy are unclear, given the distance from the material afforded by time, but there is an explanation that addresses the matter. It is likely, given the interest in landscape archaeology and survey in the modern United Kingdom, that the secondary structures present at rural agricultural sites are more likely to be captured in the resulting archaeological data than similar buildings in northern Europe, where the professional focus lies more in development and rescue excavation.[6] Consequently, ancillary constructions, which can often take the form of post-built or -framed structures, might be overlooked in the material record. To lay the responsibility at the feet of modern and contemporary archaeologists is not done in the interest of assigning blame, but rather to explain an artifact of the archaeological process that does not appear to equate to the lived experience of the past. The presence of subsidiary storage or industrial structures at rural domestic sites in Europe attests to the fact that such spaces are not unique or isolated to Britain, but instead that there is another explanation for their archaeological absence.

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[6] See Bogucki 1945 and Arnold 2000.

Insular Data	More Than One Structure Present	More Than One Entrance	Courtyard Present	Urban Context
Number of Contexts/Sites	33	47	37	14
Percentage of Total	31.13	27.85	34.91	13.21

Table 5. 2 - Subsets of the Insular Data

Comparatively, the measure of structures with more than a single entrance appears to be relatively uniform across the three corpora of data. With a margin of around a single percentage point in either direction of the value expressed in the combined data set, the Insular and Continental percentages fall within an acceptable range of deviation. While not necessarily having ramifications on an understanding of the interaction between entrance and domicile, such uniformity across the entire data set points highlights discrepancies in other areas, such as the aforementioned secondary structures.

Another architectural feature which appears in differing amounts in Britain and Continental Europe is the open courtyard. Present in 34.91 of Insular locations, the percentage of sites is significantly higher on the continent, by almost six points. Such a difference could be a reflection of regional variation, or variance in archaeological recovery. A distinction between island and continent does have some degree of merit, given the main difference in archaeological practice, landscape versus construction-focused, would not account for such a wide disparity. Instead, it seems more likely the explanation lies in climatic differences, especially since Roman Britain covers a much smaller geographic area, and therefore has a much more uniform climate within its own borders, compared to the wider area of northwestern Europe.[7]

Continental Data	More Than One Structure Present	More Than One Entrance	Courtyard Present	Urban Context

[7] See McCormick, et al. 2012.

Number of Contexts/Sites	14	56	65	18
Percentage of Total	8.81	29.95	40.88	11.32

Table 5. 3 - Subsets of the Continental Data

The final distinction between the sets of statistics gathered on the manifestation of architectural form relates again to the question of context, rural or urban. In the case of the data taken as a whole, there is a fairly low rate of appearance for urban sites, around 12 percent of the total. This metric holds relatively steady when split into the two geographic portions of the data set, with only about a percentage point of wiggle in either direction. In this particular case, it is likely this low level of representation is explainable due to matters of archaeological preservation and recovery, as, barring exceptional circumstances, urban environments are much more complex in terms of stratigraphy and the logistics of excavation, decreasing the likelihood of their exploration. Such difficulties are compounded by the presence of modern settlement and urban centers on top of past habitation.

Turning next to more specific metrics of architectural arrangement and spatial patterning, the outcomes of space syntax access analysis will now be examined and compared. As with the descriptive statistics, the first stop is with the combined data set.

Combined Data	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA

Entire Data Set	1.252101	19.34454	1.543417	0.369748	1.237078
Hypocaust Subset	1.355422	26.18675	1.753012	0.5	1.313733
Rural Subset	1.278481	19.46203	1.575949	0.325949	1.238828
Urban Subset	1.04878	18.43902	1.292683	0.707317	1.223585
Single-Structure Subset	1	18.05246	1.262295	0.295082	1.215778

Table 5. 4 - Space Syntax Results for the Combined Data Set

Within the subset of data from the entire corpus with preserved evidence for hypocaust systems, whether tile pillars, mosaic fragments in a sub-floor depression, or the remains of a *praefurnium*, the mean number of independent structures is around 1.3, averaging around 26 discreet convex spaces, including the exterior. The mean number of entrances is 1.75, as expected for private hypocaust systems, which often have separate service entrances. The mean number of courtyards is 0.5. Finally, the measure of spatial complexity and arrangement, Real Relative Asymmetry (RRA), is around 1.31. Compared to the entire collected set of data, the values for hypocausted structures is slightly higher than the overall average. The average number of structures found at a given site is 1.25, making the hypocaust subset higher by a tenth of a point. This elevated value indicates an increased likelihood of multiple structures present at sites with hypocaust, or, conversely, that there is an increased likelihood that a hypocaust should be expected at a location with more than one structure. The mean number of spaces in a structure is significantly higher than the average of around 19, a difference of close to seven. Such a distinctly different number of spaces in a given spatial arrangement is not surprising, as hypocaust systems are often employed to heat bathing suites, which manifest spatially as interconnected series of smaller architectural spaces, leading to a larger number of independent rooms in the complex. As a corollary to that observation, the mean RRA value is likewise higher than the average of around almost 1.24, by almost a tenth of a point, as with the mean number of structures. With increased complexity and number of spaces in a given complex, it appears that a decreased measure of spatial integration should be expected. Lastly, the average number of courtyards per site is slightly increased compared to the overall body of data, 0.5 compared to around 0.37, making it more likely that locations with open courtyards will have hypocaust systems.

For the subset of rural sites, the metrics drop back closer in line with the overall numbers. There is barely a difference in the average number of structures, for instance, separated by only two hundredths of a point. Similarly, the number of spaces is also close to parity, along with the average numbers of entrances and courtyards. The mean RRA value for rural sites is practically identical to the average for the entire data set, with the only numerical difference manifesting in the thousandths place. The implications for such a close tracking between the rural sites and the entire corpus relate to how dominant rural sites are within the collected sample. With 81.92 percent of the data coming from rural contexts, it is understandable for the numerical manifestation of those structures to have such a large impact on the nature and consistency of the larger pool of data.

Inversely, it is not alarming to see the urban portion of the study sample deviating from the baseline established by the rural majority. The average number of structures or discreet buildings at an urban site is close to one, as urban residences are unlikely to spread the spatial arrangement into numerous structures given the spatial limitations of the urban environment. Likewise, the somewhat smaller number of spaces in the average urban residence, around 18, is also accountable to limited space within Roman urban settings. The average number of entrances is similarly relatively low, constrained by fewer options for egress, dictated by the locations of streets and alleyways in the urban fabric. The number of courtyards trends higher, however, possibly indicating a preference for open space, where available, or potentially as a means of lighting interior spaces, which often lack windows. The mean RRA values for urban spaces are on average slightly lower than those of their rural counterparts, suggesting a degree of compactness to urban spatial arrangements.

For the single-structure contexts, the numbers fall in line with expectations. The average number of rooms is slightly smaller than the overall average, 18 compared to 19. The mean number of entrances is similarly lower than the average. This reduction in the number of egress points is affiliated with the reduced complexity of single-structure spatial arrangements, which also have the lowest mean RRA value, at 1.21. While the simplicity of these structures is partly due to the fact that they lack secondary structures, that same pattern is also a factor of the smaller size of many single-structure dwellings. As hall-type structures tend to be solo structures, and also lack a degree of sophistication found in larger, more complicated arrangements, the greater reflection of spatial integration found in these structures makes sense. In a similar vein, the mean number of courtyards for single-structure locations is also slightly lower than average, at close to 0.3, most likely skewed by the number of hall- and corridor-type buildings, which tend to lack open court-like spaces in their architectural plans.

Insular Data	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA
Insular Subset	1.376471	19.02353	1.558824	0.3	1.246297

Hypocaust Subset	1.531646	26.21519	1.873418	0.468354	1.324432
Rural Subset	1.397436	19.00641	1.589744	0.282051	1.249887
Urban Subset	1.142857	19.21429	1.214286	0.5	1.206293
Single-Structure Subset	1	16.51095	1.131387	0.197080	1.211531

Table 5. 5 - Space Syntax Results for the Insular Data

Compared to the larger data set, the material from Roman Britain presents some interesting deviations. First, the mean number of structures is slightly higher, roughly 1.38 as opposed to around 1.25. From this, it can be deduced that there is a greater rate of appearance, archaeologically speaking, of secondary structures in Britain than on the Continent. When compared, in turn, to the Continental data, with a mean number of structures of 1.14, it appears that this deduction is, in fact, the case. As previously noted, this discrepancy is likely due to differences in archaeological rates of recovery. The average number of spaces in a given complex is consistent between the Insular data and the greater corpus. Likewise with the mean number of entrances and courtyards. Such alignment indicates a uniformity to how Roman domestic spaces manifest spatially. Disregarding obvious outliers, it appears most Roman residences in the northwestern provinces of Europe abide by a certain level of consistency in terms of the frequency of certain architectural features and the size of the domestic complexes. The final point of evidence in favor of this interpretation is the close alignment of mean RRA values between the Insular data and the broader corpus, 1.25 to 1.24.

Delving further down into subsets of the Insular data, there is also a close correspondence between those British sites with preserved hypocausts and the greater whole of the study data. As with the Insular data taken as a whole, there is a close match between the mean number of spaces in a structure. There is a matching deviation to the mean number of structures in a complex, again attributable to patterns of archaeological excavation and recording. Insular residences have slightly more entrances, on average, 1.87 to 1.75, but marginally fewer courtyards, 0.47 to 0.5. The increased number of entrances tracks with the greater average number of structures at British sites. More buildings means more doors. The slightly lower number of courtyards, on average, is also not unexpected, as Insular sites have fewer courtyards when compared to their Continental neighbors. Like the broader Insular data set, the hypocaust subset's mean RRA value sits close to that of the overall data set, 1.32 to 1.31.

The group of British sites from rural contexts is likewise close in character to the larger body of data. As before, with the larger Insular data set, the greatest deviation from the entire dissertation data set is in terms of the mean number of structures per site. At close to 1.4 to the average 1.28, there is again a fairly substantial difference in value, as should be expected through the entire Insular portion of the data. Otherwise, the values track fairly closely between the rural British sites and the wider sampling of rural domestic habitation. An average number of convex spaces of 19, the number of entrances per structure, around 1.58, and mean RRA values of around 1.28 are commonalities between the two sets of values. There is a slight difference in the number of courtyards, again reflective of the larger pattern.

The urban subsection of the British data shows a greater amount of deviation from the variables in the total corpus of data. The mean number of structures at urban sites in Britain trends slightly higher than expected, given the norm from the rest of the material. However, the delta between the two values, 1.14 and 1.04, a difference of one tenth of a point, is much closer than the separation between the entirety of the British data and the rest of the collected information. The mean number of structures at urban sites is marginally elevated, 19 as opposed to 18. The average amount of entrances is also closely paired, with a difference of only 8 hundredths in favor of the combined data set. The distinction between the two mean RRA values is similarly measured in small amounts, in this case, two hundredths. The greatest discrepancy between the urban data from Roman Britain and the greater collection of urban contexts is in the occurrence of courtyards. In Britain, the average number of courtyards per site is exactly 0.5, while, according to the greater urban set of sites, it is expected for there to be just over 0.7 open courts per site. Consequently, it seems less likely for urban sites in Britain to contain open courtyards in their layout, much like in the wider comparison between British sites and the wider whole. However, it appears, based on the collected data, that courtyards appear at a far lower rate at British urban sites than in rural environments.

Finally, the discussion turns to examine sites with only a single structure. Within the context of Roman Britain, these spatial arrangements look to be smaller than average, with roughly 16.5 spaces compared to around 18 for the rest of the data. Despite the smaller than average size, and the fewer than expected number of entrances (1.13 compared to 1.26), the spatial patterning, represented by mean RRA value, conforms to the rest of the collected data, at around 1.2 for single-structure locations. Lastly, the average number of courtyards per building is lower than the overall mean, by about a tenth of a point, 0.2 as opposed to 0.3.

The pattern that emerges from a close reading of the Insular values, as compared to the combined whole, is one of subtle difference and meaningful modification. There is a greater presence of secondary buildings, primarily at rural sites. Structures with hypocausts are larger than their non-artificially heated brethren, a pattern also observed in the data set as a whole. British sites are less likely to have open courtyard features, even though the open spaces between different buildings are grouped into that category of architectural or spatial feature. It seems logical to attribute this deficit of open spaces in architectural planning to the colder, wetter climate of the British Isles. In spite of any differences among the subsets of the Insular data, such as the frequency of courtyards and secondary structures, the spatial patterning of those domestic spaces remain consistently similar, only deviating by two hundredths, at most, from the wider whole of the dissertation data set. The next phase is to perform the same close examination of the Continental data.

Continental Data	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA
Continental Subset	1.139097	19.58289	1.529412	0.433155	1.228697
Hypocaust Subset	1.195402	26.04598	1.643678	0.5287356	1.304017
Rural Subset	1.1625	19.84375	1.5625	0.36875	1.228046
Urban Subset	1	18.03704	1.333333	0.814815	1.232551
Single-Structure Subset	1	19.25	1.369048	0.375	1.219242

Table 5. 6 - Space Syntax Results for the Continental Data

Taken as a whole, the Continental material fits fairly close to the entire data set, when the Insular data is added back in. The mean number of structures is lower at Continental sites, more likely a reflection of archaeological priorities and excavation practices between Britain and European traditions. The mean number of spaces and entrances are consistent between the Continental material and the entirety of the data, at roughly 19 spaces and 1.5 entrances. The average number of courtyards is higher than the average, 0.43 to 0.37, reflective of the distinction in architectural expression between the inhabitants of the mainland and the residents of Roman Britain. However, the spatial patterns and RRA values are consistent.

In the hypocaust subset, the mean number of structures remains low, by a substantial amount, 1.19 to Insular data set’s 1.53, a difference of 0.34. This change might be attributable to the differing values between the Insular and Continental sites with hypocausts. The greater occurrence of multiple structures at British sites skews the average higher, explaining the deviation of the Continental data from that average value. The number of spaces in each domestic context remains consistent, at around 26, while the average count of entrances is within a tenth of a point. Similarly, the mean number of courtyards is also close to the overall value, 0.5, with the Continental data trending slightly higher by around four hundredths of a point over the sites from Roman Britain. The average number of entrances is similarly lower for the Continental locations with hypocausts when compared to the Insular material, by almost three tenths of a point, possibly echoing the difference in the number of structures present at the average site. The variations between the Insular and Continental portions of the data set are relatively consistent across the various categories where measurements were recorded. The deviations, primarily in the mean number of structures, as well as the number of entrances and courtyards, are all around three tenths of a point apart. In the categories of the average number of spaces and Real Relative Asymmetry measures, the two halves of the data are consistent and matched.

Turning to the rural sites, there is again a pattern of deviation between the Insular and Continental sections of the data set. As with the hypocaust subsets and the wider Insular and Continental segments, the categories with the most salient distinctions between values are the mean number of structures and the mean number of courtyards. The number of structures are the average rural site in Britain is close to 1.4, 0.24 points higher than the mainland's 1.16 buildings per context. The mean number of courtyards displays a similar spread, 0.28 to 0.37. In the case of this particular category, the Continental value is higher than the Insular measure, reflecting the same pattern present in the wider comparison between the two geographic regions. For the other categories of data, the rural subsets track closely together. The number of entrances for both sets hovers close to 1.5. The average number of spaces is within a single point, 19.0 to the Continental set's 19.8, of each other. Finally, the RRA values are within several hundredths of a point, with the Insular subset at an average of around 1.25 to the mainland's 1.23. The overall picture of the rural habitation of these two regions is, again, one of relative similarity, with minor differences explainable through archaeological and climatic differences. The differing number of structures per site can, as with the wider Insular data set, be explained as an artifact of British archaeological practices versus French and German methods. Similarly, the greater frequency of courtyards appearing in Continental contexts can be explained by a differing and more heterogeneous climate, in comparison to the islands of Britannia.

With the urban contexts, such as they are, some of the expected deviations between the Insular and Continental sets are present, but in other categories, the values are closer together than in other subsets of the data. The major point of deviation is a much closer number of average structures per site, with the Insular data trending just 0.14 higher than the Continental average of one. However, this relative proximity in value does not necessarily indicate a pattern of similarity between the two regions' urban locales, but rather points to a generalization about urban domestic contexts in the Roman Empire more generally. That is to say, it should not be unexpected for the average urban residence to possess much more than a single, discreet structure. The outliers from Britain, such as Phase 3 of the house in Caerwent's Insula I shown in Figure 5.1, are explainable as excavators initially grouping together what might be better explained as two distinct and separate residences.[8] Where a second courtyarded space appears to the north of the main residence, it is more likely to be a second, distinct residence, as opposed to an ancillary or dependent building near the main house. In other words, the data is deceptive, due

[8] See the plan from Frere 1984.

to an analytical process, in this case, space syntax, replicating the unclear nature of the archaeological record.

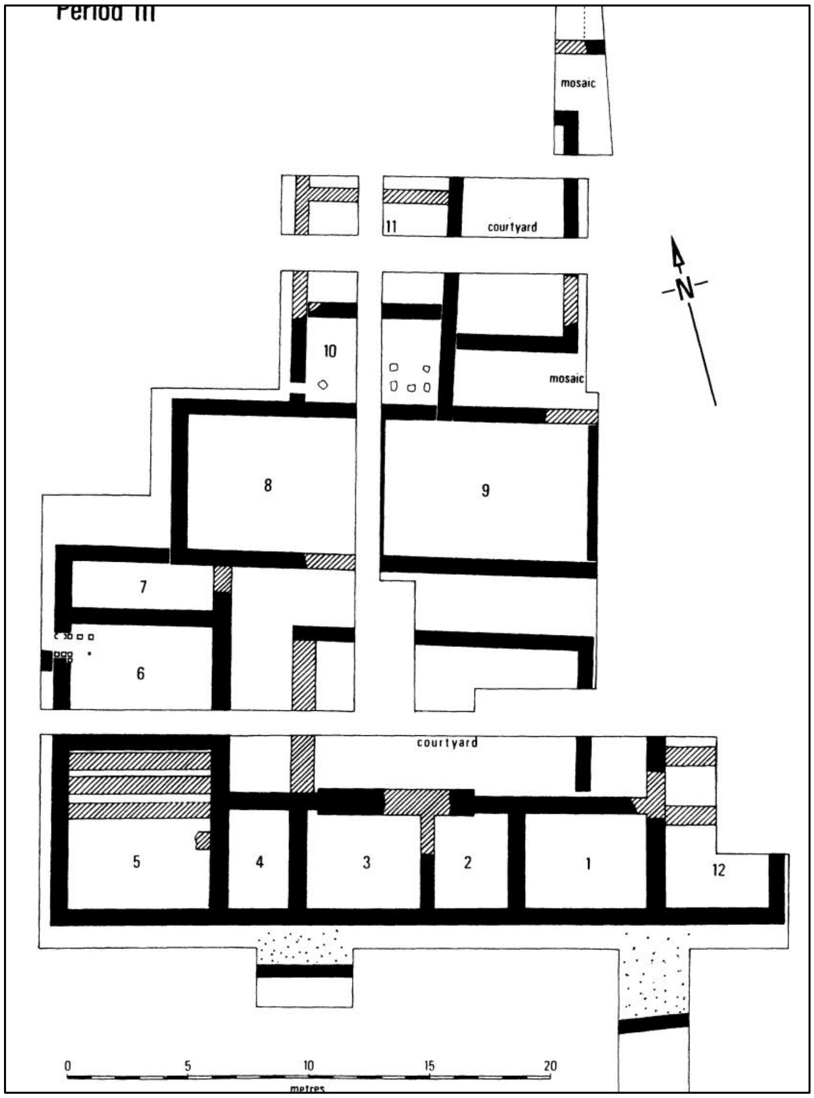

Figure 5. 1 - Caerwent, Insula I, Phase III

The presence of fewer structures per location accords with an urban environment, where space is limited and subject to different pressures than rural domiciles, either from municipal authorities, differences between the rural and urban economies, and simple constraints on available space for construction.[9] The number of spaces per site follows other trends already presented, with Insular locations possessing slightly larger spatial complexes, at around 19 to 18 spaces per context. The average number of courtyards similarly follows a predictable pattern, with mainland European sites being more likely to preserve evidence of open courts, 0.8 per site to the Insular 0.5. Again, this phenomenon makes most sense when viewed through a lens of regional climate conditions. Lastly, the representation of quantified spatial arrangement, Real Relative Asymmetry, is a fairly close match, with only a few hundredths separating the two regional sets of data.

The view of Roman domestic settlement emerging from the assembled data is one of surprising homogeneity, in terms of spatial patterning. While there may be regional variations to how residential contexts manifest architecturally in the material record, the aggregate patterns remain consistent across the entire data set. With only a slight dip in the average RRA values for Continental sites, both Insular and Continental sites float around the 1.2 mark for how their spatial arrangements are quantified. Taken at the level of such a large data set, a deviation of only a few hundredths is fairly minor. The next step in the comparative analysis of the data is to turn to the correlation analysis of the collected data variables, in order to examine statistically-significant patterns to those variables, both in the Insular and Continental subsets, as well as for the entire merged data corpus. The results of this correlation comparison are shown in **Figure 5.2**.

[9] See Nappo 1997.

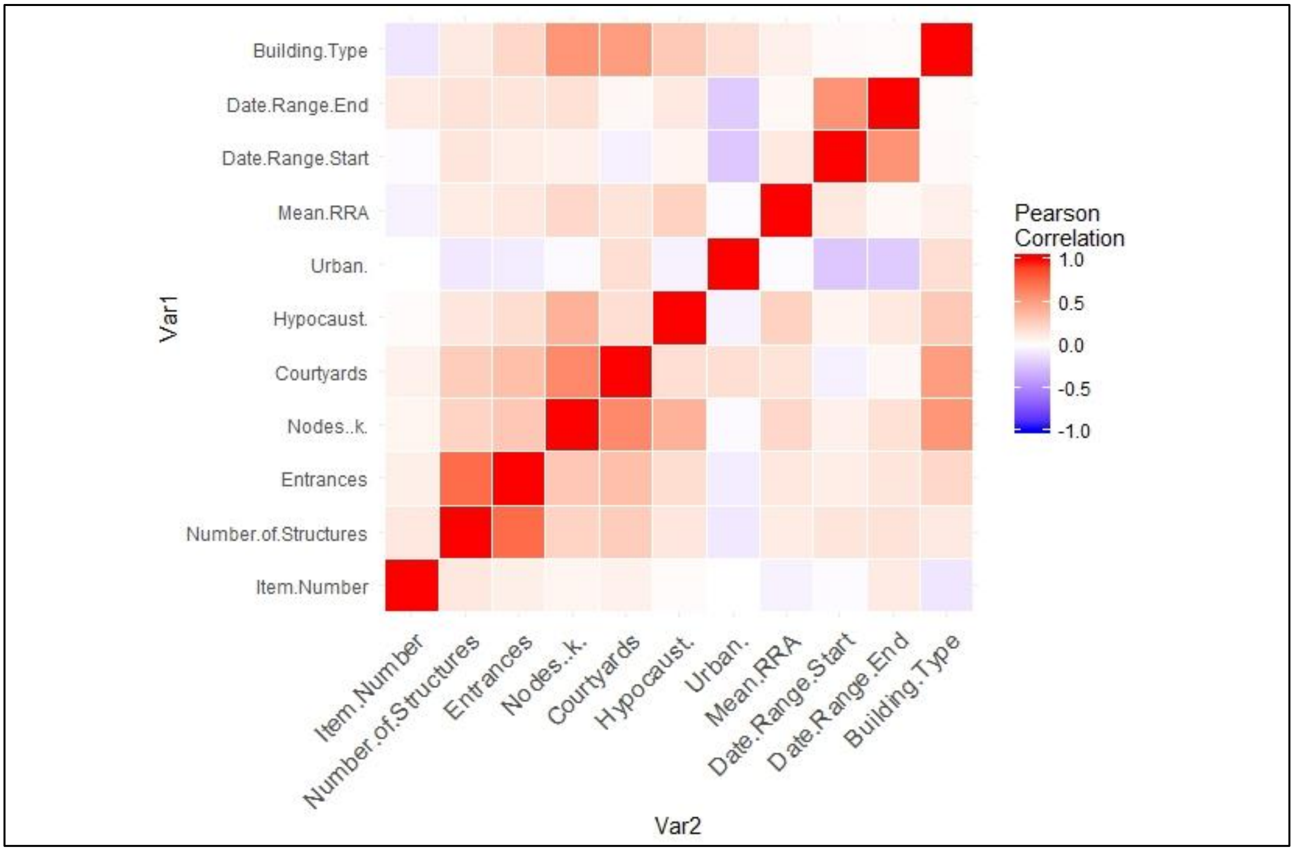

Figure 5. 2 - Correlation Analysis Visualization

The correlation analysis, measured by the Pearson correlation coefficient, is presented in the above chart, **Figure 5.2**. Visualized as an intensity heatmap, the more intense correlation between measured variables is shown in increasing shades of red, while what negative correlation that exists is presented in blue. Correlation, in this case, can be used to draw inferences from positive and negative presentations, as both are deviations from the null hypothesis, which manifests as zero correlation between two variables. In the aggregated data set, there are several obvious bright spots of positive correlation. The first, the strongly positive correlation between the beginning and end dates for the chronological data, is explainable due to how that temporal data was converted for use in the tabular recording of the data in spreadsheets. Because many publications present date ranges in approximate terms, usually centuries, many of the contexts sampled for the study have similar ranges of dates bookending their beginning and end points. Consequently, these dates track strongly with one another in a positive, linear direction. A similarly explainable pattern is the relationship between the number of entrances and the number of structures, which is presented as a strong positive correlation, actually stronger than the interrelationship between start and end dates. Because the most frequent cases where a Roman provincial domestic structure will possess more than a single entrance, in most cases, is due to the presence of a hypocaust system, the two measures, exterior doors and structures, are closely linked together. From there, the connections between variables begin to take on some meaning, in regards to the spatial configurations of Roman domestic spaces.

5.3 Spatial Configurations

First, there is a strong positive connection between the type of structure, whether a hall, courtyard, or other category of domestic building, and the number of nodes or spaces in the spatial system, the arrangement of rooms and their interconnections. Upon reflection, this link has a logical consistency, as certain types of residential structure, like the hall-type, possess, on average, fewer spaces and are less complex, spatially-speaking, than other types of structure, such as corridor- and courtyard-type buildings. As the complexity of architectural form increases, then, it should be expected that the number of spaces in a given arrangement should also increase, as adding to the number of spaces in an architectural arrangement often drives a corresponding increase to how complex that system becomes. Interestingly, however, there is not a correspondingly strong correlation between Real Relative Asymmetry value, the metric for spatial complexity and interrelatedness, and the type of structure or number of spaces. While there is a positive correlation, in both cases, it is weaker than the connection between form and the number of discreet spaces. Even though there is a certain degree of uniformity to the overall presentation of the RRA data, in that both the Continental and Insular portions of the data set have an average RRA value of around 1.2, the lack of a strong correlation between that value and other variables, such as date, type of structure, or the number of spaces in an architectural arrangement, hints that maybe the spread of RRA values is wider than presented in the averages.

Sorted to look at the range of integration values present in the data, the scope of the data becomes a little clearer. At the bottom end, the smallest RRA value measured, from the relatively large winged-corridor villa at Woodchester, in Gloucestershire, weighs in at a paltry 0.1995, while simultaneously possessing a fairly large number of spaces in the complex, at 42.[10] Far from being the largest site in the data, which is the Flavian period of occupation at Fishbourne, with 112 identifiable spaces, the Woodchester villa is nonetheless fairly integrated for its size, as represented by the low RRA value.[11] For comparison, the Fishbourne villa's RRA measures in at 1.0146, almost 0.8 higher. This discrepancy can be explained by the sheer size of the Fishbourne complex, but does not account for why a villa like Woodchester, which is one the larger size, should be quite as well integrated as it is. Because Real Relative Asymmetry is a means of normalizing depth of space from a given point in a spatial network, similar to betweenness centrality in network studies, it is representing, in the case of this study, how close, on average, each space in the spatial arrangement is from the point of origin, in this case the exterior of each space.[12] Because Fishbourne is so large, and contains so many spaces in its plan, it should be expected for the spatial integration to be higher than at a smaller site. The depth measured in each architectural spatial network by Real Relative Asymmetry is influenced by a number of factors, including the number of spaces or nodes, and, just as importantly, by the number and

[10] See Witts 2000, 317.

[11] See Cunliffe 1998.

[12] For a definition of betweenness centrality, see De Nooy, et al. 2005, 131; for relative asymmetry and integration in space syntax analysis, see Hillier, Hanson, and Graham 1987, 364. The two terms measure the same phenomenon, but employ different terminology, due to their respective analytical methods' origins in different academic fields.

nature of the connections between those nodes. The fewer steps between any two given spaces in a floor plan, the more integrated that overall architectural complex is deemed to be. Since Woodchester has a lower number of steps between the average pair of nodes in its network arrangement, it can be surmised that there are a fair number of connections or potential connections between the spaces in the villa. Turning to the plan of the villa, the reasoning behind this RRA value becomes apparent.[13]

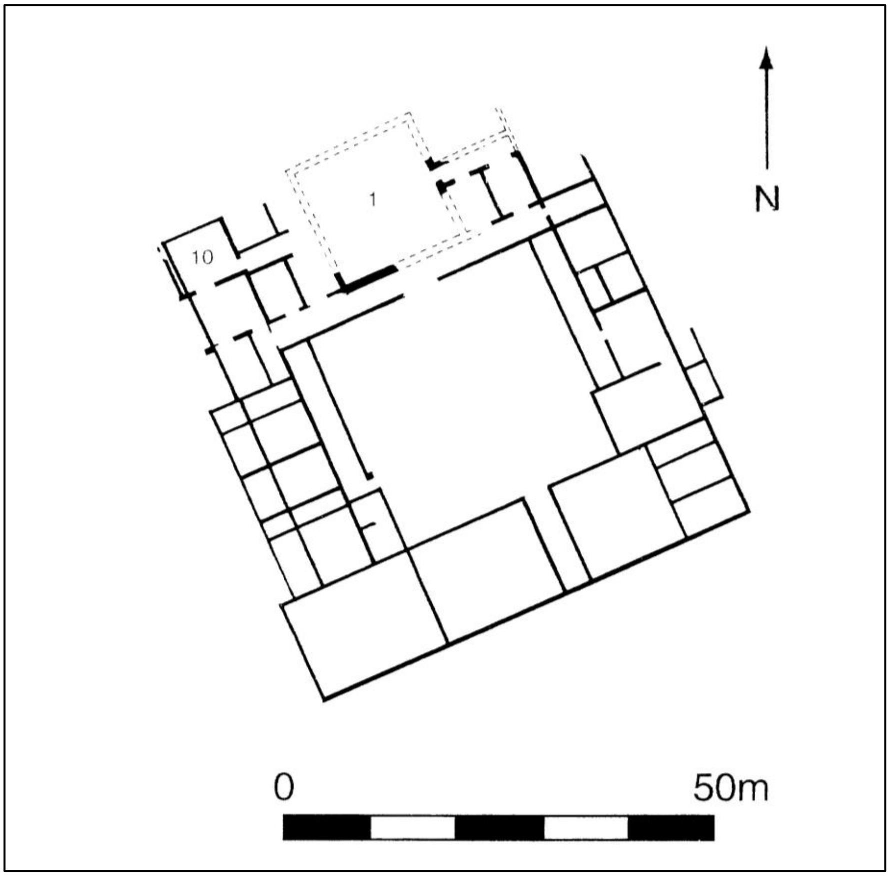

Figure 5. 3 - Woodchester

From the plan in **Figure 5.3**, it is clear that there are a number of room connections missing from the arrangement, possibly indicative of damaged architectural remains or a plan

13 Plan from Witts 2000.

derived from some manner of non-invasive archaeological investigation, such as aerial photography or magnetometric survey. In cases where these connections are missing, efforts were made to supplement with additional plans, if available. A second, more detailed plan of the Woodchester villa was located, but was still missing the connective passages between a number of the rooms.[14] The second plan is shown in **Figure 5.4**.

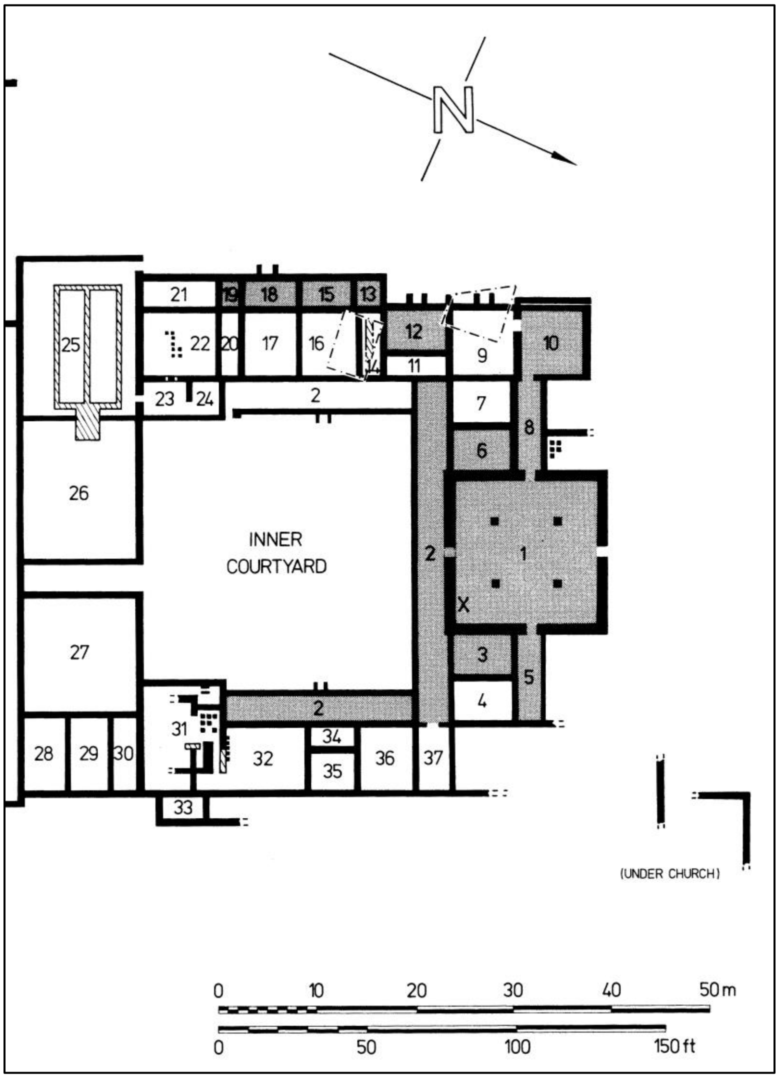

Figure 5. 4 – Woodchester, Detail

In instances where doorways or thresholds are missing, hypothetical connections were

14 The second plan is from Percival 1976, and shows some greater detail from 1973 excavations.

made to adjacent rooms, where reasonable.[15] Due to the large central courtyard and the number of somewhat large spaces connected to that central space, it appears the high degree of integration, presented by the low RRA value in the space syntax analysis of the Woodchester villa, is due in part to these salient spaces in the architectural arrangement drawing hypothetical connections to a great number of neighboring rooms, possibly driving the interrelation between spaces in an exaggerated direction.

At the other extreme, the villa at Cotterstock, in Northamptonshire, presents the highest RRA value, at 2.29919.[16] The high degree of disconnection between spaces at Cotterstock, seen here in the plan in **Figure 5.5**, which has 72 convex spaces in its plan, is most likely due to the high number of courtyards in the spatial arrangement.

The rural villa at Cotterstock has four courtyards identified by the excavators, indicating a complex rural villa with multiple organizing axes based around these courtyards, indicating that some of the spaces in the arrangement are more than likely agricultural or industrial in function.[17] Whatever the functional distinction between spaces, one of the downsides to space syntax analysis is a blindness to decoration, small finds, and, as a side effect, the function of rooms. Because the economic spaces of the complex could not be trimmed from the plan with any degree of reliability, the analysis of the villa complex as a whole is skewed by their inclusion. The effect of the courtyards, which are themselves organizational elements of architecture, is to tug the centrality of the space into a number of competing directions. Without a central organizing feature to the entire complex, the competition drives the integration of the

[15] Reasonable, in this case, is defined as a potential connection between spaces making logical sense, so excessively thick walls were ignored, as were connections that would interrupt obviously isolated groups of rooms, such as bathing suites.

[16] Upex 2001, 61.

[17] Upex 2001, 62.

space down, resulting in such a high RRA value.

The wide range of Relative Asymmetry values in the dataset highlights one of the criticisms of space syntax as an analytical tool for archaeologists. Because there are so many variables and unknowns in a given archaeological environment, it is almost impossible for space syntax to account for all possible variations and permutations which might impact the analysis of an individual site or small group of sites.[18] Given a large enough sample size, however, such anomalous extremes as Woodchester and Cotterstock can be balanced out and normalized statistically by the larger body of the sample data, as is the case here, where the average RRA value of around 1.2 shows such a leveling effect.

Another area of relatively strong positive correlation is between the number of courtyards in a spatial arrangement and the specific category of structure assigned to that particular building. This specific instance of correspondence between variables has previously appeared in both the Insular and Continental subsets, and remains logically consistent. Because the presence of an open, organizing courtyard space is very often the primary criteria employed to assign a particular location to the courtyard building type, it follows that there would be a strong link between those variables. While not all spaces with open court spaces are courtyard-type villas, the instances where the architectural pattern deviates, mainly in cases of rural complexes with multiple dependent structures, are relatively few in comparison. Due to such a strong connection between architectural feature and structure type, it is not unexpected for the two variables, in this particular instance, to be so strongly correlated.

[18] This is, of course, omitting the rare case where architecture is almost perfectly preserved, such as at Pompeii, in the case of Mark Grahame's study of domestic space in that city. See Grahame 2000.

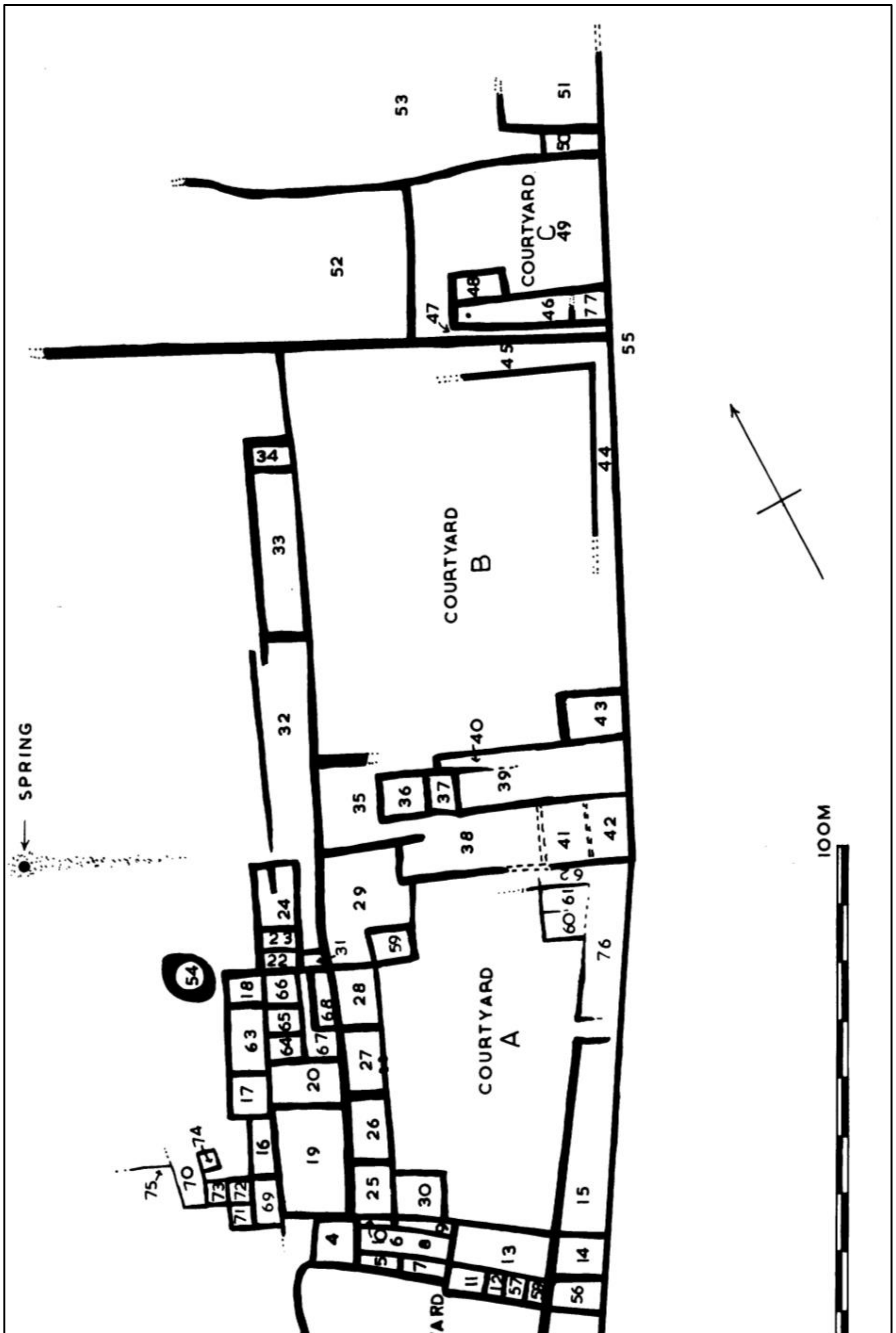

Figure 5. 5 - Cotterstock Roman Villa

There is also a somewhat strong positive link between the number of exterior-facing entrances and the number of courtyards in a given structure. While present, the connection is not strongly described by Pearson's correlation test, registering at roughly 0.3 out of 1. The presence of a positive-trending pattern can be explained by how courtyards manifest in the majority of cases in provincial domestic architecture. In most cases, the residential complex in question is rural, often, but not always, presenting as a large, open space edged by the structures of the domestic complex. These buildings include the main residence, as well as any attendant secondary structures, such as barns and industrial spaces. The next step in the comprehensive examination of the total data set is to break down the data by structural type, using the four categories previously defined: hall-type, corridor-type, winged-corridor type, and courtyard-type. The details of each structural category will be treated in turn.

5.4 Architectural Types

From the Insular and Continental data chapters, as well as from the earlier portion of this chapter, it is apparent that there is a distinction between the two portions of the data set. This division is not only a matter of geographic separation, but also one of architectural expression. As the two previous chapters on the individual portions of the data set highlight, there are regional distinctions to the manifestation of Roman domestic architecture on both sides of the English Channel. The next phase of the comparative data analysis is to break apart the combined data by building type, in order to examine distinction between these typological groupings.

Beginning with the hall-type of residence, it is a simple enough task to query and separate the requisite entries based on structural type. Similarly, the same query is easily accomplished with the Insular and Continental halves of the data set, for comparative purposes. *Hall* structures comprise 81 contexts from the overall data set, with 44 coming from Roman Britain and the remaining 37 originating in Continental Europe. The percentage of the total number of contexts for each structure type have previously presented in Chapters 3 and 4, respectively. The percentage breakdown by building category for the entire dataset are presented in **Figure 5.6**.

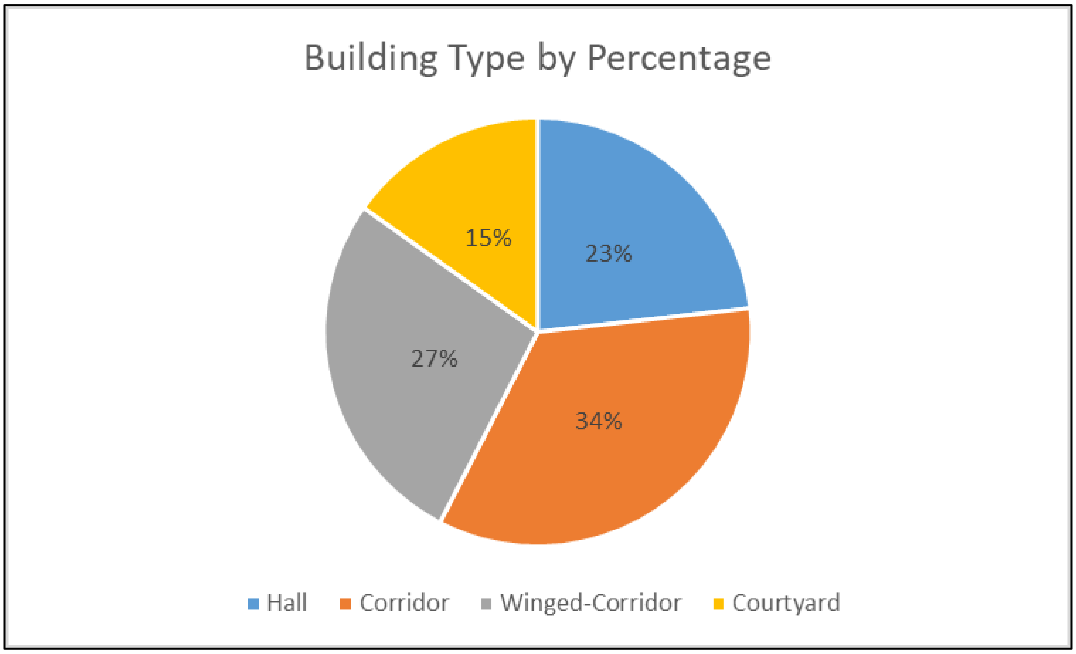

Figure 5. 6 - Building Types by Percentage of the Total Data Set

As with the Insular and Continental halves, the percentage breakdown of each structural type is fairly consistent in terms of proportion. *Corridor* structures comprise a plurality of the data, with halls and winged-corridor buildings holding fairly close to one another. *Courtyard* residences bring up the rear in the mid to high teens. To return specifically to the hall-type structures, relevant information about that particular category, including a breakdown by Insular and Continental subset, is summarized in **Table 5.7**.

Hall Structures	Number of Contexts	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA	Percentage with Hypocaust	Mean Start Date	Mean End Date
Insular	44	1.204545	9.022727	1.25	0.022727	1.154657	18.18%	188	262
Continental	37	1.216216	10.10811	1.432432	0.243243	1.237904	35.14%	107	281
Combined	81	1.209877	9.518519	1.333333	0.123456	1.192683	25.93%	151	271

Table 5. 7 - Space Syntax Results for Hall Structures

Comparing across the dataset, there is a certain uniformity to most of the information concerning the *hall-type* structures. The average number of structures and the average number of spaces per architectural complex are close enough in value as to almost be identical, for all intents and purposes. Similarly, the relative asymmetry of these buildings is also fairly consistent between the Insular and Continental portions, with a variation of 0.08 between the two. Deviation occurs noticeably in the mean number of courtyards per site. There is a significant difference in this value, 0.22, indicating that there is some factor accounting for this variation in architectural arrangement. While there are, generally speaking, fewer preserved secondary structures at Continental sites, as discussed in Chapter 4, it would appear that that pattern does not extend to the hall-type structures. So what, then, can explain the severe distinction between the number of courtyards present at hall-type structures? Since hall-type structures are most frequently associated with rural farmsteads, what is identified as a courtyard, in these cases, refers to the open space between structures in the spatial complex, rather than to any intentional act of architectural construction.[19] Due to functioning as a connective space in the architectural arrangement, these open areas are categorized in the data as courtyards, for lack of a better classification. For example, the villa at Bucknowle, in Dorset, preserves just such an open space

[19] See Percival 1976, Smith 1997, and Perring 2002 for more information on Roman domestic typologies.

in its earliest phase, shown in **Figure 5.7**[20].

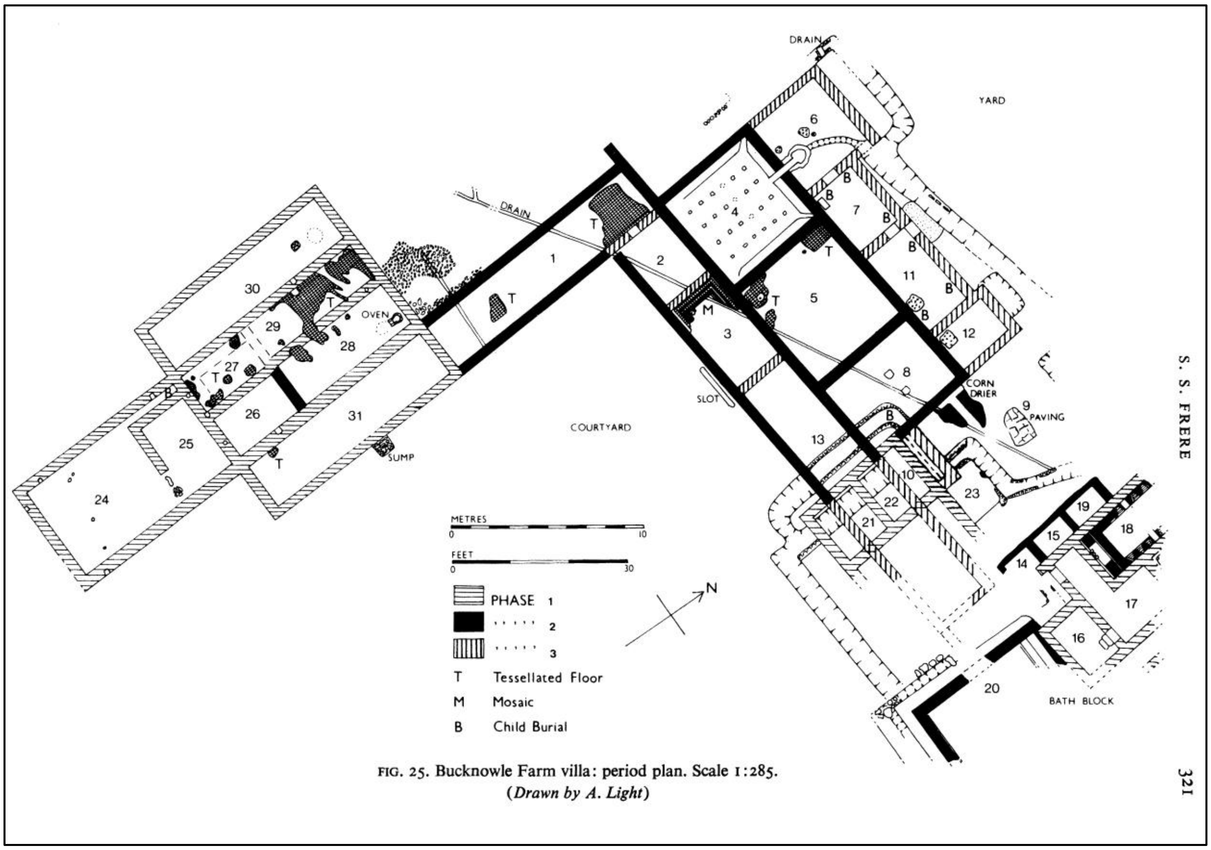

Figure 5. 7 - Bucknowle Farm

From **Figure 5.7**, it is apparent that the Bucknowle Farm complex has clear evidence for not only an open area labeled as a "courtyard" by the excavators, but also the remains of multiple structures in the earliest phase, suggesting that the courtyard was not merely a later addition to the complex, but a component of the initial plan. By way of possibly explaining the deficit in the British data for courtyard spaces at hall-type structures, it could be that such open areas are omitted from plans, or that there is, for some reason, a lack of information about larger spatial complexes at these relatively simple sites. Because the frequency of appearance for courtyards at other building types is more closely aligned between the Insular and Continental portions of the

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20 The image is from Frere 1984. See entries 18a through 18c in Appendix A.

data, it is compelling to ascribe this instance of deviation to either variation in how the information is published, or even possibly to inconsistency on the part of the current author in identifying these features in the available published plans.

In another instance of drastic dissimilarity between the two groups of archaeological sites in the data, there is a wide disparity in the percentage of hall-type sites preserving evidence for a hypocaust system. In some cases, as at Bucknowle Farm, the hypocaust is present in a separate bathing facility, while at others, the heating system is present inside of the main structure. Only 18 percent of British sites show evidence for hypocausts at these hall-type residences, compared to almost double that number, 35 percent, on the Continent. Again, such striking difference requires an explanation. Due to a lack of chronological patterning to the architectural types, which will be discussed shortly, there is no immediate reason which offers itself readily. Given the climatic conditions in Roman Britain, the rapid transition to in-home heating systems is often remarked upon by authors.[21] However, in the case of hall-type buildings, hypocausts appear much less frequently than in other structural types, including the aforementioned Continental examples of hall domiciles. The distinction from the other three categories of house, which are frequently more complex in their arrangement and tend to have more discreet spaces, can be explained away as being due to differences in complexity and scale, making the other building types more likely to have the space for hypocaust systems and bathing suites. However, that reasoning does not apply as a means of understanding the differing rates of hypocausts between British and northern European sites. It is possible that the key lies somewhere in the differing chronologies for these regions in terms of their interactions with and incorporations into the larger Roman Empire. Due to the earlier date of mainland Europe's colonization by the Romans,

[21] See Percival 1976 and Perring 2002.

occurring in the north during the reign of the emperor Augustus, it is feasible that the technology for in-home heating might reasonably be adopted sooner than in Britain, which was first conquered by the Romans under Claudius, and not fully pacified until the Flavian dynasty.

To turn to further matters of time and chronology, there does not appear to be a meaningful pattern to the dates of site settlement and abandonment. The mean dates for Britain are later for context occupation and earlier for abandonment compared to the mainland, but the temporal information does not seem to shed any meaningful light on questions of settlement patterns, apart from indicating that there is no chronological continuum to the adoption of certain structure types. When compared to the information from the other three building categories, which appears later in the chapter in their own tables, there appears to be no clear pattern. Courtyard buildings appear eleven years earlier, on average, than corridor structures in Continental Europe, while appearing at roughly the same time in Britain. As previously discussed in both Chapter 3 and Chapter 4, as well as in the correlation analysis earlier in the current chapter, there does not seem to be any meaningful connection between the chronological data and the other variables in the data set.

Corridor Structures	Number of Contexts	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA	Percentage with Hypocaust	Mean Start Date	Mean End Date
Insular	50	1.2	15.82	1.3	0.12	1.269872	40.00%	173	260
Continental	73	1.123288	14.50685	1.410959	0.150685	1.210506	36.99%	131	268
Combined	123	1.154472	15.04065	1.365854	0.138211	1.234638	38.21%	148	265

Table 5. 8 - Space Syntax Results for Corridor Structures

Turning next to the class of *corridor* structures, which hold a place of primacy in the data set through sheer weight of numbers, there is again a roughly level appearance to the data across the combined data. The mean number of structures and spaces is consistent, and the average number of courtyards per context has leveled out in comparison to the hall-type structures. The measure of spatial integration, RRA, has similarly balanced out, with the two groups sitting within 0.05 of one another. The overall relative asymmetry has slightly increased in comparison to the category of hall structures, but that is to be expected, given the greater relative complexity of corridor structures in comparison to the simpler and smaller halls. The percentages of locations with hypocausts has also increased, substantially in the case of the British examples. A full 40 percent of Romano-British sites with corridor-type features show evidence for heating systems, an increase of 22 percent over hall-type spaces. In comparison, the Continental material shows an increase of only two percent. Viewed in the context of the all of the building categories, it is clear that the hall structures as a group represent an outlier in terms of hypocausts appearing archaeologically. It is tempting to attribute this deviation to sample size or some other statistical means of discounting aberration, but the sample size for hall structures is robust, at 81 entries, and the courtyard category, which only has 55 examples, displays a greater degree of consistency between the Insular and Continental portions. Similar to the other categories, the chronological information for corridor sites does not appear to conform to a particular pattern. The third category, the winged-corridor villas, follow the example set by the corridor category.

Winged-Corridor Structures	Number of Contexts	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA	Percentage with Hypocaust	Mean Start Date	Mean End Date
Insular	57	1.438596	22.89474	1.719298	0.245614	1.273195	68.42%	216	285
Continental	41	1.121951	23.85366	1.634146	0.243902	1.260674	65.85%	130	267
Combined	98	1.306122	23.29592	1.683673	0.244898	1.267957	67.35%	180	277

Table 5. 9 - Space Syntax Results for Winged-Corridor Structures

Winged-corridor structures represent what is often described as a subset of the corridor group of domestic structures.[22] Presented as additions to the corridor-pattern, the wings, which appear alone or in pairs as architectural projections from the corridor core. To describe the wings as simple additions to a corridor structure is somewhat misleading, as there are examples where the wing appears to be an integral part of the architectural design from the beginning. One such example is the villa at Villars, in the Bourgogne-Franche-Comté region of France.[23] Shown in **Figure 5.8**, the villa shows an L-shaped bend in the longitudinal corridor, incorporating the projecting wing into the overall plan of the structure.[24] The metrics for winged-corridor structures are similar to corridor villas, except in regards to spatial complexity. The mean number of structures also varies, but in respect to region, with the Insular portion of the data ranging 0.31 points higher than the Continental information. The difference is explainable as a product of archaeological recovery, as the number of external structures does not meaningfully impact the other metrics, apart from the average number of entrances. The mean number of spaces per spatial complex is consistent across the data set, and is higher than the same measure for corridor structures, with only minor variation between the two portions of the data set.

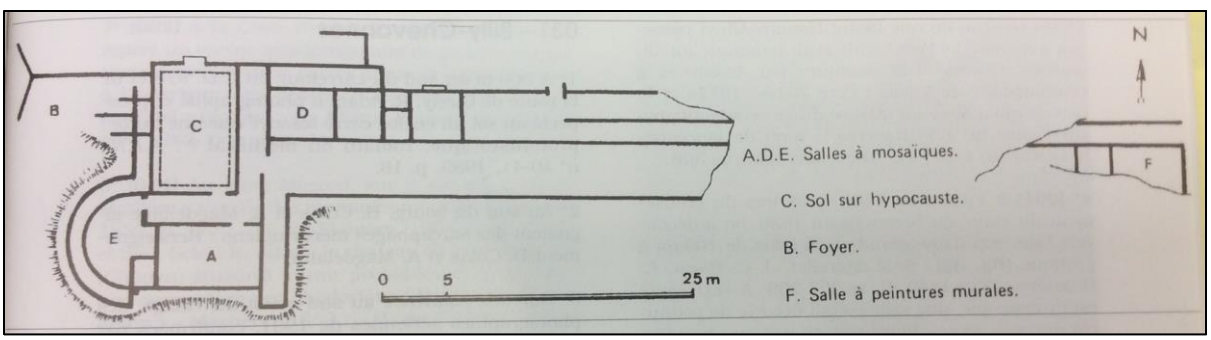

Figure 5. 8 - Villars, France

The measures of spatial integration and asymmetry are within 0.01 of one another, and

22 See Heimberg 2002/2003 and Perring 2002.
23 See entry 27 in Appendix B.
24 Plan from Bigeard 1996, 331.

practically identical. The same is true for the mean number of courtyards, with are even closer in value. Clearly, the deviation in the number of structures in a complex between the British and Continental sections of the data has had no impact on the calculated values of spatial integration. The percentage of sites with a hypocaust are likewise close in value, separated only by three percentage points. Both values are high, coming close to 70 percent of the total in the case of the Insular material. Similar to the material from the previous two categories, the chronological details show little pattern, with a wide range in origin dates, and a distinction between end dates that does not reflect a meaningful pattern. The final category, the courtyard structures, is the smallest and most complex in terms of spatial configuration. The details of the courtyard group are summarized in **Table 5.10** below.

Courtyard Structures	Number of Contexts	Mean # of Structures	Mean # of Convex Spaces	Mean # of Entrances	Mean # of Courtyards	Mean RRA	Percentage with Hypocaust	Mean Start Date	Mean End Date
Insular	19	2.052632	39.52632	2.473684	1.578947	1.315781	63.16%	172	288
Continental	36	1.111111	34.75	1.75	1.416667	1.219702	55.56%	120	263
Combined	55	1.436364	36.4	2	1.472727	1.252893	58.18%	138	271

Table 5. 10 - Space Syntax Results for Courtyard Structures

The smallest of the four categories of structure, the courtyard buildings present a clear distinction between the two regions, based on a number of measured categories, beginning with the number of examples in each group. The Continental portion of the data outnumbers the Insular by 36 to 19, while the average number of structures favors the British side by almost two to one. The amount of spaces in each structure is somewhat close, but still shows a wider spread in values than previous groupings, with the Insular portions average of around 40 to the Continental region's mean number of around 35. The number of entrances is also spread between the two, with the Insular category possessing around 0.7 more entrances on average. The average number of courtyards is likewise separated, in this case by 0.16. In terms of symmetry, or asymmetry, as the case may be, the two portions of the data remain fairly close, separated by only 0.1. These values portray an image of clear distinction between the two groups of courtyard structures. Even though the Insular examples only represent around 35 percent of the total, there is a clear trend of the British sites being larger and slightly more asymmetrical in comparison to the Continental majority. Similarly, there is a significant difference in the percentage of each portion preserving evidence of a hypocaust system. 63 percent of the British sites preserve heating technology, compared to around 56 percent on the mainland.

It is possible that these contrasts between the two sections of data are due to the difference in sample size. It is also possible that the distinctions are due to some other factor or factors. Given that the measure of relative asymmetry, which tends to vary based on sample size, remains fairly close between the two portions, it seems likely that sample size plays a relatively minor role in any difference between the two groups. How, then, to account for the difference? The variation in asymmetry measures can be attributed to a difference in the mean number of structures and entrances, which would account for the changes in integration of the spatial complexes. Likewise with the increased number of spaces. The increased percentage of sites with extant hypocausts is similarly connected to integration, as bathing rooms and suites tend to be segregated from the greater whole of the spatial complex.[25]

Broadly described, what differentiates the Insular and Continental portions of the data might best be attributed to differences in modern archaeological recovery between Britain and Continental Europe, with ancient distinctions among regional populations functioning as a secondary factor.. The principle metrics where the two groupings deviate relate to the physical

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[25] MacDonald 1986, 210-212.

evidence, rather than any reckoning of spatial configuration. Measures of the number of structures, spaces, and entrances relate to the excavation practices, unlike measures like RRA, which is wholly concerned with the relationship of rooms to one another. Consequently, it follows that the distinctions between the two regions point to an explanation unrelated to spatial organization. The posited reasons for such differences in archaeological practices are considered later in the chapter. Now, the attention turns to the lingering issue of chronology and temporal patterns, or lack thereof, in the data.

5.5 Temporal Patterns, or a Lack Thereof

Across the data set, regardless of how the data is subsetted or considered in relation to itself, there is a constant impression of irregularity in terms of chronology. Quite uncomfortable for the archaeologist who is trained to consider material culture in terms of time and the relationship of object and space to the progress of time, the lack of clear patterns can present a puzzle. However, from the data analysis in both this and the preceding chapters, it is apparent that there is no clear chronological relationship present in the gathered information. The correlation analysis between the variables in the data, both in this chapter and individually for the Insular and Continental data in Chapters 3 and 4, respectively, show that the only strong correlation of note relating to the chronological information is between the start and end dates for each context. This correlation has previously been explained as an artifact of how the temporal information was collected and structured, with centuries described in terms of numerical dates as a form of regularization. Thus, the numerous sites which list the third century as their period of occupation, for instance, all present the same beginning and end dates, hence the correlation between those variables.

Moving over to the closer examination of architectural types presented earlier in this chapter, there was no clear pattern to how those details related to one another, nor to how that information related to the architecture in particular. No explicit connections exist between form and time, both in terms of foundation and abandonment. Hall-type sites would appear on average in the late second century, only to be abandoned, on average, in the middle of the third. In other instances, sites would appear in the early second century and persist until the end of the third. In short, it would appear the data set encapsulated such a wide range of dates, that the information provided by the mean or average values presented no relevant information concerning patterning or trends to the adoption of specific architectural styles.

Looking at the data on a more granular level, at the scale of the individual spreadsheets, included as Appendices A and B, albeit in a curated form, the reasons for this lack of patterning becomes somewhat clearer. There is such a wide spectrum of dates, for both the start and end of occupations, that the calculated mean dates do not accurately encapsulate the entire span of occupation for the sites in the data. Other vacillations in the data, such as the frequency of appearance of multiple structures at a given site and the presence or absence of courtyards in a spatial arrangement. In order to be truly open about the achievements and limitations of the project, a certain degree of reflection on where exactly the data comes from is a fruitful avenue for discussion.

5.6 Archaeological Variations

As previously noted in previous chapters, there are differences in how archaeology has been undertaken in the modern nations which comprise the larger region of the current study. Variations in methodologies and intended project outcomes between commercial archaeology firms and academic-run field projects lead to differences in data collection and publication strategies. Time constraints and funding levels also provide constraints on what is feasible for a specific project to accomplish. Further limitations are imposed on the archaeological material by the realities of site preservation and intrusions or disruptions to that physical record of history. It is important to reiterate this point here, because it serves as a reminder that Roman archaeology, both within the northwest and beyond, is itself not a universal concept.

To return to the issue of the distinctions between the Insular and Continental segments of the data set, the first instance of note is the phenomenon of courtyards at hall-type structures. While not particularly common to begin with at this classification of domestic structure, the discrepancy in the frequency that courtyard spaces manifest between the British and mainland European portions is striking enough to merit comment. Earlier in the chapter, when the issue was first commented upon, it was noted that there appeared to be no clear explanation for the discrepancy between the British and European values for the average number of courtyards per archaeological context. To return to the hypothesis that the explanation might lie in the execution of the archaeology, or some other vagary of scholarly presentation or publication, it is possible that the secondary structures, which, in any cases, manifest as timber-frame structures, do not appear in the discussion of domestic spaces because those spaces are deemed to be irrelevant to those discussions. As Diederick Habermehl discusses in his research on the villa economy in the Dutch-German loess region, in the delta region at the confluence of the Meuse, Scheldt, and Rhine rivers, there has been an unfortunate trend in the scholarship of Roman domestic architecture to omit discussion of these ancillary, primarily economic, structures.[26] In Habermehl's own dataset, completely excavated villa complexes, what he refers to as "Data Class A sites," comprise only 22 percent of the data.[27] In the majority of cases, secondary

[26] Habermehl 2013, 21-23.
[27] Habermehl 2013, 22.

structures are only briefly noted or were not excavated at all.

Settlement prior to the Roman period is also usually ignored or only briefly mentioned in publications devoted to Roman housing, often only meriting a mention of such evidence's mere existence. For instance, the site of Grosses Terres, in the Centre-Val-de-Loire region of France, preserves evidence for an Iron Age round house.[28] As seen in **Figure 5.9**, the round house is noted in the drawn plan of the excavated Roman phase of occupation, with little mention in the text other than that the structure existed and its extent had been reconstructed on the provided architectural plan.[29] Granted, Grosses Terres was excavated in the late nineteenth century, indicating that perhaps the lack of interest is a product of the times, but such a case is not unique to sites excavated in that time period.

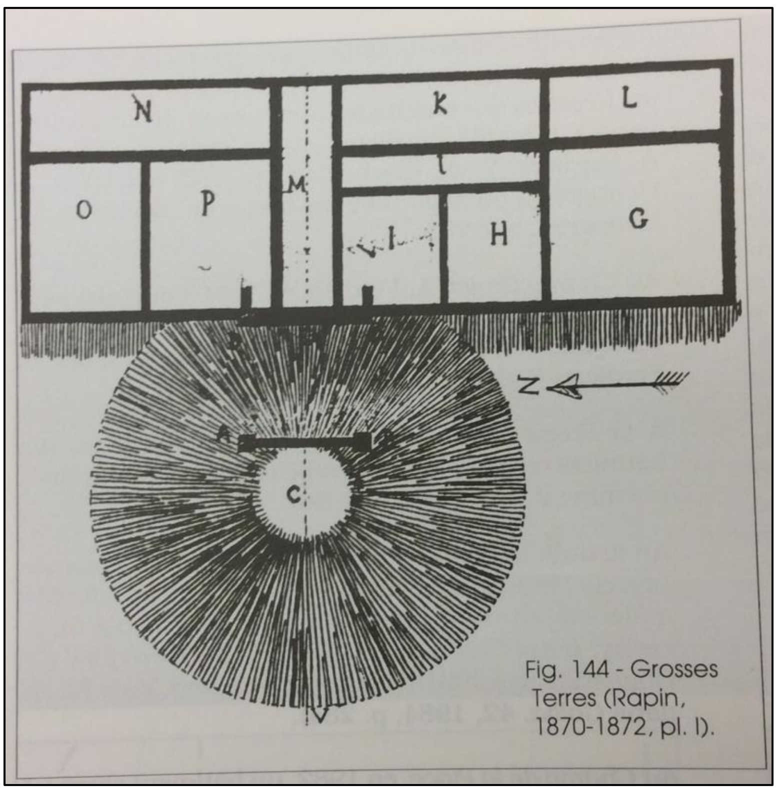

Figure 5. 9 - Grosses Terres, France

28 Provost, et al. 1992, 244.
29 Plan from Provost, et al. 1992, Fig. 144.

The implications of this lack of information on secondary structures on the current project relate to the perceived bias in the source material used to collate the data. An over-emphasis on monumental construction in stone, usually reserved for the construction of the main residential structure, naturally biases the discussion away from the role of these secondary spaces, and also away from meaningful discussion of Iron Age, pre-Roman settlement at these locations. Scholarly emphasis on Roman material, rather than on prehistoric, pre-Roman occupation strata, is also partly to blame for this omission. With auxiliary buildings removed from the minds of the excavators, or at least relegated to the sidelines, the greater extent of the spatial complex is truncated, particularly in published plans concerned primarily with showing Roman phases of occupation. Secondary structures, where they appear, are often associated with more complex structural types, such as courtyard villas and corridor houses, and contain features deemed noteworthy by excavators, such as hypocaust systems or mosaic tiling.

Given that these important economic spaces are crucial to the understanding of how the rural economy functioned in these areas, it is understandable that more attention has turned in that direction in recent years. The 2017 publication of the second volume of *The Rural Economy of Roman Britain*, which takes a close look at not only the structural remains of the rural economy, but also archaeobotanical and faunal remains, is representative of this recent trend in economic studies of the countryside.[30] However, the historical omission of these economic spaces from the corpus of scholarly publication does impact the present study, as noted earlier in the comparison of the architectural categories. Over-emphasis on monumental structures of Roman plan, to the exclusion of secondary structures and wood-frame constructions, seems to

[30] Allen, et al. 2017. See also Taylor 2007 for another comprehensive survey of the state of rural life in Roman Britain.

have led to a lack of published material on these peripheral, yet important, components of Roman domestic life. With that distortion in mind, it is possible to proceed with the examination of the data for some level of deeper meaning beyond the seeming negative results of the space syntax and network-driven pattern analysis.

Not appearing in the data, however, is any clear evidence of a chronological development of structural type or the appearance of certain architectural features. Roman building types and construction technologies appear to have been readily adopted once these regions were conquered and incorporated into the Roman imperial system. To turn to broader issues of Romanization, who, then, was occupying these seemingly Roman domestic spaces? It is apparent to most scholars that in many cases, rural farm sites show a continuity of occupation from the pre-Roman Iron Age into at least a portion of the Roman period.[31] Such continuance suggests that the occupants remained in place, adopting new means of construction as a means of performative display, showcasing their negotiated status and place in the new, Roman-oriented social hierarchy. The lack of information regarding small, portable finds, such as religious figurines or other markers of identity, hampers the specific discussion of the occupants' identities. However, at a wider resolution, the religious practices of the Roman northwest are understood from material remains of cult statues, temples, and other paraphernalia.[32] Likewise, the widespread practice of religious syncretism in this area of the Empire is understood and well-studied.[33]

From this foundation, it can be reasonably assumed that such religious practices, which appear to have been widespread, extend into the rural countryside of these new additions to the

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31 See Perring 2002 and Harding 2009.

32 See Henig 1984.

33 See De la Bédoyère 2002 and Rives 2007. See also Green 1989 and 1996 for the Iron Age and Celtic material, including syncretized images of Romano-Celtic deities.

Roman Empire. What, then, are the indicators in the domestic architecture that point to the inhabitation of provincial Romans, or indigenous inhabitants of the region who were incorporated into the Empire? There are no obvious indications that point to an Iron Age influence. The sites in the study all show a level of average consistency in terms of spatial arrangement, as measured by space syntax analysis. Similarly, there is not a strong distinction between urban and rural contexts.

Does this uniformity indicate that the inhabitants are adopting Roman architectural patterns to such a degree that their living spaces appear as if the occupants were Roman? Ursula Heimberg, in her discussion of rural villas in the region of the Hambach Forest in western Germany, notes a tendency for sites with continuous phases of occupation, such as the Hambach 512 villa, appear to transition from somewhat simple hall-type structures into more complicated spatial arrangements over time, adding corridors and wings, in some cases.[34] Heimberg also posits that it is possible to delineate the presence of indigenous peoples versus immigrants from elsewhere in the Roman Empire through the presence of commonplace landscape features.[35] The use of organic, earthen embankments as a means of land division or livestock penning, for instance, tends to accompany sites with evidence for pre-Roman occupation, whereas Roman transplants forgo such constructions and instead build rectilinear boundaries around their farmsteads.

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[34] Heimberg 2002/2003, 78-80. Hambach 512 appears in entries 111a and 111b of Appendix B.
[35] Heimberg 2002/2003, 69-71.

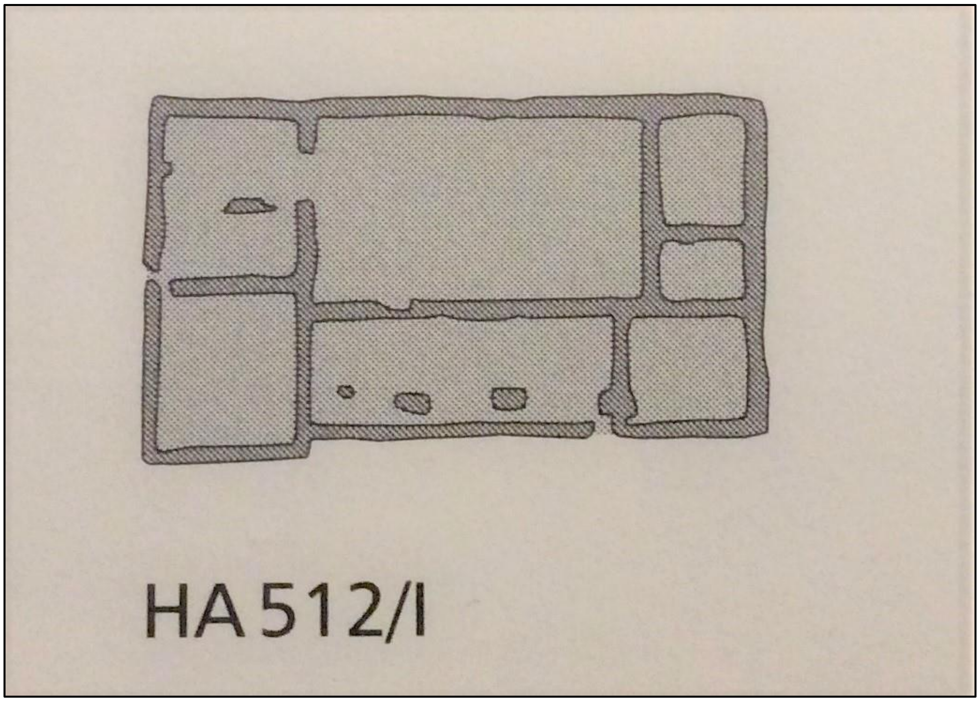

Figure 5. 10 - Hambach 512, Phase I

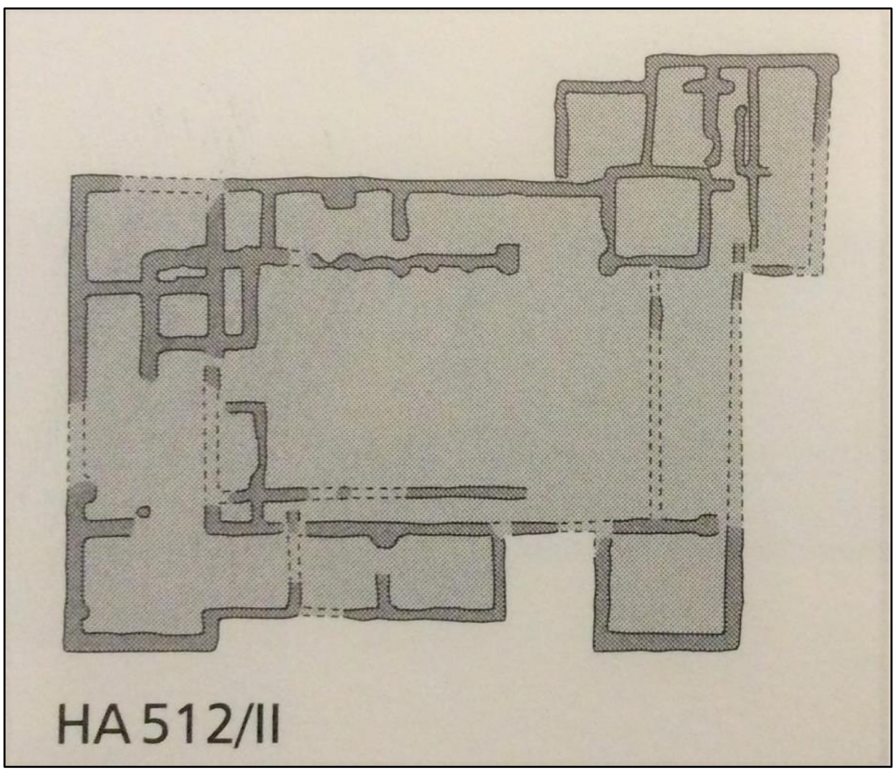

Figure 5. 11 - Hambach 512, Phase II

Unfortunately, such earthwork evidence is not widespread to the point of appearing in published architectural plans of Roman-style houses. Instead, perhaps the clues to the nature of these ephemeral inhabitants rests in the details of the architectural evolution of certain structures. To return to the Hambach 512 villa, reproduced here as **Figures 5.10** and **5.11**, the transition between the two phases occurs sometime in the middle of the second century. As described in Chapter 4, the simple corridor structure in the first phase is expanded upon, adding almost twice the number of rooms and expanding the complexity of the spatial arrangement. The increased scale and intricacy of the Hambach 512 villa in its second phase, points to a newfound necessity acting as the impetus behind that modification to the architecture. Some factor changed or shifted to compel such a drastic increase to the arrangement of the structure. One explanation could be an increase in wealth and possibly social standing, leading to a grander, more complicated residence. The shift could also be explained as part of a deepening cultural connection to a more Roman way of life. The period of this transition, as noted by Heimberg in her discussion of the site, is generally considered to be a time when larger, more typically Roman residences appear in the landscape.[36] In this scenario, the residents of this particular domicile in the Hambach Forest could easily hail from an indigenous community slowly negotiating a new way of life.

Such details reside in the individual sites, removed from view at the wide resolution of the quantitative, regional survey. In archaeology, the detail resides in the specifics. There is still information to be gained from surveys, particularly, in the present case, from a regional-level examination of spatial patterning. However, the data, due to a lack of resolution at scale, does not necessarily reveal the entire picture.

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[36] Heimberg 2002/2003, 95.

5.7 Conclusion

So what, then can the comparison of data tell scholars about the state of domestic architecture in the Roman northwest? At face value, a lack of patterning to the data appears disheartening and of little value to the workings of archaeological scholarship. However, much like how a negative shovel test pit can inform the wider archaeological survey of which it is a part, the lack of concrete chronological or region patterning to the data assembled as part of this study does provide some illumination to the understanding of how Romans, if the occupants could indeed be called that, lived and functioned within their domestic spaces. It is apparent that the inhabitants of northern Europe under the hegemony of Rome saw clear benefit to the adoption of Roman building technologies and spatial patterns of living. The widespread use of stone-foundation construction, coupled with rectilinear expressions of architectural space, markedly differentiate the material remains of domestic spaces from this period from what came before. Post-built wood and turf round-houses gave way to grander masonry expressions of *Romanitas*, while the implementation of sub-floor heating systems and mosaic pavements represented a turn toward Roman material culture. Even ignoring the evidence from small finds, such as brooches and ceramic vessels, as the present study does, the Roman influence is apparent.[37]

Reduced to the architectural remains, the historical understanding of Roman domestic life in the western and northern provinces has portrayed a dichotomy of indigenous people living in round, post-built structures, and Romans occupying rectilinear, stone constructions.[38] Even ignoring the evidence from the Iberian peninsula, where the Castro culture of the late Iron Age constructed masonry hilltop settlements with round domestic spaces, such a linear trajectory

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[37] See Henig 1995, specifically Chapter 4; See also Harding 2007 on Celtic influences on Roman art of Britain.

[38] See Harding 2009, 5-20 for a summary of previous treatments of indigenous Iron Age architecture.

over-simplifies the reality of the situation.[39] There is no hard limitation on construction technology tied to a specific culture in this region. Indeed, the existence of Roman-style villas in southeastern England, such as the complex at Fishbourne, around the time of the Claudian invasion in the mid-first century AD points to a more nuanced reality.

The assembled data on domestic contexts in northwestern Europe shows a lack of statistically significant patterning to the relationship between chronology and building type. Nor does there appear to be a clear impression of a unique, linear development of domestic architectural form tied to a specific region. What the data do show, based on correlation studies of data derived through network-based methods of pattern analysis, such as space syntax, is a uniformity to how domestic architectural spaces manifest in the archaeological record. Apart from variations that are attributable to idiosyncrasies of archaeological practice, the data shows that there is indeed a detectable spatial pattern to the use of space in Roman or provincial domestic contexts in northwestern Europe. This pattern does not show any meaningful change over time, but instead represents a consistency to the spatial arrangement of these residential structures throughout the tenure of the Roman Empire in the west.

Where, then, does the project go from here? The next chapter will discuss avenues for further development of the data, as well as opportunities for the inclusion of comparative material from elsewhere in the Roman world. As far as informing the present conversation on the nature of the Romanization phenomenon and debate within the archaeological community, the results of this research aligns with the conclusions of theorists such as Greg Woolf and Miguel John Versluys, that Romanization as a concept represents not the linear progression of one culture supplanting another, as Francis Haverfield initially posited, but rather a negotiated

[39] For an overview of the late Iron Age in Iberia, see Alvarez-Sanchis 2000, particularly the discussion of *oppida*.

position within the Roman socio-political system for newly incorporated populations.[40] Consequently, instead of a linear progression of less-Roman to more-Roman, it is understandable for the architectural data to display evidence for such a nebulous cultural shift.

40 Haverfield 1912; Woolf 1998; Versluys 2014.

Chapter 6

Conclusion:
People, Houses, and the Syntax of Space

6.1 The Time and Space of Roman Domestic Architecture

It is hoped that the data and attendant analysis presented as part of this study provide a clearer picture of what Roman domestic spaces in the provinces of northwestern Europe looked like, both collectively and, in some cases, individually. The "Roman house" represents a number of things, dependent on context. For the upper classes of the Roman aristocracy, the palatial home in the countryside represented a means of displaying social status, coupled with a carefully controlled shaping of the natural world, which was simultaneously exploited for economic gain. For the urban freedman, the domestic sphere often included commercial interests, blurring the line between residence and economic means of production and sustenance. And for the provincial, thrust into a wider world of Roman hegemony, the architecture of the home stood for a way of broadcasting identity and a sense of place in the new world order that surrounded them, at least for the wealthiest subset of society.

From the analysis of the data, there does not appear to be a temporal or geographic factor to how Roman architectural methods and arrangements in domestic spaces were applied in the northern provinces. There is similarly no clear trend to the appearance of architectural features such as baths at provincial Roman sites. However, the lack of a clear correlation belies an unexpected uniformity to the data. Instead of a direct, evolution of form in Roman provincial houses, there is instead a regularity that implies a degree of fuzziness to the shifting of cultural tides. Indeed, the lack of a clear trajectory of architectural change supports a model of cultural change driven not by a linear progression of less- to more-Roman, but instead a ready adoption of Roman architectural technology that hints at a degree of practicality on the part of the provincial population. Heated floors are useful in colder climes, after all.

While regular in their appearance across the region included in the study, the data do not properly showcase the fact that these domestic structures have different architectural designs than their antecedents in Italy and southern France, where the Roman *domus*-type is well-attested.[1] The inclusion of comparative data, drawn from Italy and other areas of the Roman Empire closer to the Mediterranean than the northern provinces, would illuminate that distinction, if it exists, from the point of view of space syntax analysis.

The conclusions to be drawn from the assembled data fall into two categories, quantitative and qualitative. The quantitative output of the project, along with the immediate, data-driven interpretation of those results, has previously been addressed in Chapters 3, 4, and 5. For example, thirteen percent of the Insular data, presented in Chapter 3, comes from urban contexts, while in comparison, only around nine percent of the Continental data, from Chapter 4, comes from similar contexts. Furthermore, while the sites of Mazières and Chassey-lès-Montbozon both present the same quantified measure of spatial arrangement, with RRA values of around 0.7, the two structures belong to different structural types and are of significantly different sizes, at 14 and 52 rooms, respectively.[2] To understand what those data points mean falls into the realm of qualitative interpretation, addressed here, in the concluding chapter. The potential significance of the analysis falls into two broad classifications, one dealing with the scale of the individual occupant and residence, a scale concerned with the specifics of spatial arrangement and its meaning. The other classification steps back, to examine the place of the

[1] See Timár 2011.
[2] For Mazières, see Provost, et al. 2009a; for Chassey-lès-Montbozon, see Faure-Brac 2002.

domestic structure in the wider landscape. Following those summary discussions, the potential for the further development and refinement of the project is discussed.

6.2 People, Houses, and the Syntax of Space

The scholarly literature on the viability of space syntax as a method of architectural analysis, both within archaeology and without, is myriad.[3] The specific criteria for space syntax to function in an archaeological environment, preserved floor plans and some documented understanding of socio-cultural norms and expectations, are available in the context of Roman-style houses. Indeed, the current study is one among a number of applications of space syntax to Roman material.[4] What sets the present analysis apart, however, is a matter of scale. With the validity of space syntax as an analytical approach in hand, what, then, does such analysis reveal about the people of the northern Roman provinces and the houses they inhabited?

From the data, it is apparent that the built environment of Roman residential life presents itself in a fairly uniform pattern across the northern provinces. The implications of that regularity are that there does appear to be a culturally-specific pattern to the spatial arrangement of this architecture. As previously noted in Chapter 5, such a relative flatness to the data appears indicative of a steady adoption of Roman practices and technologies, rather than a linear development from less civilization to more. This goes counter to previous assumptions that the incorporation of the northern areas of Europe into the Roman Empire brought with it a certain degree of civilizing influence, transforming the former barbarian Celts into productive Roman citizen.[5] The discussion surrounding the phenomenon of Romanization, then, becomes a little

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[3] For specific archaeological applications and critiques of space syntax, see Fairclough 1992 and Cutting 2006.

[4] See Grahame 1997, Simpson 2014, and Wiggins 2014.

[5] See Mommsen 1888; Haverfield 1912; Collingwood 1930; and Rivet 1969. All contain examples of a linear model of cultural change in Roman Europe.

richer and more nuanced with the injection of this study, its process, and results. Falling more in line with more recent archaeological scholars, such as Peter van Dommelen, Miguel Versluys, and Greg Woolf, a more detailed, negotiated process of cultural assimilation and identity formation runs in keeping with current scholarship and against the traditions of the early twentieth century.

It would appear, then, that the people who constructed and inhabited these residences in the Roman north were ready adopters of Roman material culture and ways of living. However, it is likely that this presents a self-fulfilling premise, as it does not include those members of the population who continued the pre-Roman way of life.This conclusion matches the understanding about the pre-Roman Iron Age communities of the region, reached from an examination of Roman trade goods and the adoption of Roman architectural forms before Roman conquest of the region, as seen at Fishbourne in England.[6] The specifics of identity are elusive archaeologically, especially in situations lacking the more nuanced information afforded by small finds, as is the case in this study. At urban sites such as Silchester in England and Amiens in France, there has been ample information preserved regarding the artifacts of everyday life.[7] The same is true for rural sites, such as Fishbourne and the villa at Mayen in Germany.[8] Unfortunately, such rich material records do not exist for every site in the area isolated for the current study. However, the conclusions drawn from the architectural information highlight that there are some markers of personal and collective identity to be found in even the grossest of archaeological remains. For example, at the villa at Presles, in France, shown in **Figure 6.1**, there is an intention to the inclusion of a covered portico along the front of the structure, which

[6] For more on the pre-conquest Roman trade in the region, see Harding 2007 and Van Oyen 2015 and 2016.
[7] See Clarke and Fulford 2002; Pichon 2009.
[8] Cunliffe 1971; Heimberg 2002/2003.

not only separates the interior of the residence from the elements and weather, but also screens that same interior from view, quite unlike the axes of spatial display found in elite Roman homes in the Mediterranean.

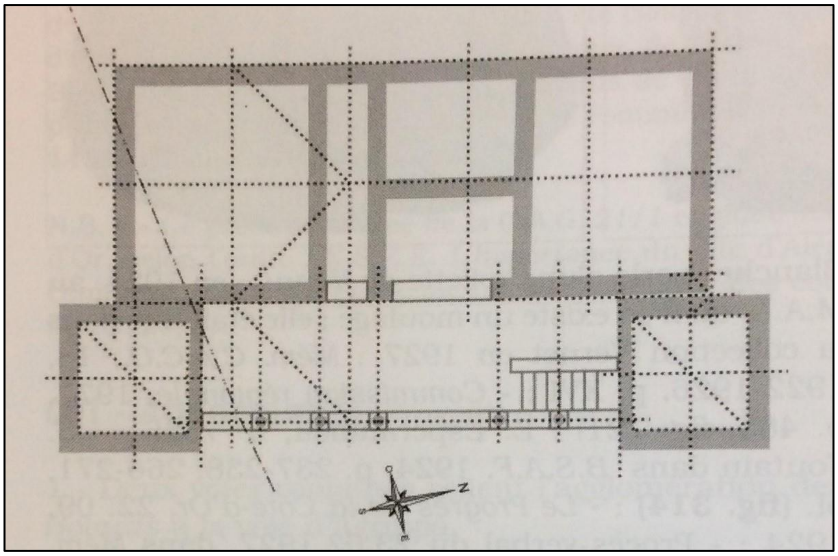

Figure 6. 1 - Presles

In contrast, at the villa at North Leigh, in Oxfordshire, shown in **Figure 6.2**, there is a prominent display of social status on display through the architecture.[9] There is a gateway, which funnels visitors into a large central courtyard, whereupon the full extent of the large villa presents itself.

The domicile at Presles contains only nine spaces, in contrast to the ninety-eight found at North Leigh. To further set the two residences apart, Presles lacks a courtyard and hypocaust system for heating, while both architectural features are on display at the lavish Oxfordshire villa. However, the two sites remain unified through a key characteristic. Both locations have spatial patterns, reflected as Real Relative Asymmetry values, measured at around 1.15. Despite drastic differences in scale, location, and architectural manifestation, there is a uniformity to how the spaces are arranged, from a quantitative point of view.

9 Plan from Wilson 2004, 79.

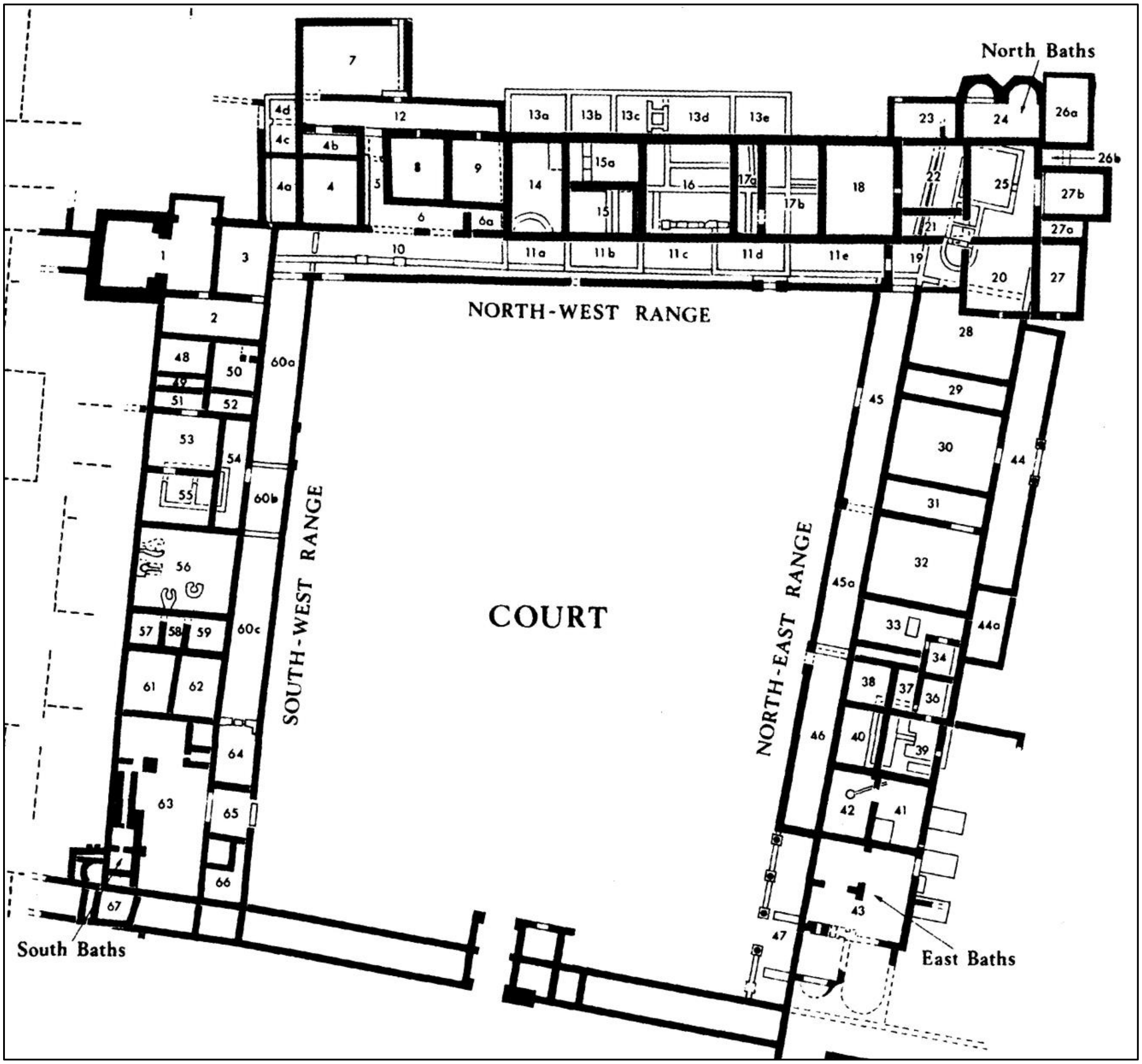

Figure 6. 2 - North Leigh

The spatial organization of the house is a reflection not only of the practical division of space for an individual occupant or family, but also a marker of cultural specificity and a signal of cultural inclusivity.[10] The close alignment of the houses in the data set, in aggregate, point to

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10 See Anna Boozer's chapter in Sabine Huebner and Geoffrey Nathan's recent publication on the ancient Mediterranean family. Boozer 2017; Huebner and Nathan 2017.

a degree of cultural uniformity, or at least similarity, across the northern region of the Roman Empire. Whether or not the inhabitants of those dwellings identified themselves as Roman, non-Roman, or something in between, is unclear, and quite possibly out of reach from the perspective of the archaeologist. However, the information provided by space syntax analysis illuminates the understanding of how those provincial populations navigated the architecture of their daily lives and used that spatial canvas as a means of signaling inclusion into a larger group, one clearly expressing Roman building technology and ways of organizing space.

6.3 Houses in the Built Environment and Rural Landscape

The archaeological record, as discussed in previous chapters, takes on different forms, with varying degrees of completeness, at different locations across northwestern Europe. The starkest contrast in available information comes in the comparison of urban sites to their rural cousins.[11] The tight confines of the urban excavation have long limited the inquiries of archaeologists. In contrast, rural excavations and survey projects enjoy the advantages of space and relatively limited human intervention in the landscape, at least in comparison to urban areas. It is therefore unsurprising to see that distinction reflected in the data during analysis. The limited available data on urban residences resulted in a reduced representation in the final data set. Additionally, those urban sites that were included were in many cases fragmentary or not completely excavated, which could have further skewed the sampling of urban material. Recall the fragmentary nature of the urban space presented from Caerwent in Chapter 3, reproduced here as **Figure 6.3**. Surprisingly, there was also a bias found in the rural sites during correlation analysis, noted for the greater incidence of multi-structure sites in comparison to those in urban

[11] For more on the subdiscipline of urban archaeology, see Staski 1987; See Woolf 1998, 116-120 on the distinction between urban and rural environments in the Roman northwest.

settings.

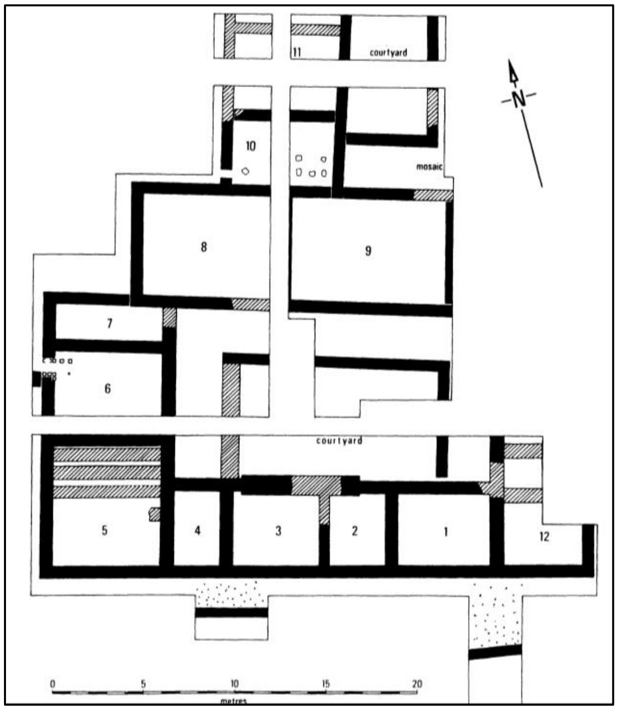

Figure 6. 3 - Caerwent, Insula I

In the course of comparing the Insular and Continental portions of the data set, it became apparent that there was a far greater rate of recovery in British contexts concerning the secondary structures that usually attend rural domestic spaces. Attributable to variations in archaeological practice, the lack of these ancillary buildings had a noticeable impact on the data, making a visible appearance not only in the correlation analysis, but in the tabular data, as well. A clear example of this is found at Littlecote Park, in Wiltshire.[12] Littlecote Park, a rural site in Britain, preserves evidence of at least two secondary structures. In contrast, the Continental site of Les Caves, in France, while also a typical rural villa with agricultural function, has no recorded data regarding any buildings other than the main residence.[13] Such was the case in comparing sites of

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[12] See Frere, et al. 1992, 255-323.
[13] See Delor 2002b, 529.

rural provenance from Britain to those from the Continent, found in Appendices A and B. From the material in the tables, where the initial data collection was performed, there is a clear disparity between the two halves of the data in terms of how many rural sites contain more than a single structure. It is possible that the absence of these spaces biases the final analysis to a certain degree. However, in noticing such missing components of a spatial complex, it is possible to account for such gaps in the interpretation of the data, as occurred in the present case.

The meaningful question, then, is what are the implications of this study for the broader understanding of Roman domestic architecture in the wider landscape? The information and material considered as part of this study shows a situation in the northern provinces similar to that found elsewhere in the Empire, of an urbanized society, nucleated in settlements across a landscape dotted with agriculturally-productive residences and luxury, conspicuous residences for the elite. In that sense, the view from the provinces matches that from the center of the Empire. However, unlike in the *latifundia* system of the late Roman Republic, the rural landscape in the imperial provinces of the north is of a more distributed, smaller-scale agricultural model, lacking the large, centralized estates of the wealthy, at least in the numbers presented in Italy by the Latin authors.[14] The situation in the urban centers is similar. There are few city residences that match the scale of some of the homes found at Pompeii, but the mixture of commercial and residential function is familiar.

The role of the landscape, while not an explicit part of the study's design, remains an important contextual consideration in the interpretation of the data, both after analysis and at the level of the individual site. The next consideration is: where to go next? In what direction does

14 The *latifundia* system was a large-scale system of centralized agriculture that developed during the late Republic, consolidating land ownership and exploitation into the hands of fewer and fewer members of the Roman aristocracy, see Dyson 2003; see Varro, *Res Rustica*.

the project evolve and develop? There are a number of considerations that inform that decision, from the perceived limitations and shortcomings of the study as it currently stands, to ideas of expanding the data and enhancing the analytical approaches.

6.4 Future Directions

While the analytical methods employed in the course of this study are derived from both space syntax and other network-based approaches, there are a number of other directions and avenues that remain to be explored, both in terms of content and in expanding the methodology. The published literature on network analysis in archaeology continues to expand, but the specifics of how specific research projects employ network principles continues to proceed in an ad hoc fashion. Despite calls for more formalized use of network approaches in archaeology, many of the methods and statistical tests are borrowed from other disciplines, such as social network analysis in sociology. Tom Brughmans has advocated for a more formalized application of network science to archaeological materials, but it remains unclear if this need has or will be answered in the short term.[15] Carl Knappett has similarly pressed for a more formal application of network theory to archaeological material, and is joined by other archaeologists, such as Shawn Graham and Iza Romanowska.[16] Network methods offer a flexibility, not only in terms of potential applications at a methodological level, but also at different levels of granularity, using different types of material culture. Astrid Van Oyen examines pottery trade distribution networks across the Roman Empire, while Iza Romanowska's research is concerned with modeling past structures and simulating agents inhabiting those theoretical constructs.[17]

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15 Brughmans 2013a, 641.
16 Graham 2006; Knappett 2011, 56; Romanowska 2015.
17 Romanowska 2015; Van Oyen 2016.

An obvious direction to take this project is to compose more formally the network methods employed to think through the pattern analysis of the space syntax results. The immediate expansion of the analysis of the domestic spaces of the Roman northwest would be to locate usable geospatial information regarding many of the sites in the Continental portion of the data. As previously noted in the data chapters, the coordinates for the British contexts are readily available through cultural heritage databases and publications, but the same is not true for the mainland sites. Given more time to collect data, it is possible that the missing locational information could be determined and incorporated.[18] With geospatial data for the entire corpus in hand, the next step would be to transition the assembled information into a geodatabase, which would, in turn, enable the visualization of the data on maps, using a Geographic Information System (GIS).

From an accurate map of the distribution of Roman domestic sites in the northwestern provinces, there are a number of ways to proceed. Network analysis methods can accommodate both temporal and spatial dimensions, which, given proper geospatial data, would assist in better visualization of the collected material. The main problem with network diagrams, and why such representations were omitted from the present study, is that they are unwieldy to look at and difficult to parse for information. However, with geolocated data and attached chronological markers, it would be possible to create more refined visualizations, ones that showed change over time and across space, which would better represent the information. Additionally, further refinement of the data would enable more nuanced analysis of that information, perhaps adding a layer of granularity to the analysis, either temporal or spatial, that is missing from the project's

[18] Resources such as Topostext, an online repository of geospatial data, are promising places to start, in the case of Topostext, which visualizes ancient place locations from textual sources, many of the domestic locations analyzed in the present study do not appear in ancient literature. Topostext can be found at www.topostext.org.

results as they stand presently.

A second, and perhaps even more obvious, heading for the project to take would be to incorporate additional data. Domestic contexts from northern Europe are well-represented, but the remainder of the Roman world could be an area of ready expansion, adding material from other provinces to the data set as a means of widening and formalizing comparisons. With its Celtiberian prehistory, Roman Spain and Portugal are easy areas in which to expand, but there is no reason why other regions in the eastern areas of the Empire could not be considered as well. For example, the terrace houses at Ephesus in Ionia (western Turkey) or the elite Roman houses of Khirbet Qumran in modern Israel would be ready additions to the data collected from domestic contexts of the Roman north.[19] An additional comparison is to examine the Insular material from Roman Britain against another island culture in the Roman Empire, such as Cyprus or Majorca.[20] Similarly, the addition of comparative material from Italy and other regions with a longer tenure as part of the Roman state, as previously noted, would enhance the understanding of how the domestic material from the Roman northwest stands in comparison to material from earlier and more central segments of the Empire, such as Pompeii, where the evidence is well-studied and plentiful.

To look in another direction, it would also be illuminating to take perhaps a half dozen of the sites examined in the present dissertation and examine those locations in more detail, wedding the space syntax analysis with the geospatial data and the recovered finds. Through closer examination, such a process would reintroduce the individual inhabitants into the architecture, where space syntax analysis and a regional frame of scale have stripped those

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[19] For houses at Ephesus, see Billings 2011; For Qumran, see Hershfeld 1998; and Magness 2003.

[20] See the recent edited volume by Anna Kouremenos for more on island archaeology of the Roman Empire. Kouremenos 2018.

occupants away. In doing so, it would be possible to further explore questions concerning identity, entanglement, and cultural interaction in these domestic spaces in a more meaningful and robust way, and in doing so, return the wider data-driven analysis to a firmer grounding in archaeological detail.

In terms of categories of evidence, the current data set omitted military housing, which represents another area of deep scholarly interest, especially in Britain. The inclusion of Roman military architecture, such as barracks blocks at sites such as Vindolanda, presents another kind of comparative evidence to place against the civilian contexts presented here. Roman military housing, generally located in forts and other specific contexts, include a number of parallels to civilian houses. The *praetoria*, or commander's residence, often appears similar in plan to upper class Roman houses, while barracks blocks provide another example of dense residential architecture from the Roman world.[21] It is easy to imagine how such a comparison could shed light on another segment of society, placing the material footprint of the civilian family in juxtaposition with the dwellings of the Roman army.

More conceptually, the network principles used to compose this dissertation's methodology are easily applied to other kinds of material culture, architectural or not. There are a number of researchers who have applied network studies to ancient material, such as Astrid van Oyen's work on amphorae distributions and trade in the Roman West, which show that archaeology as a field is a fertile ground for the application of network methods.[22] Another example is Søren Sindbaek's analysis of trade goods among medieval Viking settlements.[23]

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[21] For an overview of Roman military sites in Britain, see Bishop 2013. For greater detail on the specifics of daily life in the Roman military, see Gardner 2007.

[22] Van Oyen 2016. See also Shawn Graham's application of networks and agent-based modeling to the Antonine Itineraries, Graham 2006.

[23] Sindbaek 2007.

Studies such as these prove the potential for network-based methods in archaeology and showcase the strength and flexibility of such approaches.

6.5 Summation

It is easy to jump to conclusions in the examination of archaeological finds, and nowhere is this easier to do than in the interpretation of quantitative data. For example, Bonnie Hole, a statistician, critiques computer-driven sampling in archaeology, arguing that statistical samples are often presented without a critical eye to method and results.[24] Mark Aldenderfer, an archaeologist of the Andes and Tibet, despairs of archaeological practices of crafting bespoke analytical methods that are applicable to only a single project or set of data.[25] On the other hand, Melanie Mitchell, a computer scientist, defends the use of computational, data-driven approaches, as does Timothy Kohler, an archaeologist of the American southwest.[26] Both Mitchell and Kohler argue that complexity cannot properly be modeled without technological assistance, particularly regarding human behavior in the archaeological record. The desire to find patterns in data, regardless of statistical significance or even actual existence of those trends, can be overwhelming. However, the quantitative methods employed in the analysis of the assembled data on the domestic contexts of the Roman northwestern provinces reveals some statistically significant patterns, in some ways verifying the initial research questions, and in regards to others, not matching expected or anticipated results.

It is clear from the aggregation of the space syntax results that there appears to be a culturally-specific pattern to how space is laid out and how those arrangements interact internally

[24] Hole 1980, 220.
[25] Aldenderfer 1998, 93.
[26] Mitchell 2009, 253-255; Kohler 2011.

within themselves, at least in the domestic sphere. This measure is quantified and regularized by the Real Relative Asymmetry metric, the primary output of space syntax access analysis. To the corollary of that question, regarding the idea of change over time in those spatial arrangements, it would appear that there is no such evolution or development present, based on the analyzed information. Also, the matter of change across space, whether the analysis produced different results in the Insular and Continental portions of the data set, showed a similar lack of patterning. At face value, it would appear that one research question received a positive result, while the ancillary questions achieved negative outcomes. However, the lack of correlation between the variables is more impactful than it may appear. Without a clear, visible evolution of domestic spaces in northwestern Europe, we must turn to more detailed and complex hypotheses to explain the presence of Roman-style domestic structures in the Roman northwest. With the firm, quantified data produced by this dissertation's analysis, it is possible to push forward with more nuanced interpretations of cultural change along the northern borders of the Roman Empire.

More importantly than matters of methodological outcome is the remaining research question, which asks the broader inquiry concerning the implications of these results for the wider field, specifically in regards to the topic of cultural change and assimilation of the provincial or frontier populations into the Roman Empire. The question is not unique to the northwestern provinces, as the Dacian frontier was home to a sizable indigenous population, as was areas of Anatolia, which had a significant Celtic population residing in the interior.[27] On that count, the lack of a clear trend of change in the data still sheds some light. The absence of a clear pattern seems to indicate that instead of a measured, top-down exertion of Roman cultural practices and material goods, the region underwent a negotiated adoption of Roman building

[27] See Mitchell 1995 for more on the Celts in Anatolia. See Oltean and Hanson 2007 on Roman houses in Dacia

technologies and spatial arrangements. This interpretation supports the earlier conclusions of Greg Woolf and Peter van Dommelen, among others, who argue for an entanglement of cultures, rather than a steady supplanting of the non-Roman by the Roman.[28]

While the addition of another voice to the chorus of scholarly consensus on the subject of Romanization as a phenomenon and representation of cultural contact and assimilation in the Roman provinces and along the frontiers of the Empire does not represent a tectonic shift in the academic literature, the addition of a quantitative, statistically-grounded approach to the material remains of an entire region contributes a certain weight of its own. The inclusion of domestic remains, long held as a marker of Roman cultural presence, on such a large scale as achieved by the present study, makes the addition of the project's accumulated information all the more valuable.

An important contribution of this dissertation is in the scale and quantity of legacy data that has been collated for the purposes of this analysis. The complexities of bringing that data together, from disparate sources collected with equally divergent methods and standards, are often hidden from view from all but those initiated in the arcane practices of data collection and cleaning. Even the manner in which chronological dates are established and expressed in archaeological literature can produce frustration and labor for the data curator. If one site produces a detailed, seriated chronology grounded in pottery data, while another is centered on a single numismatic find, rectifiying those elements in a broader data set presents challenges to the analyzer which compound as the size of the data set increases. In assembling such a complex and diverse data set, pulled from published and unpublished sources, not only represents a triumph of archival and data curation work, but also brings the data itself out from the shadows and into the

[28] Woolf 1998; Van Dommelen 2014.

scholarly discourse.

The establishment of sound methodological practices and analytical workflows will enable the expansion of this examination of Roman domestic spaces in northwestern Europe to eventually include comparative material from other regions of the Roman world. This would allow for further testing of the research questions, and push those inquiries in new and unexpected directions. The network-based methods employed in this study represent only a fraction of the potential such approaches hold for the study of Roman archaeology. In a sense, this study, narrowly focused on the Roman northwest between the first and fifth centuries AD, serves not only as a proof of concept, but as a beginning point for future research, building on the methods and data presented here as a means of furthering academic investigations of the Roman north and the people who called it home.

Bibliography

Agache, R. 1978. *La Somme préromaine et romaine d'après les prospections à basse altitude.* Amiens: Société des Antiquaires de Picardie.

Aldenderfer, M. 1998. "Quantitative Methods in Archaeology: A Review of Recent Trends and Developments." *Journal of Archaeological Research*. Vol. 6(2): 91-120.

Allen, M. and N. Sykes. 2011. "New Animals, New Landscapes and New Worldviews: The Iron Age to Roman Transition at Fishbourne." *Sussex Archaeological Collections* Vol. 149: 7-24.

Allen, M. L., et al. 2017. *The Rural Economy of Roman Britain*, Vol. 2. Britannia Monograph Series, Vol. 30.

Allison, P. 2001. "Using the Material and Written Sources: Turn of the Millennium Approaches to Roman Domestic Space." *American Journal of Archaeology* Vol. 105(2): 181-208.

Allison, P. 2007. "Domestic Spaces and Activities." in J. J. Dobbins and P. Foss, eds. *The World of Pompeii*. New York: Routledge.

Amati, V., et al. 2018. "Reconstructing Archaeological Networks with Structural Holes." *Journal of Archaeological Method and Theory* Vol. 25: 226-253.

Alvarez-Sanchis, J. 2000. "The Iron Age in Western Spain (800 BC - AD 50): An Overview." *Oxford Journal of Archaeology* Vol. 19(1): 65-89.

Anderson, M. 2005. "Houses, GIS and the Micro-Typology of Pompeian Domestic Space." In J. Bruhn, B. Croxford, and D. Grigoropoulos, eds. *TRAC 2004: Proceedings of the Fourteenth Annual Theoretical Roman Archaeology Conference, Durham 2004*: 144-156.

---------------. 2013. "Computer Technologies and Republican Archaeology at Pompeii." in J. D. Evans, ed. *A Companion to the Archaeology of the Roman Republic*. Oxford: Blackwell: 581-597.

Applebaum, S. 1975. "Some Observations on the Economy of the Roman Villa at Bignor, Sussex." *Britannia* Vol. 6: 118-132.

Arnold, B. 2000. "A Transatlantic Perspective on German archaeology." in H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 398-422.

Baker, T. 1845. "Roman Villa, Discovered at Bisley, Gloucestershire." *The Archaeological Journal*, Vol. 2(1): 42-45.

Barnes, J. and F. Harary. 1983. "Graph Theory in Network Analysis." *Social Networks* 5(2): 235-244.

Barrett, J. C. 1997a. "Romanization: A Critical Comment." D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 51-64.

Barrett, J. C. 1997b. "Theorising Roman Archaeology." In K. Meadows, C. Lemke, and J. Heron, eds. *TRAC 96: Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield 1996*: 1-7.

Barton, I. 1996. "Introduction." in I. Barton, ed. *Roman Domestic Buildings*. Exeter: University of Exeter Press.

Basaran, T. 2007. "The Heating System of the Roman Baths." *ASHRAE Transactions*. DA-07-021.

Bastian, M., S. Heymann, and M. Jacomy. 2009. "Gephi: An Open Source Software for Exploring and Manipulating Networks." *International AAAI Conference on Weblogs and Social Media*.

Beard, M. 2007. *The Roman Triumph*. Harvard: Harvard University Press.

Beattie, I. H. and W. J. Phythian-Adams. 1913. "A Romano-British House near Bedmore Barn, Ham Hill, Somerset." *The Journal of Roman Studies*, Vol. 3, Part 1: 127-133.

Bechert, T. 1982. *Römische Germanien zwischen Rhein und Maas*. Munich.

Becker, J. A. "Villas and Agriculture in Republican Italy." in J. D. Evans, ed. *A Companion to the Archaeology of the Roman Republic*. Oxford: Blackwell: 309-322.

Bénabou, M. 1976. *La résistance africaine à la romanisation*. Paris: Maspero.

Benech, C. 2007. "New Approach to the Study of City Planning and Domestic Dwellings in the Ancient Near East. "*Archaeological Prospection* Vol. 14: 87-103.

Berry, J. 2016. "Boundaries and Control in the Roman House." *Journal of Roman Archaeology* Vol. 29: 125-141.

Bersu, G. 1940. "Excavations at Little Woodbury, Wiltshire." *Proceedings of the Prehistoric Society*. Vol. 6: 30-111.

Bertram, M. 1991. "Zur Situation der deutschen Un- und Frühgeschichtsforschung während der Yeit der faschistischen Diktatur." *Forschungen und Berichte der Staatlichen Museen* (East Berlin) 31: 23-43.

Bewley, R. and M. Fulford. 1996. "Aerial Photography and the Plan of Silchester ('Calleva Atrebatum')." *Britannia* Vol. 27: 387-388.

Bigeard, H. 1996. *La Nièvre*. Carte archeologique de la Gaule, Vol. 58. Paris: Académie des Inscriptions et Belles-Lettres.

Billings, B. 2011. "From House Church to Tenement Church: Domestic Space and the Development of Early Urban Christianity − The Example of Ephesus." *The Journal of Theological Studies*, Vol. 62(2): 541-569.

Binford, L. 1962. "Archaeology as Anthropology," *American Antiquity* Vol. 28: 217-25.

Binford, L. 1965. "Archaeological Systematics and the Study of Culture Process," *American Antiquity* Vol. 31: 203-10.

-------------. 1977. *For Theory Building in Archaeology*. New York: Academic Press.

Binford, S. 1968. *New Perspectives in Archaeology*. Chicago: Aldine Publishing Company.

Bintliff, J. 2004. "Time, Structure, and Agency: The Annales, Emergent Complexity, and Archaeology." In J. Bintliff, ed. *A Companion to Archaeology.* Oxford: Blackwell: 174-194.

Bishop, M. C. 2013. *Handbook to Roman Legionary Fortresses*. Barnsley: Pen and Sword Military.

Blagg, T. F. C. 1990. "First-Century Roman Houses in Gaul and Britain." In T. F. C. Blagg and M. Millett (eds.). *The Early Roman Empire in the West*. Oxford: Oxbow: 194-209.

Bogucki, P. 1985. "Theoretical Directions in European Archaeology," *American Antiquity* Vol. 50: 780-8.

Boozer, A. 2017. """Towards an Archaeology of Household Relationships in Roman Egypt." in S. Hueber and G. Nathan, eds. *Mediterranean Families in Antiquity: Households, Extended Families, and Domestic Space*. Malden: Wiley Blackwell: 174-203.

Borgatti, S. 2005. "Centrality and Network Flow." *Social Networks* Vol. 27(1): 55-71.

Bouvet, J.-Ph., et al. 2001. *La Sarthe*. Carte archeologique de la Gaule, Vol. 72. Paris: Académie des Inscriptions et Belles-Lettres.

Bradley, R. 2006. "Bridging the Two Cultures - Commercial Archaeology and the Study of Prehistoric Britain." *The Antiquaries Journal*, Vol. 86: 1-13.

-------------. 2012. *Ritual and Domestic Life in Prehistoric Europe*. London: Routledge.

Brogan, O. 1936. “Trade between the Roman Empire and the Free Germans.” *The Journal of Roman Studies,* Vol. 26, Part 2: 195-222.

Bromwich, J. 2003. *The Roman Remains of Northern and Eastern France: A Guidebook.*

Broodbank, C. 2000. *An Island Archaeology of the Early Cyclades*. Cambridge.

-----------------. 2013. “’Minding the Gap’: Thinking About Change in Early Cycladic Island Societies from a Comparative Perspective.” *American Journal of Archaeology* Vol. 117(4): 535-543.

Brothers, A. J. 1996. “Urban Housing.” in I. Barton, *Roman Domestic Buildings*. Exeter: University of Exeter Press.

Brughmans, T. 2010. “Connecting the Dots: Towards Archaeological Network Analysis.” *Oxford Journal of Archaeology* Vol. 29 (3): 277-303.

Brughmans, T. 2013a. “Thinking Through Networks: A Review of Formal Network Methods in Archaeology.” *Journal of Archaeological Method and Theory* Vol. 20: 623-662.

-----------------. 2013b. “Networks of Networks: A Citation Network Analysis of the Adoption, Use, and Adaptation of Formal Network Techniques in Archaeology.” *Literary and Linguistic Computing* Vol. 28(4): 538-562.

Brughmans, T. and J. Poblome. 2012. “Pots in Space: Understanding Roman Pottery Distribution from Confronting Exploratory and Geographical Network Analyses.” in E. Barker, S. Bouzarovski, C. Pelling, and L. Isaksen, eds. *New Worlds Out of Old Texts: Developing Techniques for the Spatial Analysis of Ancient Narratives*. Oxford: Oxford University Press.

-------------------------------------. 2016. “Roman Bazaar or Market Economy? Explaining Tableware Distributions through Computational Modelling.” *Antiquity* Vol. 90 (350): 393-408.

-------------------------------------. 2017. “The Case for Computational Modelling of the Roman Economy: A Reply to Van Oyen.” *Antiquity* Vol. 91(359): 1364-1366.

Burnham, B. C. et al. 1993. “Roman Britain in 1992.” *Britannia* Vol. 24: 267-322.

-------------------------. 1996. “Roman Britain in 1995.” *Britannia* Vol. 27: 389-457.

-------------------------. 1997. “Roman Britain in 1996.” *Britannia* Vol. 28: 395-453, 455-472.

-------------------------. 2002. “Roman Britain in 2001.” *Britannia* Vol. 33: 275-371.

-------------------------. 2003. “Roman Britain in 2002.” *Britannia* Vol. 34: 293-359, 361-382.

-------------------------. 2004. “Roman Britain in 2003.” *Britannia* Vol. 35: 253-349.

Burnham, B. C. et al. 2008. "Roman Britain in 2007." *Britannia* Vol. 39: 263-390.

Burroughs, M. 2001. *Villas of the Brigantes and Parisi: Criteria for Site Selection*. Thesis, University of Manchester.

Bury, J. B. 1920. "The Notitia Dignitatum." *Journal of Roman Studies* Vol. 10: 131-154.

Butts, C. 2006. "Exact Bounds for Degree Centralization." *Social Networks* Vol. 28(4): 283-296.

Cahill, N. 2002. *Household and City Organization at Olynthus*. Yale: Yale University Press.

Cämmerer, F. P. 1976. *Die Römer in Baden-Württemberg*. Auflage: Theiss.

Carr, L. C. 2012. *Tessa Verney Wheeler: Women in Archaeology Before World War II*. Oxford: Oxford University Press.

Carrington, R. C. 1931. "Studies in the Campanian 'Villae Rusticae.'" *The Journal of Roman Studies*, Vol. 21: 110-130

Champion, T. 1991. "Theoretical Archaeology in Britain," in I. Hodder, ed. *Archaeological Theory in Europe: The Last Three Decades*. London and New York: Routledge.

Chapman, E. M., et al. 2011. "Roman Britain in 2010." *Britannia* Vol. 42: 319-466.

Chapman, E. M., et al. 2012. "Roman Britain in 2011." *Britannia* Vol. 43: 271-422.

Chevallier, R. 1971. "Problematique de l'Archeologie Gallo-Romaine (1955-1970)." *The Journal of Roman Studies*, Vol. 61: 243-254.

Childe, V. G. 1926. "Review of G. Kossinna, Ursprung und Verbreitung der Germanen in vor- und frühgeschichtlicher Zeit (1. Teil)." Berlin 1926. *Man* Vol. 27: 54-55.

Chossenot, R. 2004. *La Marne*. Carte archeologique de la Gaule, Vol. 51, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

Clarke, A. and M. Fulford. 2002. "The Excavation of Insula IX, Silchester: The First Five Years of the 'Town Life' Project, 1997-2001." *Britannia* Vol. 33: 129-166.

Clarke, D. 1968. *Analytical Archaeology*. London: Methuen.

Clarke, G. et al. 1982. "The Roman Villa at Woodchester." *Britannia* Vol. 13: 197-228.

Clarke, S. 1995. "Locational Models and the Study of Romano-British Small Towns." *Theoretical Roman Archaeology: Second Conference Proceedings*: 81-91.

Clarke, J. 2014. "*Domus*/Single Family House." in R. Ulrich, ed. *A Companion to Roman Architecture*. Oxford: Wiley-Blackwell: 342-362.

Cleuziou, S., A. Coudart, J-P. Demoule, and A. Schnapp. 1991. "The Use of Theory in French Archaeology." in I. Hodder, ed. *Archaeological Theory in Europe: The Past Three Decades*. London and New York: Routledge: 91-128.

Cliquet, D. 1993. *L'Eure*. Carte archeologique de la Gaule, Vol. 27. Paris: Académie des Inscriptions et Belles-Lettres.

Coblenz, W. 2000. "Archaeology under Communist Control: the German Democratic Republic, 1945 - 1990." In H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 304-338.

Collar, A., et al. 2015. "Networks in Archaeology: Phenomena, Abstraction, Representation." *Journal of Archaeological Method and Theory* Vol. 22: 1-32.

Colleoni, F. 2009. "Les formes de l'habitat rural gallo-romain dans la cité d'Auch,"" in Leveau, P., C. Raynaud, R. Sablayrolles, and F. Trement (eds.) 2009. *Les formes de l'habitat rural gallo-romain: Terminologies et typologies à l'épreuve des réalités archéologiques*. *Aquitania* Supplement 17. Bourdeaux: 259-279.

Collingwood, R. G. 1930. *The Archaeology of Roman Britain*. London: Methuen.

Collis, J. 2003. *The Celts: Origins, Myths, and Inventions*. Stroud: The History Press.

Cosh, S. R. 2001. "Seasonal Dining-Rooms in Romano-British Houses." *Britannia* Vol. 32: 219-242.

Council for British Archaeology. 1955. *Romano-British Villas: Some Current Problems*. CBA Research Report 1.

Courbot-Dewerdt, C. 2006. "An Alleged Far West? The Romanisation of the Countryside in Western Gaul." In Croxford, B., et al. (eds.) *TRAC 2005: Proceedings of the Fifteenth Annual Theoretical Roman Archaeology Conference, Birmingham 2005*: 73-82.

-------------------------. 2009. "Feeling Like Home: Romanised Rural Landscape from a Gallo-Roman Point of View." In Driessen, M., et al. (eds.) *TRAC 2008: Proceedings of the Eighteenth Annual Theoretical Roman Archaeology Conference, Amsterdam 2008*: 13-24.

Coward, F. 2013. "Grounding the Net: Social Networks, Material Culture, and Geography in the Epipaleolithic and Early Neolithic of the Near East (~ 21,000-6,000 cal BCE)." in Knappett, C., ed. *Network Analysis in Archaeology: New Approaches to Regional Interaction*. Oxford: Oxford University Press.

Creighton, J. D. and R. J. A. Wilson (eds.) 1999. *Roman Germany: Studies in Cultural Interaction*. JRA Supplementary Series 32.

Crummy, P. 1982. "The Origins of Some Major Romano-British Towns." *Britannia* Vol. 13: 125-134.

Cunliffe, B. 1971. *Excavations at Fishbourne 1961-1969*. Society of Antiquaries.

--------------. 1998. *Fishbourne Roman Palace*. Stroud: The History Press.

--------------. 2003. *The Celts: A Very Short Introduction*. Oxford: Oxford University Press.

Cunliffe, B. and T. Rowley, eds. 1976. *Oppida, the Beginnings of Urbanization in Barbarian Europe: Papers Presented at a Conference at Oxford, October 1975*. Oxford: Oxford University Press.

Cutting, M. 2006. "More Than One Way to Study a Building: Approaches to Prehistoric Houses and Settlement Space." *Oxford Journal of Archaeology* Vol. 25: 225-246.

Davies, J. L. and T. G. Driver. 2011. "Abermagwr (SN 6688 7416)." *Britannia* Vol. 42: 320-321.

De la Bédoyère, G. 1991. *The Buildings of Roman Britain*. Stroud: Tempus.

----------------------. 2002. *Gods with Thunderbolts: Religion in Roman Britain.* Stroud: Tempus.

----------------------. 2006. *Roman Britain: A New History*. London: Thames and Hudson.

Delmaire, R., A. Jacques, G. Leman-Delerive, and C. Seillier. 1993. *Le Pas-de-Calais*. Carte archeologique de la Gaule, Vol. 62, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

--. 1994. *Le Pas-de-Calais*. Carte archeologique de la Gaule, Vol. 62, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Delmaire, R., G. Leman-Delerive, C. Seillier, and P. Thollard. 1996. *Le Nord*. Carte archeologique de la Gaule, Vol. 59. Paris: Académie des Inscriptions et Belles-Lettres.

Delor, J.-P. 2002a. *L'Yonne*. Carte archeologique de la Gaule, Vol. 89, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

-------------. 2002b. *L'Yonne*. Carte archeologique de la Gaule, Vol. 89, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Denajar, L. 2005. *L'Aube*. Carte archeologique de la Gaule, Vol. 10. Paris: Académie des Inscriptions et Belles-Lettres.

Dickmann, J-A. 1997. “The Peristyle and the Transformation of Domestic Space in Hellenistic Pompeii,” in R. Laurence and A. Wallace-Hadrill (eds.) *Domestic Space in the Roman World: Pompeii and Beyond*. JRA Supplementary Series 22: 121-136.

Dobbins, J. J. 2000. “The Houses of Antioch.” in C. Kondoleon, ed. *Antioch: The Lost Ancient City: Exhibition Catalogue, Worcester Art Museum, October 7, 2000-February 4, 2001; The Cleveland Museum of Art, March 18-June 3, 2001; The Baltimore Museum of Art, September 16-December 30, 2001*. Princeton: Princeton University Press.

van Dommelen, P. 1998. *On Colonial Grounds: A Comparative Study of Colonialism and Rural Settlement in First Millennium BC West Central Sardinia*. Leiden: University of Leiden.

van Dommelen, P. 2014. “Fetishizing the Romans.” *Archaeological Dialogues* Vol. 21(1): 41-45.

Drerup, H. 1959. “Bildraum und Realraum in der römischen Architektur.” in *Römische Mitteilungen*, Vol. 66: 145-174.

Dunbabin, K. 1996. “Convivial Spaces: Dining and Entertainment in the Roman Villa.” *Journal of Roman Archaeology* Vol. 9: 66-80.

Dyson, S. 1993. “From New to New Age Archaeology: Archaeological Theory and Classical Archaeology - A 1990s Perspective.” *American Journal of Archaeology* Vol. 97(2): 195-206.

Dyson, S. 2003. *The Roman Countryside*. Bristol: Bristol Classical Press.

Earl, G. And S. Keay. 2007. “Urban Connectivity of Iberian and Roman Towns in Southern Spain: A Network Analysis Approach.” in J. T. Clark and E. Hagenmeister, eds. *Digital Discovery: Exploring New Frontiers in Human Heritage: Prodceedings of the 34th CAA Conference, Fargo 2006.* Budapest: Archaeolingua: 77-86..

Eck, W. 2004. “Die CCAA als Provinzhauptstadt und die Vertreter der staatlichen Macht.” in *Köln in römischer Zeit: Geschichte einer Stadt im Rahmen des Imperium Romanum*. Vol. 1: 242-272.

Eckstein, A. 2008. *Rome Enters the Greek East: From Anarchy to Hierarchy in the Hellenistic Mediterranean, 230-170 BC*. London: Blackwell.

Eggers, H. 1959. *Einführung in die Vorgeschichte*. Munich: Piper.

Ellis, P. et al. 1999. “North Leigh Roman Villa, Oxfordshire: A Report on Excavation and Recording in the 1970s. *Britannia* Vol. 30: 199-246.

Ellis, S. 1995. “Classical Reception Rooms in Romano-British Houses.” *Britannia* Vol. 26: 163-178.

Ellis, S. 1993. “Theories of Circulation in Roman Houses.” In Leslie, A. (ed.) *Theoretical Roman Archaeology and Architecture: The Third Conference Proceedings*: 75-98.

---------. 2000. *Roman Housing*. Bristol: Bristol Classical Press.

Evans, E. 1994. “Military Architects and Building Design in Roman Britain.” *Britannia* Vol. 25: 143-164.

Fairclough, G. 1992. “Meaningful Constructions - Spatial and Functional Analysis of Medieval Buildings.” *Antiquity* Vol. 44: 348-366.

Farley, M. E. 1983. “The Villa at Mill End, Hambleden, Buckinghamshire, and Its Neighbor.” *Britannia* Vol. 14: 256-259.

Faure-Brac, O. 2002. *La Haute-Saône*. Carte archeologique de la Gaule, Vol. 70. Paris: Académie des Inscriptions et Belles-Lettres.

Février, P. 1973. “The Origin and Growth of the Cities of Southern Gaul to the Third Century A.D.: An Assessment of the Most Recent Archaeological Discoveries.” *Journal of Roman Studies* Vol. 63: 1-28.

Fitzhugh, B. and T. Hunt. 1997. “Introduction: Islands as Laboratories: Archaeological Research in Comparative Perspective.” *Human Ecology* Vol. 25(3): 379-383.

Flotté, P. 2005. *Metz*. Carte archeologique de la Gaule, Vol. 57, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Flotté, P. and M. Fuchs. 2004. *La Moselle*. Carte archeologique de la Gaule, Vol. 57, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

Foot, S. 2011. *Æthelstan: The First King of England*. Yale: Yale University Press.

Forcey, C. 1997. “Beyond ‘Romanization’: Technologies of Power in Roman Britain.” In Meadows, K., et al. (eds.) *TRAC 96: Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield 1996*: 15-21.

Foster, S. M. 1989. “Analysis of Spatial Patterns in Buildings (Access Analysis) as an Insight into Social Structure: Examples from the Scottish Atlantic Iron Age.” *Antiquity* Vol. 63: 40-50.

Freeman, L. 1970. “Centrality in Social Networks Conceptual Clarifications.” *Social Networks* Vol. 1(3): 215-239.

Freeman, P. 1997a. “’Romanization – Imperialism’ – What are We Talking About?” in K. Meadows, et al. (eds). *TRAC 96: Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield 1996*: 8-14.

Freeman, P. 1997b. “Mommsen to Haverfield: The Origins of Studies of Romanization in Late 19th-c. Britain.” D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 27-50.

Frere, S. S. 1967. *Britannia: A History of Roman Britain*. Bournemouth: Pimlico.

-------------. 1987. *Roman Britain since Haverfield and Richmond: A Lecture Delivered in All Souls College, 23 October 1987*.

Frere, S. S., et al. 1982a. “The Bignor Villa.” *Britannia* Vol. 13: 135-195.

Frere, S. S., et al. 1982b. “Roman Britain in 1982.” *Britannia* Vol. 14: 279-356.

--------------------. 1984. “Roman Britain in 1983.” *Britannia* Vol. 15: 265-356.

--------------------. 1985. “Roman Britain in 1984.” *Britannia* Vol. 16: 251-332.

--------------------. 1986. “Roman Britain in 1985.” *Britannia* Vol. 17: 363-454.

--------------------. 1987. “Roman Britain in 1986.” *Britannia* Vol. 18: 301-377.

--------------------. 1989. “Romans Britain in 1988.” *Britannia* Vol. 20: 257-345.

--------------------. 1990. “Roman Britain in 1989.” *Britannia* Vol. 21: 303-378.

--------------------. 1992. “Roman Britain in 1991.” *Britannia* Vol. 23: 255-323.

Frere, S. S. and R. S. O. Tomlin. 1991. “Roman Britain in 1990.” *Britannia* Vol. 22: 221-311.

Fremersdorf, F. 1933. “Der römische Gutshof Köln-Müngersdorf.” *Römisch-Germanische Forschungen,* Band 6.

Fulford, M. 2012. “Urban Essentials: Perspectives on Change in a Residential *Insula* at Silchester (early 2nd to 5th c. A.D.)” in M. Fulford (ed.) *Silchester and the Study of Romano-British Urbanism*. JRA Supplementary Series 90: 257-271.

-------------. 2015. “Silchester: The Town Life Project 1997-2014: Reflections on a Long Term Research Excavation.” In Brindle, T., et al. (eds.) *TRAC 2014: Proceedings of the Twenty-Fourth Annual Theoretical Roman Archaeology Conference, Reading 2014*: 114-121.

Gaitsch, W. 1986. “Grundformen römischer Landsiedlungen im Westen der CCAA.” *Bonner Jahrbucher* Vol. 186: 397-427.

Gallay, A. 1989. Logicism: A French View of Archaeological Theory Founded in Computational Perspective.” *Antiquity* Vol. 63: 27-39.

Galliou, P. 1989. *Le Finistère*. Carte archeologique de la Gaule, Vol. 29. Paris: Académie des Inscriptions et Belles-Lettres.

Galliou, P., et al. 2009. *Morbihan*. Carte archeologique de la Gaule, Vol. 56. Paris: Académie des Inscriptions et Belles-Lettres.

Gardin, J-C. 1971a. "Archéologie et calculateurs: nouvelles perspectives," *Revue Internationale des Sciences Sociales* XXIII (2): 204-218.

--------------. 1971b. *UNISIST. Etudes sur la réalisation d'un système mondial d'information scientifique*. Paris: UNESCO.

--------------. 1975. "Effets logiques des bases de données sur les disciplines d'érudition." *Revue Internationale des Sciences Sociales* XXVII: 815-830.

Gardner, A. 2007. *An Archaeology of Identity: Soldiers and Society in Late Roman Britain*. Left Coast Press.

-------------. 2013. "Thinking About Roman Imperialism: Postcolonialism, Globalisation, and Beyond?" *Britannia* Vol. 44, 1-25.

George, M. 1997. *The Roman Domestic Architecture of Northern Italy*. Oxford: Oxford University Press.

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. London: Polity.

Gilles, K.-J. 2008. "Pfalzel: Befestigter spätrömischer Palast." in Rheinisches Landesmuseum Trier, *Führer zu archäologischen Denkmälern des Trierer Landes*. Trier.

Godwin, E. W. 1856. "Account of a Roman Villa Discovered at Colerne, In the County of Wiltshire." *The Archaeological Journal* Vol. 13, No. 1: 328-332.

Goldhill, S., ed. 2001. *Being Greek under Rome: Cultural Identity, the Second Sophistic, and the Development of Empire*. Cambridge: Cambridge University Press.

Gomes, F., et al. 2005. "Cultura castreja - A Cividade de Terroso." *Subtus Montis Terroso*: 97-131.

Goodburn, R. 1976. "Roman Britain in 1975." *Britannia* Vol. 7: 290-392.

Goodburn, R., et al. 1978. "Roman Britain in 1977." *Britannia* Vol. 9: 403-485.

-----------------------. 1979. "Roman Britain in 1979." *Britannia* Vol. 10: 267-356.

Gosden, C. and C. Pavlides. 1994. "Are Islands Insular? Landscape vs. Seascape in the Case of the Arawe Islands, Papua New Guinea." *Oceania* Vol. 29(3): 162-171.

Graham, S. 2006. "Networks, Agent-based Models and the Antonine Itineraries: Implications for Roman Archaeology." *Journal of Mediterranean Archaeology* Vol. 19(1): 45-64.

Grahame, M. 1997. "Public and Private in the Roman House: The Spatial Order of the Casa Del Fauno." in R. Laurence and A. Wallace-Hadrill, eds. *Domestic Space in the Roman World: Pompeii and Beyond*. Journal of Roman Archaeology, Supplementary Series 22: 137-164.

Grahame, M. 1998. "Redefining Romanization: Material Culture and the Question of Social Continuity in Roman Britain." In Forcey, C., et al. *TRAC 97: Proceedings of the Seventh Annual Theoretical Roman Archaeology Conference, Nottingham 1997*: 1-10.

---------------. 1999. "Reading the Roman House: The Social Interpretation of Spatial Order." In Leslie, A. (ed.) *Theoretical Roman Archaeology and Architecture: The Third Conference Proceedings*: 48-74.

---------------. 2000. *Reading Space: Social Interaction and Identity in the Houses of Roman Pompeii*. BAR International Series 886.

Granovetter, M. 1973. "The Strength of Weak Ties." *The American Journal of Sociology* Vol. 78(5): 1360-1380.

------------------. 1983. "The Strength of Weak Ties: A Network Theory Revisited." *Sociological Theory* Vol. 1(1): 201-233.

Green, M. 1989. *Symbol and Image in Celtic Religious Art*. London: Routledge.

-----------. 1996. *The Celtic World*. London: Psychology Press.

Grenier, A. 1931. "Archéologie gallo-romaine, première partie: généralités, travaux militaires." in J. Dechelette, ed. *Manuel d'archéologie préhistorique, celtique et gallo-romaine*, vol. V. Paris: Picard.

Grew, F. O., et al. 1980. "Roman Britain in 1979." *Britannia* Vol. 11: 345-417.

---------------------. 1981. "Roman Britain in 1980." *Britannia* Vol. 12: 313-396.

Griffisch, J.-N., et al. 2008a. *La Seine-et-Marne*. Carte archeologique de la Gaule, Vol. 77, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

Griffisch, J.-N., et al. 2008b. *La Seine-et-Marne*. Carte archeologique de la Gaule, Vol. 77, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Gros, P. 1996. *L'architecture romaine du début du IIIe siècle av. J.-C. À la fin du Haut-Empire. Vol. I: Les monuments publics*.

---------. 2001. *L'architecture romaine du début du IIIe siècle av. J.-C. À la fin du Haut-Empire.Vol. 2: Maisons, palais, villas et tombeaux*.

Habermehl, D. 2013. *Settling in a Changing World: Villa Development in the Northern Provinces of the Roman Empire*. Amsterdam: Amsterdam University Press.

Hadman, J. 1978. "Aisled Buildings in Roman Britain." in M. Todd, ed. *Studies in the Romano-British Villa*. London: Continuum International: 187-196.

Hales, S. 2013. "Republican Houses." in J. D. Evans, ed. *A Companion to the Archaeology of the Roman Republic*. Oxford: Blackwell: 50-66.

Hamm, G. 2004. *La Meurthe et Moselle*. Carte archeologique de la Gaule, Vol. 54. Paris: Académie des Inscriptions et Belles-Lettres.

Hanson, J. 1998. *Decoding Homes and Houses*. Cambridge: Cambridge University Press.

Hanson, W. S. 1997. "Forces of Change and Methods of Control." D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 67-80.

Harding, D. W. 2007. *The Archaeology of Celtic Art*. London:Routledge.

------------------. 2009. *The Iron Age Round-House: Later Prehistoric Building in Britain and Beyond*. Oxford: Oxford University Press.

Härke, H. 1991. "All Quiet on the Western Front? Paradigms, Methods and Approaches in West German Archaeology." In I. Hodder, ed. 1991. *Archaeological Theory in Europe: The Last Three Decades*. London and New York: Routledge: 187-222.

Haselgrove, C. 1984. "'Romanization' Before the Conquest: Gaulish Precedents and British Consequences," in T. F. C. Blagg and A.C. King (eds.) *Military and Civilian in Roman Britain*. BAR British Series 136: 5-63.

-----------------. 1987. "Culture Process on the Periphery: Belgic Gaul and Rome during the Late Republic and Early Empire," in M. Rowland, M. Larsen, and K. Kristiansen (eds.) *Centre and Periphery in the Ancient World*. Cambridge: Cambridge University Press: 104-24.

-----------------. 1990. "The Romanization of Belgic Gaul: Some Archaeological Perspectives." T. F. C. Blagg and M. Millett (eds.) *The Early Roman Empire in the West*. Oxford: Oxford University Press: 45-71.

Haßmann, H. 2000. “Archaeology in the ‘Third Reich.’” in H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 65-139.

Häussler, R. 1998. “Motivations and Ideologies of Romanization.” in Forcey, C., et al. (eds.) *TRAC 97: Proceedings of the Seventh Annual Theoretical Roman Archaeology Conference, Nottingham 1997*: 11-19.

Haverfield 1912. *The Romanization of Roman Britain*. London: Batsford.

Heather, P. 2007. *The Fall of the Roman Empire: A New History of Rome and the Barbarians*. Oxford: Oxford University Press.

Heeren, Stijn. 2014. “The Material Culture of Small Rural Settlements in the Batavian Area: A Case Study on Discrepant Experience, Creolisation, Romanisation or Globalisation.” In Platts, H., et al. (eds.) *TRAC 2013: Proceedings of the Twenty-Third Annual Theoretical Roman Archaeology Conference, King’s College, London 2013*: 159-173.

Heimberg, U. 1998. “Was bedeutet ‘Romanisierung’? Das bespiel Niedergermanien,” *Antike Welt* Vol. 29: 19-40.

---------------. 2002/2003. “Römische Villen an Rhein und Maas.” *Bonner Jahrbücher* 202/203: 57-148.

Henig, M. 1984. *Religion in Roman Britain*. London: Batsford.

-----------. 1995. *The Art of Roman Britain*. Ann Arbor: University of Michigan Press.

Hepple, L. W. 2004. “’The Camden Connection’: Revisiting the Origins of Romano-British Archaeology and Its Historiography.” In Croxford, B., et al. (eds.) *TRAC 2003: Proceedings of the Thirteenth Annual Theoretical Roman Archaeology Conference, Leicester 2003*: 147-156.

Hester, T., et al. 2016. *Field Methods in Archaeology*, 7th edition. London: Routledge.

Higham, N. J. 1994. “Literary Evidence for Villas, Towns and Hillforts in Fifth-Century Britain.” *Britannia* Vol. 25: 229-232.

Hillier, B. 2014. “Spatial Analysis and Cultural Information: the Need for Theory as Well as Method in Space Syntax Analysis.” in Hillier, B., ed. 2014. *Spatial Syntax and Cultural Information* Berlin: De Gruyter: 19-47.

Hillier, B. And J. Hanson. 1984. *The Social Logic of Space*. Cambridge: Cambridge University Press.

Hillier, B., J. Hanson, and H. Graham. 1987. “Ideas are in things: an application of the space syntax method to discovering house genotypes.” *Environment and Planning B: Planning and Design B*. Vol. 14: 363-85.

Hingley, R. 1989. *Rural Settlement in Roman Britain*. London: Seaby.

-------------. 1990. "Domestic Organisation and Gender Relations in Iron Age and Romano-British Households." in R. Samson, ed. *The Social Archaeology of Houses*. Edinburgh: Edinburgh University Press: 125-147.

-------------. 1993. "Attitudes to Roman Imperialism." In Scott, E. (ed.) *Theoretical Roman Archaeology: First Conference Proceedings*: 23-27.

-------------. 1997. "Resistance and Domination: Social Change in Roman Britain." D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 81-100.

-------------. 2005. *Globalizing Roman Culture: Unity, Diversity, and Empire*. London and New York: Routledge.

-------------. 2014. "Struggling with a Roman Inheritance. A Response to Versluys." *Archaeological Dialogues* Vol. 21(1): 20-24.

Hirschfeld, Y. 1998. "Early Roman Manor Houses in Judea and the Site of Khirbet Qumran." *Journal of Near Eastern Studies*. Vol. 57(3): 161-189.

Hodder, I. 1982. *Symbolic and Structural Archaeology*. Cambridge: Cambridge University Press.

-----------. 1986. *Reading the Past*. Cambridge: Cambridge University Press.

-----------. 1991. "Archaeological Theory in Contemporary European Societies: The Emergence of Competing Traditions." in I. Hodder, ed. *Archaeological Theory in Europe: The Last Three Decades*. London and New York: Routledge.

-----------. 2012. *Entangled: An Archaeology of the Relationships Between Humans and Things*. London: Wiley-Blackwell.

Hodder, I. and M. Millett. 1980. "Romano-British Villas and Towns: A Systematic Analysis." *World Archaeology* Vol. 12(1): 69-76.

Hogg, A. H. A. and D. J. Smith. 1974. "The Llanwit Major Villa: A Reconsideration of the Evidence." *Britannia* Vol. 5: 225-250.

Hole, B. L. 1980. "Sampling in Archaeology: A Critique." *Annual Review of Anthropology*. Vol. 9: 217-234.

Hueber, S. and G. Nathan, eds. 2017. *Mediterranean Families in Antiquity: Households, Extended Families, and Domestic Space*. Malden: Wiley Blackwell.

Irwin-Williams, C. 1977. "A Network Model for the Analysis of Prehistoric Trade." in T. Earle and J. Ericson, eds. *Exchange Systems in Prehistory*. New York: Academic: 141-151.

Isaksen, L. 2007. "Network Analysis of Transport Vectors in Roman Baetica." in J. T. Clark and E. Hagenmeister, eds. *Digital Discovery: Exploring New Frontiers in Human Heritage: Proceedings of the 34th CAA Conference, Fargo 2006*. Budapest: Archaeolingua: 76-87.

Jacobs, J. 2000. "German unification and East German archaeology." in H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 339-352.

Jankuhn, H. 1933. "Die Germanen und die slawischen Staatengründungen." *Kieler Neueste Nachrichten*, December 1933.

-------------. 1937. "Haithabu, eine germanische Stadt der Frühzeit." *Zeitschrift für Deutschkunde* Vol. 51(1): 30-45.

Janssen, M. 2005. "Review: Complex Systems and Archaeology: Empirical and Theoretical Applications." *American Journal of Archaeology*. Vol. 109(3): 568-569.

Jimenez, D. and D. Chapman. 2002. "An Application of Proximity Graphs in Archaeological Spatial Analysis." in Wheatley et al. 2002. *Contemporary Themes in Archaeological Computing*. Oxford: Oxbow.

Joan, L. 2003. *Le Doubs et le territoire de Belfort*. Carte archeologique de la Gaule, Vol. 25 and 90. Paris: Académie des Inscriptions et Belles-Lettres.

Johnson, M. 1999. *Archaeological Theory: An Introduction*. Oxford: Blackwell.

Johnson, P., ed. 1996. *Architecture in Roman Britain*. CBA Research Report 94.

Johnston, D. E. 1978. "Villas of Hampshire and the Isle of Wight." in M. Todd, *Studies in the Romano-British Villa*. London: Continuum International: 71-93.

Jones, M. 1998. *The End of Roman Britain*. Cornell: Cornell University Press.

Kampen, N. 2015. "Roman Art and Architecture, the Provinces, and Beyond." in C. Marconi, ed. 2015. *The Oxford Handbook of Greek and Roman Art and Architecture*. Oxford: Oxford University Press: 395-413.

Keay, S. J. and N. Terrenato, eds. 2001. *Italy and the West: Comparative Issues in Romanization*. Oxford: Oxbow.

Keevill, G. D. 1995. "Processes of Collapse in Romano-British Buildings: A Review of the Evidence," in E. Shepherd (ed.) *Interpreting Stratigraphy* Vol. 5: 26-37.

Kendall, D. 1969. “Incidence Matrices, Interval Graphs, and Seriation in Archeology.” *Pacific Journal of Mathematics* Vol. 28(3): 565-570.

Kendall, D. 1971. “Seriation from Abundance Matrices.” In F. R. Hodson, D. G. Kendall, and P. Tăutu, eds. *Mathematics in the Archaeological and Historical Sciences: Proceedings of the Anglo-Romanian Conference, Mamaia 1970*. Edinburgh: Edinburgh University Press: 215-252.

Keppie, L., et al. 1998. “Roman Britain in 1997.” *Britannia* Vol. 29: 365-445.

--------------------. 1999. “Roman Britain in 1998.” *Britannia* Vol. 30: 319-386.

--------------------. 2001. “Roman Britain in 2000.” *Britannia* Vol. 32: 311-385, 387-400.

Knappett, C. 2011. *An Archaeology of Interaction: Network Perspectives on Material Culture and Society*. Oxford: Oxford University Press.

Knappett, C., T. Evans, and R. Rivers. 2008. “Modelling Maritime Interaction in the Aegean Bronze Age.” *Antiquity* Vol. 82(318): 1009-1024.

Knight, J. 2001. *Roman France: An Archaeological Field Guide*. London: Tempus.

Knights, C. 1994. “The Spatiality of the Roman Domestic Setting: An Interpretation of Symbolic Content.” In M. Parker Pearson and C. Richards, eds. *Architecture and Order: Approaches to Social Space*. London and New York: Routledge: 113-146.

Kohler, T. 2011. “Complex Systems in Archaeology.” *Sante Fe Institute Working Paper* 2011-06-023.

Kossinna, G. 1911. “Die Herkunft der Germanen: Zur Methode der Siedlungsarchäologie.” *Mannus-Bibliothek* 6. Würzburg: Kabitzsch.

Krause, D. 1999. “Romanization in the Middle Rhine and Moselle region: new evidence from recent excavations in Luxembourg, Rhineland-Pfalz and Saarland,” in Creighton, J. D. and R. J. A. Wilson (eds.) *Roman Germany: Studies in Cultural Interaction*. JRA Supplementary Series 32: 54-70.

Kurchin, B. 1995. “Romans and Britons on the Northern Frontier: A Theoretical Evaluation of the Archaeology of Resistance.” in Rush, P. (ed.) *Theoretical Roman Archaeology: Second Conference Proceedings*: 124-131.

Lantier, R. 1946. “Roman Gaul, 1940-1944.” *The Journal of Roman Studies,* Vol. 36, Parts 1 and 2: 76-90.

Laurence, R. 1994. *Pompeii: Space and Society*. London: Psychology.

Laurence, R. and A. Wallace-Hadrill. 1997. *Domestic Space in the Roman World: Pompeii and Beyond*. Journal of Roman Archaeology Suppl. Series no. 22. Portsmouth, Rhode Island: Journal of Roman Archaeology.

Laurence, R. and A. Wallace-Hadrill (eds.) 1997. *Domestic Space in the Roman World: Pompeii and Beyond*. JRA Supplementary Series 22.

Laurence, R., S. Esmonde Cleary, and G. Sears. 2011. *The City in the Roman West c. 250 BC - C. AD 250*. Cambridge: Cambridge University Press.

Lawrence, A. 2015. "Collecting the Evidence: Improving Access to Grey Literature and Data for Public Policy and Practice." *Australian Academic and Research Libraries* Vol. 46(4): 229-248.

Leach, E. 1997. "Oecus on Ibycus: Investigating the Vocabulary of the Roman House." in R. Jones and S. Bon, eds. *Space and Sequence in Ancient Pompeii*. Oxford: Oxbow: 50-71.

Le Gall, J. 1963. *Alésia, archéologie et histoire*. Paris: Fayard.

Lenz, K.-H. 1998. "Villae rusticae: Zur Entstehung dieser Siedlungsform in den Nordwestprovinzen des römischen Reiches." *Kölnner Jahrbuch*, Vol. 31: 49-70.

Lequoy, M.-C. and B. Guillof. 2004. *Rouen*. Carte archeologique de la Gaule, Vol 76, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Leroi-Gourhan, A. 1957. "Technique et société chez l'animal et chez l'homme," *Originalité biologique de l'homme, recherces et débats*. Paris: Albin Michel.

----------------------. 1964. *Les Religions de la Préhistoire*. Paris: Press Universitaires de France.

Leroux, G. 1990. *L'ille-et-Vilaine*. Carte archeologique de la Gaule, Vol. 35. Paris: Académie des Inscriptions et Belles-Lettres.

Lèvi-Strauss, C. 1973. *Anthropologie structurale deux*. Paris: Plon.

Liversidge, et al. 1973. "Brantingham Roman Villa: Discoveries in 1962." *Britannia* Vol. 4: 84-106.

Locock, M. 1994. "Meaningful Architecture." in M. Locock, ed. *Meaningful Architecture: Social Interpretations of Buildings*. Aldershot: Avebury: 1-13.

MacDonald, W. 1986. *The Architecture of the Roman Empire, II: An Urban Appraisal*. New Haven: Yale University Press.

MacGregor, A. 2007. "E. T. Leeds and the Formation of an Anglo-Saxon Archaeology." in M. Henig and T. J. Smith, eds. *Collectanea Antiqua: Essays in Memory of Sonia Chadwick Hawkes*. Oxford: Archaeopress.

de Maeyer, R. 1937. *De Romeinsche Villa's in België: Een Archeologische Studie*. Antwerp: De Sikkel.

Magness, J. 2003. *The Archaeology of Qumran and the Dead Sea Scrolls*. Grand Rapids: Eerdmans.

Makaronas, C. and E. Gionri. 1989. *Oi oikies arpagis Elenis kai Dionysion*. Athens Archaeological Service.

Malkin, I. 2011. *A Small Greek World: Networks in the Ancient Mediterranean*. Oxford: Oxford University Press.

Maner, B. 2018. *Germany's Ancient Pasts: Archaeology and Historical Interpretation Since 1700*. Chicago: University of Chicago Press.

Manning, W. H. 1962. "The Villa in Roman Britain." *Antiquity*. Vol. 36(141): 56-58.

Manum, B., et al. 2009. "AGRAPH: Software for Drawing and Calculating Space Syntax Graphs." https://www.ntnu.no/ad/spacesyntax.

Marchand, S. 2003. *Down from Olympus: Archaeology and Philhellenism in Germany, 1750 - 1970*. Princeton: Princeton University Press.

Mari, Z. 1991. *Tibur 4*. Forma Italiae.

Martins, C. 2003. "Becoming Consumers: Looking Beyond Wealth as an Explanation for Villa Variability." In Carr, G., et al. (eds.) *TRAC 2002: Proceedings of the Twelfth Annual Theoretical Roman Archaeology Conference, Canterbury 2002*: 84-100.

Mattingly, D. J. 1997a. "Dialogues of Power and Experience in the Roman Empire." D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 7-24.

------------------. 1997b. *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23.

------------------. 2004. "Being Roman: Expressing Identity in the Provincial Setting," *Journal of Roman Archaeology*. Vol 17: 5-26.

Maxwell, G. S. and D. R. Wilson. 1987. "Air Reconnaissance in Roman Britain 1977-84." *Britannia* Vol. 17: 1-48.

McCormick, M, et al. 2012. "Climate Change During and After the Roman Empire: Reconstructing the Past from Scientific and Historical Evidence." *Journal of Interdisciplinary History* Vol. XLIII(2): 169-220.

McGowen, S. L. 2005. *When Cultures Collide: Romanization and the Temple Art of Roman Bath*. Charlottesville.

-------------------. 2010. *Sacred and Civic Stone Monuments of the Northwest Roman Provinces*. Oxford: Archaeopress.

McKay, A. 1975. *Houses, Villas and Palaces in the Roman World*. New York: Thames and Hudson.

McKendrick, P. 1972. *Roman France*. New York: Bell.

Meates, G. W. 1979. *The Lullingstone Roman Villa*, Vol. 1. Kent Archaeological Society.

Meiggs, R. 1973. *Roman Ostia*, 2nd ed. Oxford: Clarendon.

Meyer, K. 1999. "Axial Peristyle Houses in the Western Empire." *Journal of Roman Archaeology*. Vol. 12: 101-121.

Mielsch, H. 1987. *Die römische Villa: Architektur und Lebensform*. Munich: Beck.

Miles, H., et al. 1977. "The Honeyditches Roman Villa, Seaton, Devon." *Britannia* Vol. 8: 107-148.

Milgram, S. 1967. "The Small World Problem." *Psychology Today* Vol. 2: 60-67.

Milgram, S. 1992. *The Individual in a Social World: Essays and Experiments*, 2nd ed. New York: McGraw-Hill.

Millett, M. 1982. "Distinguishing between the 'Pes Monetalis' and the 'Pres Drusianus:' Some Problems." *Britannia* Vol. 13: 315-320.

------------. 1990a. "Romanization: Historical Issues and Archaeological Interpretation." T. F. C. Blagg and M. Millett (eds.) *The Early Roman Empire in the West*. Oxford: Oxford University Press: 35-41.

------------. 1990b. *The Romanization of Britain: An Essay in Archaeological Interpretation*. Cambridge: Cambridge University Press.

Mitchell, M. 2009. *Complexity: A Guided Tour*. New York: Oxford University Press.

Mitchell, S. 1995. *Anatolia: Land, Men, and Gods in Asia Minor Volume I: The Celts and the Impact of Roman Rule*. Oxford: Clarendon.

Mitterrand, F. 1985. "Allocution prononcée par M. François Mitterrand, Président de la République, au Mont Beuvray, mardi 17 septembre 1985." *Nouvelles de l'Archéologie* Vol. 21: 51-5.

Mizoguchi, K. 2009. "Nodes and Edges: A Network Approach to Hierarchisation and State Formation in Japan." *Journal of Anthropological Archaeology* Vol. 28(1): 14-26.

Mommsen, T. 1888. *History of Rome V: The provinces of the Roman Empire from Caesar to Diocletian.* Leipzig: Reimer and Hirzel.

Moore, T. 2017. "Beyond Iron Age 'Towns': Examining *Oppida* as Examples of Low-Density Urbanism." *Oxford Journal of Archaeology* Vol. 36(3): 287-305.

Moreno, J. 1946. "Sociogram and sociomatrix: a note to the paper by Forsyth and Katz." *Sociometry* Vol. 9: 348-349.

------------. 1960. *The Sociometry Reader*. Glencoe: The Free Press.

Mourot, F. 2001. *La Meuse*. Carte archeologique de la Gaule, Vol. 55. Paris: Académie des Inscriptions et Belles-Lettres.

Munro, B. 2011. "Approaching Architectural Recycling in Roman and Late Roman Villas." In Mladenovic, D. and Russell, B. (eds.). *TRAC 2010: Proceedings of the Twentieth Annual Theoretical Roman Archaeology Conference, Oxford 2010*: 76-88.

Munson, J. and M. Macri. 2009. "Sociopolitical Network Interactions: A Case Study of the Classic Maya." *Journal of Anthropological Archaeology* Vol. 28(4): 424-438.

Nappo, S. 1997. "The Urban Transformation at Pompeii in the Late Third and Early Second Centuries BC," in R. Laurence and A. Wallace-Hadrill (eds.) *Domestic Space in the Roman World: Pompeii and Beyond*. JRA Supplementary Series 22: 91-120.

Naudet, F. 2004. *L'Essonne*. Carte archeologique de la Gaule, Vol. 91. Paris: Académie des Inscriptions et Belles-Lettres.

Neal, D. S. 1970. "The Roman Villa at Boxmoor: Interim Report." *Britannia* Vol. 1: 156-162.

------------. 1978. "The Growth and Decline of Villas in the Verulamium Area." in M. Todd, ed. *Studies in the Romano-British Villa*. London: Continuum International: 33-58.

------------. 1989. "The Stanwick Villa, Northants: An Interim Report on the Excavations of 1984-88." *Britannia* Vol. 20: 149-168.

Neal, D. S. and B. Walker. 1988. "A Mosaic from Boughspring Roman Villa, Tidenham, Gloucestershire." *Britannia* Vol. 19: 191-197.

Nevett, L. 1999. “Greek Households under Roman Hegemony: The Archaeological Evidence.” In Leslie, A. (ed.) *Theoretical Roman Archaeology and Architecture: The Third Conference Proceedings*: 99-110.

-----------. 2007. “Housing and Households: Greek.” in S. Alcock and R. Osborne, eds. *Classical Archaeology*. Oxford: Blackwell: 205-223.

Neville, R. C. 1853. “Investigations of Roman Remains in the County of Essex.” *The Archaeological Journal*. Vol. 1, No. 1: 14-24.

Newman, M. 2003. “Ego-centered Networks and the Ripple Effect.” *Social Networks* Vol. 25(1): 83-95.

Nicolas, D., et al. 2011. *Les Ardennes*. Carte archeologique de la Gaule, Vol. 8. Paris: Académie des Inscriptions et Belles-Lettres.

de Nooy, W., Mrvar, A., Batagelj, V. 2005. *Exploratory Social Network Analysis with Pajek*. Cambridge: Cambridge University Press.

North, J. A. 1981. “The Development of Roman Imperialism.” *The Journal of Roman Studies*. Vol. 71: 1-9.

Oelmann, F. 1921. “Die Villa rustica bei Stahl und Verwandtes.” *Germania*. Vol. 5(2): 64-73.

--------------. 1928. “Römische Villen in Rheinland.” *Archäologischen zeiger* Vol. 43: 228-250.

Oelmann, F. and H. Mylius. 1928. *Bonner Jahrbücher* Vol. 133: 51-152.

Ollagnier, A. and D. Joly. 1994. *L’Eure-et-Loir*. Carte archeologique de la Gaule, Vol. 28. Paris: Académie des Inscriptions et Belles-Lettres.

Oltean, I. A. and W. S. Hanson. 2007. "Villa Settlements in Roman Transylvania." *Journal of Roman Archaeology*. Vol. 20(1): 113-137.

Orton, C. 1980. *Mathematics in Archaeology*. London: Collins.

Osman, K. M. and M. Suliman. 1994. “The Space Syntax Methodology: Fits and Misfits,” in *Architecture and Behavior* Vol. 10(2): 189-204.

Östborn, P. and H. Gerding. 2014. “Network Analysis of Archaeological Data: A Systematic Approach.” *Journal of Archaeological Science*. Vol. 46: 75-88.

Parker Pearson, M. and C. Richards. 1994a. “Ordering the World: Perceptions of Architecture, Space and Time.” In M. Parker Pearson and C. Richards, eds. *Architecture and Order: Approaches to Social Space*. London and New York: Routledge: 1-37.

Parker Pearson, M. and C. Richards. 1994b. "Architecture and Order: Spatial Representation and Archaeology." In M. Parker Pearson and C. Richards, eds. *Architecture and Order: Approaches to Social Space*. London and New York: Routledge: 38-72.

Parry, B. 1994. "Resistance Theory/Theorising Resistance or Two Cheers for Nativism." In F. Barker, P. Hulme, and M. Iversen (eds.) *Colonial Discourse/Postcolonial Theory*. Manchester: Columbia University Press: 172-193.

Percival, J. 1976. *The Roman Villa: An Historical Introduction*. Berkeley: University of California Press.

-------------. 1996. "Houses in the Country." in I. Barton, *Roman Domestic Buildings*. Exeter: University of Exeter Press.

Peregrine, P. 1991. "A Graph-Theoretic Approach to the Evolution of Cahokia." *American Antiquity* Vol. 56(1): 66-75.

Perring, D. 2002. *The Roman House in Britain*. London: Routledge.

Petersen, E. 1933. "Der Werdegang der Germanen im deutschen Osten." *Ostdeutscher Naturwart* Vol. 5(2) (August 1933).

Petts, D. 1997. "Elite Settlements in the Roman and Sub-Roman Period." In Meadows, K., et al. (eds.) *TRAC 96: Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield 1996*: 101-112.

Pichon, B. 2009. *Amiens*. Carte archeologique de la Gaule, Vol. 80, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

Pirson, F. 2009. "Shops and Industries." In J. J. Dobbins and P. Foss, eds. *The World of Pompeii*. New York: Taylor & Francis.

Pitts, F. 1979. "The Medieval River-Trade Network of Russia Revisited." *Social Networks* Vol. 1(3): 285-292.

Pitts, M. 2007. "The Emperor's New Clothes? The Utility of Identity in Roman Archaeology." *American Journal of Archaeology*. Vol. 111, No. 4: 693-713.

Popham, M. And H. Sackett, eds. 1993. *Lefkandi: The Protogeometric Building at Toumba II: The Excavation, Architecture, and Finds*. British School at Athens.

Provost, M. 1988a. *Le Loiret*. Carte archeologique de la Gaule, Vol. 45. Paris: Académie des Inscriptions et Belles-Lettres.

-------------. 1988b. *Le Loir-et-Cher*. Carte archeologique de la Gaule, Vol. 41. Paris: Académie des Inscriptions et Belles-Lettres.

Provost, M. 1988c. *L'Indre-et-Loire*. Carte archeologique de la Gaule, Vol. 37. Paris: Académie des Inscriptions et Belles-Lettres.

-------------. 1988d. *Le Maine-et-Loire*. Carte archeologique de la Gaule, Vol. 49. Paris: Académie des Inscriptions et Belles-Lettres.

-------------. 1988e. *La Loire- Atlantique*. Carte archeologique de la Gaule, Vol. 44. Paris: Académie des Inscriptions et Belles-Lettres.

-------------. 2009. *La Côte d'Or*. Carte archeologique de la Gaule, Vol. 21, No. 1. Paris: Académie des Inscriptions et Belles-Lettres.

Provost, M., G. Coulon, and J. Holmgren. 1992. *L'Indre*. Carte archeologique de la Gaule, Vol. 36. Paris: Académie des Inscriptions et Belles-Lettres.

Provost, M., et al. 1992. *Le Cher*. Carte archeologique de la Gaule, Vol. 18. Paris: Académie des Inscriptions et Belles-Lettres.

--------------------. 2009a. *La Côte d'Or*. Carte archeologique de la Gaule, Vol. 21, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

--------------------. 2009b. *La Côte d'Or*. Carte archeologique de la Gaule, Vol. 21, No. 3. Paris: Académie des Inscriptions et Belles-Lettres.

Quenouille, M. H. 1949. "Problems in Plane Sampling." *The Annals of Mathematical Statistics*. Vol. 20(3): 355-375.

Rankov, N. B., et al. 1982. "Roman Britain in 1981." *Britannia* Vol. 13: 327-422.

Rebourg, A. 1993. *Saône-et-Loire*. Carte archeologique de la Gaule, Vol. 71, No. 3. Paris: Académie des Inscriptions et Belles-Lettres.

--------------. 1994. *Saône-et-Loire*. Carte archeologique de la Gaule, Vol. 71, No. 4. Paris: Académie des Inscriptions et Belles-Lettres.

Redjeb, T. B. 2012. *La Somme*. Carte archeologique de la Gaule, Vol. 80, No. 2. Paris: Académie des Inscriptions et Belles-Lettres.

Reece, R. 1990. "Romanization: A Point of View," in T. F. C. Blagg and M. Millett (eds.) *The Early Roman Empire in the West*. Oxford: Oxford University Press: 30-34.

-----------. 1993. "Theory and Roman Archaeology." in Scott, E. (ed.) *Theoretical Roman Archaeology: First Conference Proceedings*: 29-38.

Remouchamps, A. E. 1923. “Opgraving van een Romeinsche villa te Ubachsberg.” *Oudheidkundige Mededelingen van het Rijksmuseum voor Oudheden te Leiden* Vol. 4: 64-77.

Renfrew, A. C. 1972. *The Emergence of Civilisation: the Cyclades and the Aegean in the Third Millenium B.C.* London: Methuen.

Renfrew, A. C. 1982a. “Discussion: Contrasting Paradigms,” in A. C. Renfrew and S. Shennan, eds. *Ranking, Resource, and Exchange*. Cambridge: Cambridge University Press.

-----------------. 1982b, “Socio-Economic Change in Ranked Societies,” in A. C. Renfrew and S. Shennan, eds. *Ranking, Resource, and Exchange*. Cambridge: Cambridge University Press.

Revell, L. 2010. “Romanization: A Feminist Critique.” In Moore, A., et al. (eds.) *TRAC 2009: Proceedings of the Nineteeth Annual Theoretical Roman Archaeology Conference, Michigan and Southampton 2009*: 1-10.

Ribeiro, R., et al. 2017. “A Roman Mosaic Unearthed in Armazéns Sommer (Lisbon). Archaeology and Iconography.” *Journal of Mosaic Research*. Vol. 10: 335-346.

Richmond, I. A. 1960. “Roman Britain, 1910-1960.” *The Journal of Roman Studies*, Vol. 50, Parts 1 and 2: 173-191.

von Richthofen, B. 1937. *Die Vor- und Frühgeschichtsforschung im neuen Deutschland*. Berlin: Junker and Dünnhaupt.

Riggsby, A. 1997. “’Public’ and ‘Private’ in Roman Culture: The Case of the *Cubiculum*.” *Journal of Roman Archaeology* Vol. 10: 36-56.

Rihll, T. and A. Wilson. 1991. “Modelling Settlement Structures in Ancient Greece: New Approaches to the Polis.” in J. Rich and A. Wallace-Hadrill, eds. *City and Country in the Ancient World*. London: Routledge: 59-96.

Rippengal, R. 1993. “’Villas As a Key to Social Structure’? Some Comments on Recent Approaches to the Romano-British Villa and Some Suggestions Toward an Alternative.” In Scott, E. (ed.) *Theoretical Roman Archaeology: First Conference Proceedings*: 79-101.

Rives, J. B. 2007. *Religion in the Roman Empire*. Oxford: Oxford University Press.

Rivet, A. L. F. 1969. *The Roman Villa in Britain*. Santa Barbara: Praeger.

Robinson, D. And V. W. Graham. 1938. *Excavations at Olynthus VIII: The Hellenic House*. Baltimore: Johns Hopkins.

Rodwell, et al. 1973. “The Roman Villa at Rivenhall, Essex: An Interim Report.” *Britannia*. Vol. 4: 115-127.

Romanowska, I. 2015. "So You Think You Can Model? A Guide to Building and Evaluating Archaeological Simulation Models of Dispersals." *Human Biology*. Vol. 87(3): 169-193.

Romero, A.-M. 2006. *Bibracte. Archéologie d'une ville gauloise*. Bibracte-Centre archéologique européen.

Rothman, M. 1987. "Graph Theory and the Interpretation of Regional Survey Data." *Paléorient* Vol. 13(2): 73-91.

Roymans, N. 2004. *Ethnic Identity and Imperial Power: the Batavians in the Roman Empire*. Amsterdam: Amsterdam University Press.

Samson, R. 1990. "Comment on Eleanor Scott's 'Romano-British Villas and the Social Construction of Space.'" In R. Samson, ed. *The Social Archaeology of Houses*. Edinburgh: Edinburgh University Press: 173-180.

Schiffer, M. 1972. "Archaeological context and systemic context." *American Antiquity*. Vol. 37(2): 156-165.

--------------. 1976. *Behavioral Archaeology*. New York: Academic.

Schönberger, H. 1969. "The Roman Frontier in Germany: An Archaeological Survey." *The Journal of Roman Studies,* Vol. 59, No. 1, 2: 144-197.

Scott, E. 1990. "Romano-British Villas and the Social Construction of Space." In R. Samson, ed. *The Social Archaeology of Houses*. Edinburgh: Edinburgh University Press: 149-172.

---------. 1993. *A Gazetteer of Roman Villas in Britain*. Leicester: Leicester University Archaeology.

Scott, S. 1994. "Patterns of Movement: Architectural Deisgn and Visual Planning in the Romano-British Villa." In M. Locock, ed. *Meaningful Architecture: Social Interpretations of Buildings*. Aldershot: Avebury: 86-98.

Segarra, S., M. Eisen, G. Egan, and A. Ribeiro. 2016. "Attributing the Authorship of the *Henry VI* Plays by Word Adjacency." In *Shakespeare Quarterly*. Vol. 67(2): 232-256.

Shanks, M. 2009. "Post-processual Archaeology and After." in H. Maschner, C. Chippendale, and A. Bentley, eds. *A Handbook of Archaeological Theories*. Lanham: AltaMira: 133-144.

Shanks, M. and C. Tilley. *Re-Constructing Archaeology: Theory and Practice*. 2nd Edition. London and New York: Routledge.

Shennan, S. J. "Trends in the study of later European prehistory," *Annual Review of Anthropology* Vol. 16: 365-382.

Simpson, L. 2014. *Neighborhood Networks: Social and Spatial Organization of Domestic Architecture in Greco-Roman Karanis, Egypt*. Unpublished PhD Dissertation. UCLA.

Sindbaek, S. 2007. "The Small World of the Vikings: Networks in Early Medieval Communication and Exchange." *Norwegian Archaeological Review*. Vol. 40(1): 59-74.

Slofstra, J. 1983. "An Anthropological Approach to the Study of Romanization Processes," in R. Brandt and J. Slofstra (eds.) *Roman and Native in the Low Countries. Spheres of Interaction*. BAR International Series 184. Oxford: Archaeopress: 71-104.

------------. 1991. "Changing Settlement Patterns in the Meuse-Demer-Scheldt Area during the Early Roman Period." in N. Roymans and F. Theuws, eds. *Images of the Past: Studies on Ancient Societies in Northwestern Europe*: Chicago: University of Chicago Press: 131-199.

Smith, D. J. 1969. "The Mosaic Pavements." in A. L. F. Rivet, ed. *The Roman Villa in Britain*. Santa Barbara: Praeger: 71-125.

-------------. 1978. "Regional Aspects of the Winged Corridor Villa in Britain." In M. Todd, ed. *Studies in the Romano-British Villa*. London: Continuum International: 117-148.

-------------. 1984. "Second-century Traditions in Romano-British Mosaics." *Mosaic* Vol. 11: 4-8.

Smith, J. T. 1997. *Roman Villas: A Study in Social Structure*. New York: Routledge.

-------------. 1978a. "Halls or Yards? A Problem of Villa Interpretation." *Britannia*, Vol. 9: 351-358.

-------------. 1978b. "Villas as a Key to Social Structure." In M. Todd, ed. *Studies in the Romano-British Villa*. London: Continuum International: 149-186.

Smolla, G. 1964. "Analogien und Polaritäten." In R. v. Uslar and K. J. Narr, eds. *Srudien aus Alteuropa*, vol. 1. Beihefte der Bonner Jahrbücher 10/1. Cologne: Böhlau: 30-35.

------------. 1984. "Gustaf Kossinna nach 50 Jahren." *Acta Prehistorica et Archaeologica* Vol. 16/17: 9-14.

Sommer, C. S. 1999. "From Conquered Territory to Roman Province: Recent Discoveries and Debate on the Roman Occupation of SW Germany," in Creighton, J. D. and R. J. A. Wilson (eds.) *Roman Germany: Studies in Cultural Interaction*. JRA Supplementary Series 32: 160-198.

Spence-Morrow, G. 2009. "Analyzing the Invisible: Syntactic Interpretation of Archaeological Remains Through Geophysical Prospection." in D. Koch, et al., eds. *Proceedings of the 7th International Space Syntax Symposium*: 106-110.

Stampfuß, R. 1935. *Gustaf Kossinna, ein Leben für die Deutsche Vorgeschichte.* Leipzig: Kabitzsch.

Staski, E., ed. 1987. *Living in Cities: Current Research in Urban Archaeology*. Society for Historical Archaeology.
Stöger, H. 2014. "The spatial signature of an *insula* neighborhood of Roman Ostia," in E. Paliou et al. (eds.) *Spatial Analysis and Social Spaces: Interdisciplinary Approaches to the Interpretation of Prehistoric and Historic Built Environments*. Berlin: De Gruyter: 297-315.

-----------. 2015. "Roman Neighborhoods by the Numbers: A Space Syntax View on Ancient City Quarters and Their Social Life." *Journal of Space Syntax*. Vol. 6(1): 61-80.

Storey, G. 2013. "Housing and Domestic Architecture." in P. Erdkamp, ed. *The Cambridge Companion to Ancient Rome*. Cambridge: Cambridge University Press: 151 - 168.

Swoboda, K. 1918. *Römische und römanische Paläste: eine Architekturgeschichtliche Untersuchung*. Vienna: Kunstverlag Anton Schroll.

Tan, Z. M. 2014. "Subversive Geography in Tacitus' 'Germania.'" *The Journal of Roman Studies*. Vol. 104: 181-204.

Taylor, J. 2007. *An Atlas of Roman Rural Settlement in England*. Council for British Archaeology.

Teichner, F. 2008. *Zwischen Land und Meer - Entre terre y mar. Studien zur Architektur und Wirtschaftsweise ländlicher Siedlungen im Süden der römischen Provinz Lusitanien*. Stvdia Lvsitania 3. Merida.

Terrenato, N. 2001. "The Auditorium Site in Rome and the Origins of the Villa." *Journal of Roman Archaeology*. Vol. 14: 5-32.

Thébert, Y. 1987. "Private life and domestic architecture in Roman Africa." In P. Veyne, ed. *A History of Private Life 1: From Pagan Rome to Byzantium*. Cambridge: Cambridge University Press: 326-329.

Thévenard, J.-J. 1996. *La Haute-Marne*. Carte archeologique de la Gaule, Vol. 52. Paris: Académie des Inscriptions et Belles-Lettres.

Thomas, C., ed. 1966. *Rural Settlement in Roman Britain*. CBA Research Report 7.

Thomas, E. 2007, *Monumentality and the Roman Empire: Architecture in the Antonine Age*. Oxford: Oxford University Press.

Thompson, E. A. 1956. "The Settlement of the Barbarians in Southern Gaul." *The Journal of Roman Studies*. Vol. 46, Parts 1 and 2: 65-75.

Thompson, H. And R. E. Wycherley 1972. *Excavations in the Athenian Agora XIV: The History, Shape, and Uses of an Ancient City Center*. American School of Classical Studies.

Todd, M. 1970. “The Small Towns of Roman Britain.” *Britannia* Vol. 1: 114-130.

Todd, M. (ed.) 1978. *Studies in the Romano-British villa*. Leicester: Leicester University Archaeology.

Tombrägel, M. 2010. “Der fundus Quintiliolus bei Tivoli im Spannungsfeld zwischen historischer und archäologischer.” in T. Capelle, et al. (eds.), *Imperium - Varus und seine Zeit, Beiträge zum internationalen Kolloquium des LWL-Römermuseums (Münster 2008)*. Münster: 237-244.

Trigger, B. 1980. *Gordon Childe: Revolutions in Archaeology*. London: Thames & Hudson.

------------. 1989. *A History of Archaeological Thought*. Cambridge: Cambridge University Press.

------------. 2007. *A History of Archaeological Thought*, 2nd ed. Cambridge: Cambridge University Press.

Tsakirgis, B. 1996. “Greek Houses and Households.” *American Journal of Archaeology*. Vol. 100: 777-781.

Tully, D. 2000. “The Application of GIS to the Study of Settlement Patterns: Silchester, a Case Study.” In Fincham, G., et al. (eds.) *TRAC 99: Proceedings of the Ninth Annual Theoretical Roman Archaeology Conference, Durham 1999*: 104-117.

Upex, S. 2001. “The Roman Villa at Cotterstock, Northamptonshire.” *Britannia*. Vol. 32: 57-91.

Van Oyen, A. 2013. “Towards a Post-Colonial Artefact Analysis.” *Archaeological Dialogues*. Vol. 20 (1): 87-107.

----------------. 2015. “Deconstructing and Reassembling the Romanization Debate through the Lens of Postcolonial Theory: From Global to Local and Back?” *Terra Incognita*. Vol. 5: 205-226.

----------------. 2016. *How Things Make History: The Roman Empire and its Terra Sigillata Pottery*. Amsterdam: Amsterdam University Press.

----------------. 2017. “Agents and commodities: a response to Brughmans and Poblome (2016) on modelling the roman economy.” *Antiquity*. Vol. 91 (359): 1356-1363.

Veit, U. 2000. “Gustaf Kossinna and His Concept of a National Archaeology.” in H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 40-64.

Van de Velde, P. 1994. “A Short History of Dutch Archaeology.” Universiteit Leiden: 1-23.

Versluys, M. 2013. “Material Culture and Identity in the Late Roman Republic (c.200-c.20).” in J. D. Evans, ed. *A Companion to the Archaeology of the Roman Republic*. Oxford: Blackwell: 429-440.

Versluys, M. 2014. “Understanding Objects in Motion. An Archaeological Dialogue on Romanization.” *Archaeological Dialogues*. Vol. 21 (1): 1-20.

de Vos, A. and M. de Vos. 1982. *Pompei, Ercolano, Stabia*. Laterza.

Wabont, M., F. Abert, and D. Vermeersch. 2006. *Le Val-d’Oise*. Carte Archeologique de la Gaule, Vol. 95. Paris: Académie des Inscriptions et Belles-Lettres.

Wacher, J. 1998. *Roman Britain*. Phoenix Mill: Wrens Park.

Wallace-Hadrill, A. 1988. “The Social Structure of the Roman House,” in *Papers of the British School at Rome*. Vol. 56: 43-97.

----------------------. 1994. *Houses and Society in Pompeii and Herculaneum*. Princeton: Princeton University Press.

----------------------. 1997. “Rethinking the Roman atrium house,” in R. Laurence and A. Wallace-Hadrill (eds.) *Domestic Space in the Roman World: Pompeii and Beyond*. JRA Supplementary Series 22: 219-240.

Ward-Perkins, J. B. 1970. “From Republic to Empire: Reflections on the Early Provincial Architecture of the Roman West.” *The Journal of Roman Studies*. Vol. 60: 1-19.

Wasserman, S. and K. Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Watts, D. J. 2003. *Six Degrees: The Science of a Connected Age*. New York and London: W. W. Norton and Company.

Watts, D. J. 2004. “The ‘New’ Science of Networks.” *Annual Review of Sociology*. Vol. 30(1): 243-270.

Watts, D. J. And S. H. Strogatz. 1998. “Collective Dynamics of ‘Small-World’ Networks.” *Nature*. Vol. 393(6684): 440-442.

Webster, J. 2001. “Creolizing the Roman Provinces.” *American Journal of Archaeology*. Vol. 105: 209-225.

Wells, C. M. 1992. *The Roman Empire,* 2nd ed. Harvard: Harvard University Press.

Wells, C. M. 1998. “What’s New Along the Lippe: Recent Work in North Germany.” *Britannia*. Vol. 29: 457-64.

Wells, P. 1999. *The Barbarians Speak*. Princeton: Princeton University Press.

Wheeler, R. E. M. 1921. "A Roman Fortified House near Cardiff." *The Journal of Roman Studies*. Vol. 11: 67-85.

---------------------. 1932. "Notes on Building-Construction in Roman Britain." *The Journal of Roman Studies*, Vol. 22, Part 1: 117-134.

Whitley, J. 2001. *The Archaeology of Ancient Greece*. Cambridge: Cambridge University Press.

Whitmarsh, T. 2010. *Local Knowledge and Microidentities in the Imperial Greek World: Greek Culture in the Roman World*. Cambridge: Cambridge University Press.

Whittaker, C. R. 1997. "Imperialism and Culture: The Roman Initiative." D. J. Mattingly (ed.) *Dialogues in Roman Imperialism: Power, Discourse, and Discrepant Experience in the Roman Empire*. Journal of Roman Archaeology, Supplementary Series 23: 143-163.

Wigg, A. 1999. "Configuration and Interaction: Celts, Germans and Romans in the Central German Highlands," in Creighton, J. D. and R. J. A. Wilson (eds.) *Roman Germany: Studies in Cultural Interaction*. JRA Supplementary Series 32: 35-53.

Wiggins, M. 2014. *Roman Households: Space, Status and Identity*. Unpublished PhD Dissertation.

Wightman, E. 1970. *Roman Trier and the Treveri*. London: Hart-Davis.

----------------. 1985. *Gallia Belgica*. Berkeley: University of California Press.

Willey, G. And P. Phillips. 1958. *Method and Theory in American Archaeology*. Chicago: University of Chicago Press.

Willems, W. J. H. 1990. *Romeins Nijmegen. Vier eeuwen stad en centrum aan der Waal*. Utrecht.

Williams, R. J. and R. J. Zeepvat. 1994. *Bancroft: a late Bronze Age/Iron Age settlement, Roman villa and temple-mausoleum*. Buckinghamshire Archaeological Society Monograph Series 7. Aylesbury.

Williamson, T. M. 1984. "The Roman Countryside: Settlement and Agriculture in N. W. Essex." *Britannia*. Vol. 15: 225-230.

Wilson, D. R. 1970. "Roman Britain in 1969." *Britannia*. Vol. 1: 268-315.

----------------. 1971. "Roman Britain in 1970." *Britannia*. Vol. 2: 242-304.

Wilson, D. R. 1972. “Roman Britain in 1971.” *Britannia*. Vol. 3: 298-367.

----------------. 1973. “Roman Britain in 1972.” *Britannia*. Vol. 4: 270-337.

----------------. 1974a. “Romano-British Villas from the Air.” *Britannia*. Vol. 5: 251-261.

----------------. 1974b. “Roman Britain in 1973.” *Britannia*. Vol. 5: 396-480.

----------------. 1975. “Roman Britain in 1974.” *Britannia*. Vol. 6: 220-294.

----------------. 2004. “The North Leigh Roman Villa: Its Plan Reviewed.” *Britannia*. Vol. 35: 77-113

Wilson, R. J. A. 2006. “Review: What’s New in Roman Baden-Württemberg?” *The Journal of Roman Studies*, Vol. 96: 198-212.

Wilson, R. J. A. and J. D. Creighton. 1999. “Introduction: Recent Research on Roman Germany,” in Creighton, J. D. and R. J. A. Wilson (eds.) *Roman Germany: Studies in Cultural Interaction*. JRA Supplementary Series 32: 9-34.

Witts, P. 2000. “Mosiacs and Room Function: the Evidence from Some Fourth-Century Romano-British Villas.” *Britannia*. Vol. 31: 291-324.

Wiwjorra, I. 1996. “German Archaeology and Its Relation to Nationalism and Racism.” in M. Diaz-Andreu and T. Champion, eds. *Nationalism and Archaeology in Europe*. Boulder and San Francisco: Westview Press: 164-188.

Woimant, G.-P. 1995. *L’Oise*. Carte archeologique de la Gaule, Vol. 60. Paris: Académie des Inscriptions et Belles-Lettres.

Wolfe, A. 1978. “The Rise of Network Thinking in Anthropology.” *Social Networks*. Vol. 1: 53-64.

Wolfram, S. 2000. “’*Vorsprung durch Technik*’ or ‘Kossinna Syndrome?’ Archaeological Theory and Social Context in Post-war West Germany.” in H. Härke, ed. *Archaeology, Ideology and Society: The German Experience*. Frankfurt am Main: Peter Lang: 180-201.

Woolf, G. 1995. “Romans and Civilizers. The Ideological Pre-conditions of Romanization,” in J. Metzler, M. Millett, N. Roymans, and J. Slofstra (eds.) *Integration in the Early Roman West. The Role of Culture and Ideology*. Luxembourg: Musée national d’histoire et d’art: 9-18.

-----------. 1998. *Becoming Roman: The Origins of Provincial Civilization in Gaul*. Cambridge: Cambridge University Press.

-----------. 2004. “The Present State and Future Scope of Roman Archaeology: A Comment.” *American Journal of Archaeology*. Vol. 108(3): 417-428.

Woolf, G. 2011. “Afterword: Catastrophe and Aftermath” in Sweetman, R. J., ed. 2011. *Roman Colonies in the First Century of their Foundation*. Oxford: Oxbow.

-----------. 2014. “Romanization 2.0 and Its Alternatives.” *Archaeological Dialogues*. Vol. 21 (1): 45-50.

Ytterberg, M. 2005. *The Perambulations of Hadrian: A Walk through Hadrian’s Villa*. Dissertation, University of Pennsylvania.

Zanker, P. 1998. *Pompeii: Public and Private Life*. Harvard: Harvard University Press.

Zieling, N. 1994. “Das Stadtbad der Colonia Ulpia Traiana,” *Archäologie im Rheinland 1993*. Cologne: 64-67.

Zubrow, E. 1990. “Modelling and Prediction with Geographic Information Systems: A Demographic Example from Prehistoric and Historic New York.” In K. Allen, S. Green, and E. Zubrow, eds. *Interpreting Space: GIS and Archaeology*. Boca Raton: CRC Press: 307-318.

Appendix A – Insular Data

Item	Name	Structures	Entrance	Node	Courtyard	Hypo	Rural/ Urban	RRA	D_k	TDn	MDn	RA	Start	End	Date	Type
1	Abermagwr	1	1	9	0	FALSE	Rural	0.901305	0.317	16.888889	2	0.285714	200	400	3rd - 4th c.	Winged-corridor
2	Ancaster	1	2	3	0	FALSE	Rural	0.666666	N/A	2.666666	1.333333	0.666666	300	350	early 4th c.	Corridor
3a	Bancroft 1.5	1	1	10	0	TRUE	Rural	1.034859	0.306	20.4	2.266667	0.316667	100	200	2nd c.	Aisled
3b	Bancroft 2	1	1	12	0	TRUE	Rural	1.222751	0.285	30.166667	2.742424	0.348484	150	250	late 2nd-early 3rd c.	Winged-corridor
3c	Bancroft 3	1	1	18	0	TRUE	Rural	1.113456	0.237	52.888889	3.111111	0.263889	325	375	mid 4th c.	Winged-corridor
4	Barcombe	1	1	16	0	FALSE	Rural	0.839498	0.251	37.125	2.475	0.210714	200	300	3rd c.	Winged-corridor
5	Barnsley Park	1	2	17	0	TRUE	Rural	1.542909	0.244	61.17647	3.823529	0.37647	350	360	c. 350-360	Winged-corridor
6	Barton Court Farm	1	1	10	0	FALSE	Rural	1.14379	0.306	21.6	2.4	0.35	200	300	3rd c.	Corridor
7	Beadlam	2	2	23	0	TRUE	Rural	1.404876	0.209	89.826087	4.083004	0.293619	300	400	4th c.	Winged-corridor
8	Beddington	1	1	27	0	TRUE	Rural	1.23813	0.192	103.259259	3.97151	0.237721	50	400	1st - 4th c.	Winged-corridor
9	Begbroke/Blenheim	1	1	10	0	FALSE	Rural	0.925925	0.306	19.2	2.133333	0.283333	200	400	3rd-4th c.	Corridor
10a	Bignor (complex)	4	4	85	3	TRUE	Rural	1.872181	0.094	697.482353	8.303361	0.175985	200	400	c. 200-400	Courtyard
10b	Bignor (main)	1	1	73	2	TRUE	Rural	1.603644	0.104	498.287671	6.920662	0.166779	200	400	c. 200-400	Courtyard

11	Boughspring	1	1	10	0	TRUE	Rural	1.633987	0.306	27	3	0.5	100	300	2nd-3rd c.	Winged-corridor
12a	Boxmoor 1	1	1	8	0	FALSE	Rural	1.270326	0.328	15.75	2.25	0.416667	50	100	late 1st c.	Corridor
12b	Boxmoor 2	1	1	9	0	FALSE	Rural	1.001451	0.317	16.888889	2.111111	0.31746	100	200	2nd c.	Corridor
12c	Boxmoor 3	1	1	11	0	FALSE	Rural	0.876563	0.295	21.636364	2.163636	0.258586	100	200	2nd c.	Corridor
12d	Boxmoor 4	1	1	11	0	FALSE	Rural	0.945044	0.295	22.545454	2.254545	0.278788	200	300	3rd c.	Corridor
12e	Boxmoor 5A	1	1	20	0	TRUE	Rural	1.325346	0.306	23.6	2.622222	0.405556	300	350	early 4th c.	Corridor
12f	Boxmoor 5B	1	1	13	0	TRUE	Rural	1.055707	0.276	31.230769	2.602564	0.291375	300	400	4th c.	Corridor
13	Brading	1	1	16	1	FALSE	Rural	1.019729	0.251	41.875	2.791667	0.255952	50	300	1st-3rd c.	Courtyard
14	Bradley Hill	3	3	8	0	FALSE	Rural	1.415506	0.328	16.75	2.392857	0.464286	350	400	late 4th c.	Hall
15	Brantingham	1	1	9	0	TRUE	Rural	1.652397	0.317	22.666667	2.833333	0.52381	300	400	4th c.	Aisled
16	Brislington	1	1	18	0	TRUE	Rural	1.223768	0.237	56.444444	3.320261	0.290033	200	300	3rd	Winged-corridor
17a	Brixworth 1	1	1	7	0	FALSE	Rural	1.176471	0.34	12	2	0.4	70	100	AD 70-100	Hall
17b	Brixworth 3	1	1	17	0	TRUE	Rural	1.398262	0.244	56.941176	3.558824	0.341176	150	250	late 2nd-early 3rd c.	Corridor
18a	Bucknowle 1	2	2	17	1	FALSE	Rural	1.824172	0.244	69.411765	4.338235	0.445098	200	200	c. 200	Aisled
18b	Bucknowle 2	1	2	29	1	FALSE	Rural	1.545853	0.184	135.517241	4.839901	0.284437	250	250	c.250	Corridor
18c	Bucknowle 3	1	2	31	1	TRUE	Rural	1.627275	0.178	156	5.2	0.289655	270	370	c. 270-370	Corridor

19a	Caerwent, House I.28N Phase 1	1	1	16	0	FALSE	Urban	1.033 961	0.2 51	42.25	2.816 667	0.25 952 4	200	400	3-4 c.	Courtyard
19b	Caerwent, House I.28N, Phase 3	2	2	23	2	FALSE	Urban	1.453 507	0.2 09	92.1739 13	4.189 723	0.30 378 3	200	400	3-4 c.	Courtyard
20	Caerwent, House VII	1	1	30	1	FALSE	Urban	1.125 84	0.1 81	111.733 333	3.852 874	0.20 377 7	200	400	3-4 c.	Courtyard
21a	Carisbrooke 1	1	1	5	0	FALSE	Rural	1.515 151	0.3 52	7.2	1.8	0.53 333 3	250	300	late 3rd c.	Aisled
21b	Carisbrooke 2	1	1	18	0	TRUE	Rural	1.178 954	0.2 37	55	3.235 294	0.27 941 2	300	350	early 4th c.	Aisled
22	Castlefield	1	1	5	0	FALSE	Rural	1.136 364	0.3 52	6.4	1.6	0.4	50	150	late 1st-early 2nd c.	Aisled
23	Castor-Mill Hill	4	4	29	0	TRUE	Rural	1.418 935	0.1 84	126.689 655	4.524 631	0.26 108 4	100	200	2nd c.	Hall
24	Cefn Graeanog	1	1	5	0	FALSE	Rural	1.515 151	0.3 52	7.2	1.8	0.53 333 3	100	200	2nd c.	Aisled
25	Chedworth	1	2	54	2	TRUE	Rural	1.707 874	0.1 27	351.888 889	6.639 413	0.21 69	100	150	early 2nd c.	Winged-corridor
26	Beeches Road, Cirencester	1	1	12	0	FALSE	Urban	0.946 305	0.2 85	25.8333 33	2.348 485	0.26 969 7	100	200	2nd c.	Aisled
27a	Cirencester, Building XII, 1	1	1	24	0	TRUE	Urban	1.100 615	0.2 05	80.0833 33	3.481 884	0.22 562 6	100	200	2nd c.	Corridor
27b	Cirencester, Building XII, 2	1	1	22	1	TRUE	Urban	1.563 701	0.2 14	91.2727 27	4.346 32	0.33 463 2	100	200	2nd c.	Corridor
28a	Clanville 1	1	1	5	0	FALSE	Rural	1.515 151	0.3 52	7.2	1.8	0.53 333 3	100	200	2nd c.	Aisled
28b	Clanville 2	1	1	16	0	FALSE	Rural	0.962 817	0.2 51	40.375	2.691 667	0.24 166 7	250	350	late 3rd-early 4th c.	Aisled
29a	Clear Cupboard 1	1	1	3	0	FALSE	Rural	0.666 667	N/ A	2.66666 7	1.333 333	0.66 666 7	300	350	early 4th c.	Aisled
29b	Clear Cupboard 2	1	1	6	0	FALSE	Rural	1.241 642	0.3 49	9.33333 3	1.866 667	0.43 333 3	325	350	2nd quarter 4th c.	Aisled

29c	Clear Cupboard 3	1	1	9	0	FALSE	Rural	0.926344	0.317	16.222222	2.027778	0.293651	350	375	3rd quarter 4th c.	Winged-corridor
29d	Clear Cupboard 4	1	1	11	0	FALSE	Rural	0.958739	0.295	22.727273	2.272727	0.282828	350	400	late 4th c.	Winged-corridor
30	Colerne	1	1	19	0	TRUE	Rural	1.16155	0.231	59.052632	3.280702	0.268318	100	200	2nd c.	Corridor
31	Combley	1	1	17	0	TRUE	Rural	1.856316	0.244	70.352941	4.397059	0.452941	250	300	late 3rd c.	Aisled
32	Cotterstock	2	1	72	4	FALSE	Rural	2.29919	0.105	670.916667	9.449531	0.241415	300	400	4th c.	Courtyard
33a	Cox Green 1	1	1	3	0	FALSE	Rural	0.666667	N/A	2.666667	1.333333	0.666667	100	150	early 2nd c.	Aisled
33b	Cox Green 2	1	1	11	0	TRUE	Rural	1.082007	0.295	24.363636	2.436364	0.319192	150	200	late 2nd c.	Winged-corridor
33c	Cox Green 3	1	1	15	0	TRUE	Rural	1.125772	0.259	40.533333	2.895238	0.291575	200	300	3rd c.	Winged-corridor
34a	Denton 2	1	1	11	0	FALSE	Rural	1.547681	0.295	30.545455	3.054545	0.456566	300	400	4th c.	Aisled
34b	Denton 3	1	1	12	0	FALSE	Rural	1.563	0.285	35.5	3.227273	0.445455	350	400	late 4th c.	Aisled
35	Ditches	1	1	17	0	FALSE	Rural	0.731275	0.244	37.411765	2.338235	0.178431	50	100	late 1st c.	Winged-corridor
36	Dorchester	1	1	5	0	FALSE	Rural	1.515151	0.352	7.2	1.8	0.533333	300	350	early 4th c.	Hall
37	Drayton II	1	1	21	0	TRUE	Rural	1.116427	0.22	66.666667	3.333333	0.245614	200	300	3rd c.	Hall
38	East Grimstead	1	1	19	0	FALSE	Rural	1.414706	0.231	68	3.777778	0.326797	200	400	3rd-4th c.	Corridor
39	Eaton-by-Tarporley	1	1	11	0	TRUE	Rural	1.054614	0.295	24	2.4	0.311111	350	350	c.350	Winged-corridor
40a	Ely Early 1	2	2	15	1	TRUE	Rural	1.188	0.259	42	3	0.307692	100	150	1st half 2nd c.	Winged-corridor

40b	Ely Early 2	3	3	21	1	TRUE	Rural	1.228068	0.22	71.333333	3.566667	0.270175	100	150	1st half 2nd c.	Winged-corridor
40c	Ely Middle	3	3	22	1	TRUE	Rural	1.28614	0.214	75.909091	3.614719	0.275234	200	300	3rd c.	Winged-corridor
40d	Ely Late	3	3	23	1	TRUE	Rural	1.23377	0.209	81.565217	3.70751	0.257858	300	350	early 4th c.	Winged-corridor
41a	Engleton 1	1	1	11	0	TRUE	Rural	1.684644	0.295	32.363636	3.236364	0.49697	150	200	late 2nd c.	Corridor
41b	Engleton 2	1	1	18	0	TRUE	Rural	1.501198	0.237	62.666667	3.686275	0.335784	200	300	3rd c.	Corridor
41c	Engleton 3	1	1	19	0	TRUE	Rural	1.375987	0.231	66.631579	3.701754	0.317853	250	300	late 3rd c.	Winged-corridor
41d	Engleton 4	1	1	22	0	TRUE	Rural	1.383664	0.214	83.181818	3.961039	0.296104	300	400	4th c.	Winged-corridor
42	Exning	1	1	16	0	TRUE	Rural	0.787327	0.251	35.75	2.383333	0.197619	250	300	late 3rd c.	Aisled
43	Finkley	1	1	7	0	FALSE	Rural	1.176471	0.34	12	2	0.4	100	200	2nd c.	Aisled
44	Folkestone	1	1	39	0	TRUE	Rural	1.285755	0.155	178.102564	4.68691	0.199292	100	200	2nd c.	Winged-corridor
45a	Frocester Court 1	1	1	5	0	FALSE	Rural	1.515151	0.352	7.2	1.8	0.533333	275	275	c 275	Aisled
45b	Frocester Court 2	1	1	14	0	FALSE	Rural	1.2553	0.267	39.142857	3.010989	0.335165	300	300	c 300	Winged-corridor
45c	Frocester Court 3	1	3	20	0	FALSE	Rural	1.348929	0.225	70.9	3.731579	0.303509	360	360	c 360	Winged-corridor
46a	Gadebridge 1	1	1	20	0	FALSE	Rural	1.216373	0.225	65.8	3.463158	0.273684	100	200	2nd c.	Winged-corridor
46b	Gadebridge 2	1	1	26	0	TRUE	Rural	1.060964	0.196	87.384615	3.495385	0.207949	350	350	c. 350	Winged-corridor
47a	Gatcombe 1	1	1	6	0	FALSE	Rural	1.241642	0.349	9.333333	1.866667	0.433333	100	200	2nd c.	Aisled

47b	Gatcombe 2	1	1	4	0	FALSE	Rural	0.5	N/A	4.5	1.5	0.5	200	300	3rd c.	Aisled
48	Gayton Thorpe	2	2	30	0	FALSE	Rural	1.344475	0.181	127.8	4.406897	0.24335	200	300	3rd c.	Winged-corridor
49	Gloucester	1	1	25	1	TRUE	Rural	1.265215	0.2	93.84	3.91	0.253043	200	300	3rd c.	Courtyard
50	Godmanchester	2	2	45	1	TRUE	Rural	1.490831	0.142	244.266667	5.551515	0.211698	250	300	late 3rd c.	Courtyard
51a	Gorhambury 1	1	1	14	0	TRUE	Rural	1.042652	0.267	34.714286	2.67033	0.278388	100	200	2nd c.	Corridor
51b	Gorhambury 2	1	1	21	0	TRUE	Rural	1.175668	0.22	69.142857	3.457143	0.258647	100	200	2nd c.	Corridor
51c	Gorhambury 3	1	1	22	0	TRUE	Rural	1.238014	0.214	76.636364	3.649351	0.264935	100	200	2nd c.	Corridor
51d	Gorhambury 4	1	1	24	0	TRUE	Rural	1.256468	0.205	88.166667	3.833333	0.257576	100	200	2nd c.	Corridor
52a	Great Casterton 2	1	1	4	0	FALSE	Rural	0.666667	N/A	5	1.666667	0.666667	200	300	c 300	Aisled
52b	Great Casterton 3	2	2	9	0	FALSE	Rural	1.301886	0.317	19.555556	2.444444	0.412698	350	350	c 350	Aisled
53	Great Staughton	1	1	7	0	FALSE	Rural	0.728291	0.34	9.714286	1.619048	0.247619	200	300	3rd c.	Winged-corridor
54a	Great Witcombe 1	1	1	26	1	TRUE	Rural	1.573786	0.196	117.538462	4.701538	0.308462	250	270	AD 250-270	Winged-corridor
54b	Great Witcombe 2	1	2	54	1	TRUE	Rural	1.78089	0.127	364.666667	6.880503	0.226173	270	400	AD 270-400	Winged-corridor
55	Halstock	4	5	59	1	TRUE	Rural	1.57375	0.12	370.169492	6.382233	0.18885	100	400	2nd-4th c.	Corridor
56a	Hambleden 1 (Mill End Villa)	1	1	8	0	FALSE	Rural	1.705866	0.328	18.75	2.678571	0.559524	100	200	2nd c.	Corridor
56b	Hambleden 2 (Mill End Villa)	1	1	16	0	FALSE	Rural	1.318534	0.251	49.75	3.316667	0.330952	200	300	3rd c.	Winged-corridor

57	Holbury	1	1	4	0	FALSE	Rural	0.5	N/A	4.5	1.5	0.5	100	200	2nd c.	Hall
58a	Holcombe 1	1	1	3	0	FALSE	Rural	0.666667	N/A	2.666667	1.333333	0.666667	70	70	c. 70	Aisled
58b	Holcombe 2	1	1	12	0	FALSE	Rural	1.020733	0.285	27	2.454545	0.290909	180	200	180-200	Corridor
58c	Holcombe 3	1	1	16	0	FALSE	Rural	1.304307	0.251	49.375	3.291667	0.327381	225	275	mid 3rd c.	Corridor
58d	Holcombe 4	1	1	27	0	TRUE	Rural	1.279677	0.192	105.851852	4.071225	0.245698	250	300	late 3rd c.	Corridor
59a	Holme House 1	1	1	5	0	FALSE	Rural	0.946969	0.352	6	1.5	0.333333	100	200	2nd c.	Corridor
59b	Holme House 2	2	4	19	0	TRUE	Rural	1.614255	0.231	75.052632	4.169591	0.372893	100	200	2nd c.	Winged-corridor
60a	Huntsham 1	1	1	6	0	FALSE	Rural	0.668576	0.349	7.333333	1.466667	0.233333	100	200	2nd c.	Aisled
60b	Huntsham 2	1	1	7	0	FALSE	Rural	0.896359	0.34	10.571429	1.761905	0.304762	200	300	3rd c.	Corridor
61	Montacute-Ham Hill	3	3	18	0	FALSE	Rural	1.241004	0.237	57	3.352941	0.294118	300	400	4th c.	Corridor
62	Iwerne	1	1	6	0	FALSE	Rural	1.337155	0.349	9.666667	1.933333	0.466667	200	300	3rd c.	Aisled
63	Keynsham	1	4	21	1	TRUE	Rural	0.970609	0.22	60.571429	3.028571	0.213534	300	400	4th c.	Courtyard
64	Kings Weston Park	1	1	16	0	TRUE	Rural	1.911402	0.251	65.375	4.358333	0.479762	275	300	end of 3rd c.	Winged-corridor
65a	Landwade 2a	1	1	8	0	FALSE	Rural	1.560686	0.328	17.75	2.535714	0.511905	100	200	2nd c.	Aisled
65b	Landwade 2c	1	1	15	0	FALSE	Rural	0.933429	0.259	36	2.571429	0.241758	200	300	3rd c.	Aisled
66	Lippen Wood	1	1	19	0	FALSE	Rural	1.274727	0.231	63.052632	3.502924	0.294462	200	300	3rd c.	Courtyard

67	Little Chester	1	1	5	1	TRUE	Rural	1.515151	0.352	7.2	1.8	0.533333	50	100	1st c.	Courtyard
68a	Littlecote Park 1	3	3	21	0	TRUE	Rural	1.084527	0.22	65.333333	3.266667	0.238596	170	170	c. 170	Winged-corridor
68b	Littlecote Park 2	3	3	25	0	TRUE	Rural	1.09565	0.2	84.48	3.52	0.21913	200	270	c. 200-270	Winged-corridor
68c	Littlecote Park 3	3	3	26	0	TRUE	Rural	1.119832	0.196	90.846154	3.633846	0.219487	290	290	c. 290	Winged-corridor
68d	Littlecote Park 4	3	4	39	0	TRUE	Rural	1.285755	0.155	178.102564	4.68691	0.199292	360	365	c. 360-365	Winged-corridor
69	Llantwit Major	5	10	53	1	TRUE	Rural	1.31075	0.12	260.566038	5.010885	0.15729	100	200	2nd c.	Courtyard
70	Lockleys	1	1	6	0	FALSE	Rural	1.241642	0.349	9.333333	1.866667	0.433333	125	175	mid 2nd c.	Winged-corridor
71a	Lullingstone 1	1	1	11	0	FALSE	Rural	1.136793	0.295	25.090909	2.509091	0.335354	100	100	c. 100	Corridor
71b	Lullingstone 2	1	1	24	0	TRUE	Rural	1.317522	0.205	91.333333	3.971014	0.270092	150	200	2nd half of 2nd c.	Winged-corridor
71c	Lullingstone 3/4	1	2	23	0	TRUE	Rural	1.176134	0.209	78.782609	3.581028	0.245812	360	360	c. 360	Winged-corridor
72a	Mansfield Woodhouse 2	1	1	14	0	FALSE	Rural	0.960337	0.267	33	2.538462	0.25641	300	300	c. 300	Aisled
72b	Mansfield Woodhouse 3	1	1	11	0	FALSE	Rural	1.082007	0.295	24.363636	2.436364	0.319192	325	325	c. 325	Winged-corridor
73	Newport	1	1	19	0	TRUE	Rural	1.40875	0.231	67.789474	3.766082	0.325421	200	300	3rd c.	Winged-corridor
74	Newton St. Loe	2	2	36	0	FALSE	Rural	1.470448	0.163	177.111111	5.074603	0.239683	300	400	4th c.	Corridor
75	North Leigh	1	2	98	1	TRUE	Rural	1.198244	0.086	576.795918	5.94635	0.103049	100	150	early 2nd c.	Winged-corridor
76a	Northchurch 1	1	1	6	0	FALSE	Rural	1.528175	0.349	10.333333	2.066667	0.533333	100	200	2nd c.	Aisled

76b	Northchurch 2	1	1	11	0	FALSE	Rural	1.1094	0.295	24.727273	2.472727	0.327273	339	339	c. 339	Corridor
76c	Northchurch 3	1	1	21	0	TRUE	Rural	1.266805	0.22	72.952381	3.647619	0.278697	350	350	c. 350	Corridor
77	Norton Disney	1	1	14	0	FALSE	Rural	0.932899	0.267	32.428571	2.494505	0.249084	300	400	4th c.	Aisled
78	Painted House	1	1	7	0	FALSE	Rural	1.400559	0.34	13.142857	2.190476	0.47619	200	200	c. 200	Corridor
79a	Park Street 1	2	2	7	0	FALSE	Urban	1.064426	0.34	11.428571	1.904762	0.361905	50	100	late 1st c.	Aisled
79b	Park Street 2	1	2	19	0	TRUE	Urban	1.444489	0.231	69.052632	3.836257	0.333677	125	175	mid 2nd c.	Corridor
80a	Piddington 2	1	1	8	0	FALSE	Rural	1.742162	0.328	19	2.714286	0.571429	80	100	c. 80-100	Corridor
80b	Piddington 3	2	2	12	0	FALSE	Rural	1.913877	0.285	41	3.727273	0.545455	100	150	c. 100-150	Corridor
80c	Piddington 4	2	2	22	0	FALSE	Rural	1.733626	0.214	98.909091	4.709957	0.370996	150	180	c. 150-180	Corridor
80d	Piddington 5	1	1	32	0	FALSE	Rural	1.745764	0.174	172.25	5.556452	0.303763	180	200	c. 180-200	Winged-corridor
80e	Piddington 6	1	1	36	0	FALSE	Rural	1.668644	0.163	196.833333	5.62381	0.271989	200	280	c. 200-280	Winged-corridor
80f	Piddington 7	6	6	16	0	FALSE	Rural	1.180992	0.251	46.125	3.075	0.296429	300	380	c. 300-380	Winged-corridor
81	Pitney	5	5	44	3	FALSE	Rural	1.110563	0.144	187.409091	4.358351	0.159921	300	400	3rd-4th c.	Courtyard
82	Quinton	1	1	4	0	FALSE	Rural	0.5	N/A	4.5	1.5	0.5	70	170	c. 70-170	Hall
83	Rapsley	1	1	5	0	FALSE	Rural	1.136364	0.352	6.4	1.6	0.4	100	200	2nd c.	Aisled
84a	Redlands Farm, Stanwick/Meadow Furlong 2b	1	1	8	0	TRUE	Rural	1.596982	0.328	18	2.571429	0.52381	100	200	2nd c.	Winged-corridor

84b	Redlands Farm, Stanwick/Meadow Furlong 2c	1	1	11	0	TRUE	Rural	1.657251	0.295	32	3.2	0.488889	125	175	mid 2nd c.	Winged-corridor
84c	Redlands Farm, Stanwick/Meadow Furlong 2d	1	1	5	0	FALSE	Rural	1.515151	0.352	7.2	1.8	0.533333	200	300	3rd c.	Corridor
85	Rivenhall, Building 1	1	1	16	1	TRUE	Rural	1.128817	0.251	44.75	2.983333	0.283333	80	100	c. 80-100	Corridor
86	Rudston	1	1	13	0	TRUE	Rural	1.123272	0.276	32.461538	2.705128	0.310023	200	400	3rd-4th c.	Corridor
87	Sandwich	1	1	6	0	FALSE	Rural	1.050622	0.349	8.666667	1.733333	0.366667	100	200	2nd c.	Corridor
88	Sedgebrook	1	1	11	0	TRUE	Rural	1.465502	0.295	29.454545	2.945455	0.432323	150	150	c. 150	Winged-corridor
89	Silchester, Insula IX, House 1	1	1	11	0	FALSE	Urban	1.082007	0.295	24.363636	2.436364	0.319192	50	100	1st c.	Corridor
90	Silchester, Insula VIII, House 1	1	1	19	1	TRUE	Urban	1.01561	0.231	53.894737	2.994152	0.234606	50	100	1st c.	Courtyard
91	Silchester, Insula XIX, House 2	1	1	37	1	TRUE	Urban	1.299338	0.16	166..972973	4.638138	0.207894	50	100	1st c.	Courtyard
92	Silchester Insula XXVIII, House 2	1	1	8	0	FALSE	Urban	1.125146	0.328	14.75	2.107143	0.369048	50	100	1st c.	Corridor
93	Silchester Insula XXXIII, House 5	1	1	16	0	FALSE	Urban	1.285335	0.251	48.875	3.258333	0.322619	50	100	1st c.	Winged-corridor
94	Sparsholt - Complex	3	3	27	1	TRUE	Rural	1.060068	0.192	92.148148	3.54416	0.203533	200	400	3rd-4th c.	Corridor
95	Sparsholt - Villa	1	1	13	0	FALSE	Rural	0.895239	0.276	28.307692	2.358974	0.247086	200	400	3rd-4th c.	Corridor
96	Spoonley Wood	1	2	38	1	TRUE	Rural	1.105867	0.158	153.368421	4.145092	0.174727	200	400	3rd-4th c.	Winged-corridor

97a	Stroud 1	1	2	6	0	FALSE	Rural	1.050622	0.349	8.666667	1.733333	0.366667	200	300	3rd c.	Aisled
97b	Stroud 2	2	3	15	0	TRUE	Rural	1.295486	0.259	44.533333	3.180952	0.335531	200	400	3rd-4th c.	Aisled
98	Tarrant Hinton	7	7	37	1	TRUE	Rural	1.058556	0.16	142.702703	3.963964	0.169369	300	400	4th c.	Courtyard
99a	Thistleton 1	1	1	10	0	FALSE	Rural	1.452431	0.306	25	2.777778	0.444444	200	300	3rd c.	Corridor
99b	Thistleton 2	2	2	34	1	TRUE	Rural	1.703619	0.168	184.117647	5.579323	0.286208	300	400	4th c.	Winged-corridor
100	Verulamium, House ?	1	1	25	1	TRUE	Urban	1.347825	0.2	98.4	4.1	0.269565	200	300	3rd c.	Winged-corridor
101a	Watergate 1	1	1	4	0	FALSE	Rural	0.5	N/A	4.5	1.5	0.5	125	175	mid 2nd c.	Hall
101b	Watergate 2	1	1	5	0	FALSE	Rural	1.515151	0.352	7.2	1.8	0.533333	200	250	early 3rd c.	Hall
101c	Watergate 3	1	1	6	0	FALSE	Rural	1.528175	0.349	10.333333	2.066667	0.533333	225	275	mid 3rd c.	Corridor
101d	Watergate 4	1	1	11	0	FALSE	Rural	1.424414	0.295	28.909091	2.890909	0.420202	300	400	4th c.	Corridor
102	West Park, Rockbourne	2	6	40	1	TRUE	Rural	1.211928	0.153	176.4	4.523077	0.185425	300	300	c. 300	Winged-corridor
103	Woodchester	1	1	42	1	FALSE	Rural	0.1995	0.148	186.571429	4.550523	0.177526	300	400	4th c.	Winged-corridor
104	Wraxall	1	2	17	0	TRUE	Rural	1.550947	0.244	61.411765	3.838235	0.378431	250	250	c. 250	Winged-corridor
105	Fishbourne Proto-Palace	1	1	19	1	TRUE	Rural	1.265792	0.231	62.736842	3.48538	0.292398	43	75		Courtyard
106	Fishbourne Flavian Palace	1	2	112	5	TRUE	Rural	1.014641	0.078	594.160714	5.352799	0.079142	80	100		Courtyard

Appendix B – Continental Data

Item	Name	Structures	Entrance	Node	Court yard	Hypo	Urban/ Rural	RRA	D_k	TDn	MDn	RA	Start	End	Date	Type
1	Villa de Loché	1	1	6	0	FALSE	RURAL	1.776504	0.349	11.2	2.24	0.62	200	300	3rd c.	hall
2	La Bussière	1	1	8	1	FALSE	RURAL	1.052555	0.328	14.25	2.035714	0.345238	200	300	3rd c.	courtyard
3	Ciry-le-Noble	1	1	11	0	FALSE	RURAL	1.328539	0.295	27.636364	2.763636	0.391919	200	300	3rd c.	corridor
4	Heurtebise est	1	1	19	0	FALSE	RURAL	0.893498	0.231	49.578947	2.754386	0.206398	200	400	3rd-4th c.	corridor
5	Les Roches	1	1	51	1	TRUE	RURAL	1.31628	0.132	262.843137	5.256863	0.173749	200	300	3rd c.	courtyard
6	Les Corbiers	1	1	6	0	FALSE	RURAL	0.8596	0.349	8	1.6	0.3	98	236	Trajan - 236	hall
7	La Cascade	1	1	11	0	FALSE	RURAL	0.890258	0.295	21.818182	2.181818	0.262626	100	300	2nd - 3rd c.	winged-corridor
8	Le Crot-au-Port	1	4	10	1	TRUE	RURAL	1.034859	0.306	20.4	2.266667	0.316667	200	300	3rd c.	hall
9	Le Tète de Fer, Principal Building	3	3	58	1	TRUE	RURAL	1.536686	0.121	353.758621	6.206292	0.185939	75	300	2nd half 1st - 3rd c.	winged-corridor
10	Attricourt	1	1	30	1	FALSE	RURAL	1.656552	0.181	150.733333	5.197701	0.299836	250	300	2nd half 3rd c.	corridor
11	En Brûle-Bois	1	1	11	0	FALSE	RURAL	0.671119	0.295	18.909091	1.890909	0.19798	75	200	late 1st c. - late 2nd c.	corridor
12	Brussey	1	1	21	0	FALSE	RURAL	0.829345	0.22	54.666667	2.733333	0.182456	100	300	2nd - 3rd c.	winged-corridor
13	Chassey-lès-Montbozon. Main house	1	1	53	1	TRUE	RURAL	0.7781	0.12	175.811321	3.380987	0.093372	25	300	Augustan - 3rd c.	courtyard
14	Chassey-lès-Montbozon. Maison A	1	1	6	0	FALSE	RURAL	0.95511	0.349	8.333333	1.666667	0.333333	100	150	early 2nd c.	corridor
15	Chassey-lès-Montbozon. Maison B	1	1	6	0	FALSE	RURAL	0.668576	0.349	7.333333	1.466667	0.233333	100	150	early 2nd c.	corridor
16a	Frotey-lès-Lure 1	1	1	8	0	TRUE	RURAL	1.016259	0.328	14	2	0.333333	100	250	2nd - 4th c.	corridor
16b	Frotey-lès-Lure 2	1	1	14	0	TRUE	RURAL	1.200423	0.267	38	2.923077	0.320513	250	400	2nd - 4th c.	corridor

17	Jonville	1	1	11	0	TRUE	RURAL	1.87639	0.295	34.909091	3.490909	0.553535	150	200	late 2nd c.	corridor
18	La villa Membrey	1	2	50	0	TRUE	RURAL	1.254669	0.133	245.54	5.004898	0.166871	120	274	Hadrian - Tetricus	winged-corridor
19	Villa du Magny	1	3	50	1	TRUE	RURAL	1.003015	0.133	205.88	4.201633	0.133401	275	400	end of 3rd - 4th c.	courtyard
20	Les Caves	1	1	13	0	FALSE	RURAL	1.123272	0.276	32.461538	2.705128	0.310023	200	300	3rd c.	corridor
21	Les Mazières	1	4	22	3	TRUE	RURAL	1.610229	0.214	93.363636	4.445887	0.344589	120	325	Hadrian - Constantine	courtyard
22	Les Chagnats	3	6	42	4	TRUE	RURAL	1.544797	0.148	228.47619	5.57259	0.22863	200	300	3rd c.	courtyard
23	La Villa Cérès	1	1	24	1	TRUE	RURAL	1.38179	0.205	94.666667	4.115942	0.283267	100	400	2nd - 4th c.	courtyard
24	Les Fontaines Salées	2	4	45	2	FALSE	RURAL	1.514324	0.142	247.422222	5.623232	0.215034	75	500	1st - 5th c.	courtyard
25	Les Hauts de Briotte	1	1	15	1	FALSE	RURAL	0.752402	0.259	31.733333	2.266667	0.194872	200	300	3rd c.	winged-corridor
26	Mont	1	1	10	0	TRUE	RURAL	1.180101	0.306	22	2.444444	0.361111	100	300	2nd - 3rd c.	hall
27	Villars	1	1	19	1	TRUE	RURAL	1.149636	0.231	58.631579	3.25731	0.265566	60	240	Nero - Gordian III	winged-corridor
28	Picarnon	1	1	4	0	FALSE	RURAL	0.333333	N/A	4	1.333333	0.333333	100	200	2nd c.	hall
29	Les Prés Pillats	1	1	5	0	FALSE	RURAL	0.757577	0.352	5.6	1.4	0.266667	100	300	2nd - 3rd c.	hall
30	Neuzy	1	1	8	0	FALSE	RURAL	1.23403	0.328	15.5	2.214286	0.404762	100	400	2nd - 4th c.	hall
31	Les Egliseries	1	1	25	0	TRUE	RURAL	0.908695	0.2	74.16	3.09	0.181739	100	200	2nd c.	winged-corridor
32	Habitat aux Boutiques	1	1	15	0	FALSE	URBAN	1.386	0.259	46.666667	3.333333	0.358974	0	68	Julio-Claudian	hall
33	Habitat gallo-romain, Belfort	2	2	12	0	FALSE	RURAL	1.307814	0.285	31.5	2.863636	0.372727	50	275	1st - 3rd quarter 3rd c.	hall
34	Offemont (main villa)	1	3	42	1	TRUE	RURAL	1.234426	0.148	190.809524	4.653891	0.182695	75	225	end 1st - early 3rd c.	winged-corridor
35	Vernes Villa	1	3	46	1	TRUE	RURAL	1.097307	0.14	197.086957	4.37971	0.153623	150	300	end 2nd - 3rd c.	winged-corridor
36	Townhouse, Insula 55, space 99	1	1	14	0	TRUE	URBAN	1.735468	0.267	49.142857	3.78022	0.46337	100	300	2nd - 3rd c.	hall
37	Residence 1, Insula 57	1	1	12	0	FALSE	URBAN	0.850611	0.285	24.333333	2.212121	0.242424	100	300	2nd - 3rd c.	hall
38	Residence 2, Insula 57	1	1	8	0	TRUE	URBAN	1.560686	0.328	17.75	2.535714	0.511905	100	300	2nd - 3rd c.	hall
39	Residence 1, Insula 63	1	1	7	0	TRUE	URBAN	1.288515	0.34	12.571429	2.095238	0.438095	100	300	2nd - 3rd c.	hall

40	Residence 2, Insula 63	1	1	10	0	TRUE	URBAN	1.198258	0.306	22.2	2.466667	0.366667	100	300	2nd - 3rd c.	hall
41	Residence 3, Insula 63	1	1	6	0	FALSE	URBAN	1.241642	0.349	9.333333	1.866667	0.433333	100	300	2nd - 3rd c.	hall
42	La Pépinière	1	1	6	0	FALSE	RURAL	1.241642	0.349	9.333333	1.866667	0.4333333	50	100	1st c.	corridor
43	Villa de Chaintry	1	1	20	0	TRUE	RURAL	1.164391	0.225	63.8	3.357895	0.261988	90	300	Domitian - Maximian	corridor
44	Presles	1	1	9	0	FALSE	RURAL	1.151669	0.317	18.222222	2.277778	0.365079	100	300	2nd - 3rd c.	corridor
45	Villa des Longues Royes	1	1	30	1	FALSE	RURAL	1.181177	0.181	115.8	3.993103	0.213793	50	300	1st - 3rd c.	hall
46	Mazières	1	2	15	0	TRUE	RURAL	0.766544	0.259	50.133333	3.580952	0.198535	100	300	2nd - 3rd c.	hall
47	La Maison du Propriétaire	1	1	19	1	FALSE	URBAN	1.23303	0.231	61.578947	3.421053	0.28483	100	400	1st - 4th c.	courtyard
48a	La Maison des Escargotiers, Phase 1	1	2	14	2	FALSE	URBAN	1.296457	0.267	40	3.076923	0.346154	0	50	1st half 1st c.	courtyard
48b	La Maison des Escargotiers, Phase 2	1	2	12	2	FALSE	URBAN	1.765018	0.285	38.666667	3.515152	0.50303	50	100	2nd half 1st c.	courtyard
48c	La Maison des Escargotiers, Phase 3	1	2	9	1	FALSE	URBAN	1.552249	0.317	21.777778	2.722222	0.492063	200	300	3rd c.	hall
49	Les Maselles à Thésée	3	3	14	1	FALSE	RURAL	1.221	0.267	38.428571	2.956044	0.326007	117	138	Hadrianic	corridor
50	Villa des Bordes à Pontlevoy	1	2	13	1	FALSE	RURAL	0.91213	0.276	28.615385	2.384615	0.251748	0	274	Augustus - Tetricus II	corridor
51	Les Bolleaux	1	1	18	0	FALSE	RURAL	0.782523	0.237	42.222222	2.48366	0.185458	100	300	2nd - 3rd c.	winged-corridor
52	Villa de Coulanges	1	1	7	0	FALSE	RURAL	0.840335	0.34	10.285714	1.714286	0.285714	100	200	2nd c.	corridor
53	Villa de Soulangé à Pouzay	1	1	74	5	TRUE	RURAL	1.334683	0.104	437.783784	5.997038	0.138807	100	300	2nd - 3rd c.	courtyard
54	La Grange Liénard	1	1	10	0	TRUE	URBAN	1.016703	0.306	20.2	2.244444	0.311111	100	300	2nd - 3rd c.	hall
55	Villa de Cheillé	1	1	24	1	FALSE	RURAL	1.33841	0.205	92.416667	4.018116	0.274374	120	180	Hadrian - Marcus Aurelius	hall
56	Villa de Châtigny	1	2	21	0	TRUE	RURAL	2.134882	0.22	109.238095	5.461905	0.469674	200	400	3rd - 4th c.	winged-corridor
57	Villa de Gannes	1	4	24	1	TRUE	RURAL	1.682254	0.205	110.25	4.793478	0.344862	60	340	Nero - Constantine II	winged-corridor

58	Charnay	1	1	14	0	FALSE	RURAL	1.097528	0.267	35.857143	2.758242	0.29304	175	325	Faustina - Constantine	corridor
59	Tronçay	1	1	9	0	FALSE	RURAL	0.801161	0.317	15.111111	1.888889	0.253968	50	300	1st - 3rd c.	corridor
60	La Touratte	1	1	25	1	TRUE	RURAL	1.16232	0.2	88.16	3.673333	0.232464	50	400	1st - 4th c.	courtyard
61	Grosses Terres	1	1	11	0	FALSE	RURAL	0.794383	0.295	20.545455	2.054545	0.234345	30	380	Tiberius - Valentinian II	hall
62	Le Plaix	1	1	11	0	FALSE	RURAL	1.191576	0.295	25.818182	2.581818	0.351515	260	325	Gallienus - Constantine	corridor
63	Domus des Epars	1	1	18	1	TRUE	URBAN	0.789418	0.237	42.444444	2.496732	0.187092	100	400	2nd - 4th c.	courtyard
64	Habitat des rue Saint-André	1	1	8	0	TRUE	URBAN	1.125146	0.328	14.75	2.107143	0.369048	100	400	2nd - 4th c.	hall
65	Villa de Mienne	1	2	53	1	TRUE	RURAL	1.05865	0.12	220.45283	4.239478	0.127038	100	300	2nd - 3rd c.	courtyard
66	Aiguillettes	5	5	23	2	TRUE	RURAL	1.246378	0.209	82.173913	3.735178	0.260493	50	300	1st - 3rd c.	hall
67a	Les Petit Didris, Phase 1	2	2	6	1	FALSE	RURAL	1.623688	0.349	10.666667	2.133333	0.566667	50	500	1st - 5th c.	hall
67b	Les Petit Didris, Phase 2	1	1	12	0	FALSE	RURAL	0.744284	0.285	22.666667	2.060606	0.212121	50	500	1st - 5th c.	corridor
68	Salweise	3	3	6	1	FALSE	RURAL	1.337155	0.349	9.66667	1.933333	0.466667	0	400	Augustus - 4th c.	hall
69	Heidenschloss	2	2	27	1	TRUE	RURAL	1.296297	0.192	106.888889	4.111111	0.248889	160	330	Antoninus Pius - Constantine	corridor
70	La Villa de Reinheim	1	1	64	0	TRUE	RURAL	1.323737	0.114	357.71875	5.678075	0.150906	200	300	2nd - 3rd c.	winged-corridor
71	Château d'Urville	1	1	11	0	FALSE	RURAL	1.177881	0.295	25.636364	2.563636	0.347475	200	370	2nd - Gratian	corridor
72a	Villa 1, Saint Ulrich, Phase 1	1	1	23	0	TRUE	RURAL	1.147316	0.209	77.391304	3.517787	0.239789	50	250	1st - 4th c.	winged-corridor
72b	Villa 1, Saint Ulrich, Phase 2	1	1	100	2	TRUE	RURAL	1.484274	0.084	703.82	7.109293	0.124679	250	400	1st - 4th c.	courtyard
73	Le Grand Sareu	1	1	13	0	TRUE	RURAL	1.233065	0.276	34.461538	2.871795	0.340326	175	274	3rd quarter 2nd - Tetricus	corridor
74	Larry	1	1	94	1	TRUE	RURAL	1.307352	0.088	585.170203	6.292153	0.115047	100	400	2nd - 3rd/4th c.	courtyard
75	La Villa Haute	1	1	12	0	FALSE	RURAL	1.12706	0.285	28.666667	2.606061	0.321212	160	325	Antoninus Pius - Constantine	corridor
76	Renaucru	1	1	12	0	FALSE	RURAL	1.031365	0.285	27.166667	2.469697	0.293939	200	300	2nd - 3rd c.	corridor
77	Heidenhauser	2	2	34	0	TRUE	RURAL	1.511304	0.168	167.058824	5.062389	0.253899	275	350	end 3rd/start 4th c.	corridor

78	Heidenschloss	1	2	13	1	TRUE	RURAL	1.199283	0.276	33.846154	2.820513	0.331002	200	300	2nd - 3rd c.	winged-corridor
79	Grosswald	1	6	18	0	FALSE	RURAL	0.937646	0.237	47.222222	2.777778	0.222222	50	400	1st - 4th c.	corridor
80	Au Sarrazin	2	3	15	1	TRUE	RURAL	1.295486	0.259	44.533333	3.180952	0.335531	100	400	2nd - 4th c.	corridor
81	La Marlerie	1	1	14	0	TRUE	RURAL	1.275876	0.267	39.571429	3.043956	0.340659	0	330	Augustus - Constantine	corridor
82	La Tâte de Villers	1	1	15	0	TRUE	RURAL	1.28983	0.259	44.4	3.171429	0.334066	100	200	2nd c.	corridor
83	Bois de Lana	1	1	15	0	TRUE	RURAL	1.301143	0.259	44.666667	3.190476	0.336996	98	192	Nerva - Commodus	corridor
84	Villa zu Allenz im Maiengau	1	2	23	0	TRUE	RURAL	1.653431	0.209	101.826087	4.628458	0.345567	325	354	Gallus II	corridor
85	Villa bei Manderscheid in der Eifel	1	1	16	0	FALSE	RURAL	1.266363	0.251	48.375	3.225	0.317857	271	274	Tetricus	winged-corridor
86	Villa bei Stahl im Kreise Bitburg	1	1	18	0	TRUE	RURAL	1.599515	0.237	68.555556	4.03268	0.379085	117	138	Hadrian	winged-corridor
87	Villa C, Rottweil-Altstadt	1	1	41	0	FALSE	RURAL	1.385801	0.151	203.219512	5.080488	0.209256	100	150	1st half, 2nd cent.	corridor
88	Roman Villa, Broichweiden	1	1	8	0	FALSE	RURAL	1.415506	0.328	16.75	2.392857	0.464286	125	175	middle, 2nd cent	corridor
89	Villa rustica B55, Hambacher Forst	1	1	21	0	FALSE	RURAL	1.439964	0.22	80.190476	4.009524	0.316792	175	200	end 2nd cent.	corridor
90a	Villa rustica, Rommerskirchen-Butzheim, IIa	1	1	6	0	FALSE	RURAL	1.241642	0.349	9.333333	1.866667	0.433333	125	275	mid 2nd - mid 3rd	corridor
90b	Villa rustica, Rommerskirchen-Butzheim, IIb	1	1	14	0	TRUE	RURAL	0.987775	0.267	33.571429	2.582418	0.263736	225	275	mid 3rd	winged-corridor
90c	Villa rustica, Rommerskirchen-Butzheim, IIc	1	1	11	0	FALSE	RURAL	0.890258	0.295	21.818182	2.181818	0.262626	275	275	c 275	winged-corridor
91	Villa rustica, Alsdorf-Höngen	1	1	18	0	FALSE	RURAL	0.975565	0.237	48.444444	2.849673	0.231209	50	400	1st - 4th c.	hall
92	Mayen	1	2	12	0	FALSE	RURAL	1.190856	0.285	29.666667	2.69697	0.339394	0	25	Augustan	corridor
93	Villa du Bois de Chelvaux	1	2	6	0	TRUE	RURAL	1.623688	0.349	10.666667	2.133333	0.566667	306	337	Constantine	hall
94	Villa du Margny	1	1	11	0	FALSE	RURAL	1.013525	0.295	23.454545	2.345455	0.29899	75	250	end 1st - early 3rd c.	hall

95a	Guyomerais Phase 1	1	1	7	0	FALSE	RURAL	1.008403	0.34	11.142857	1.857143	0.342857	30	80	30-80	hall
95b	Guyomerais Phase 2	2	3	11	1	FALSE	RURAL	0.876563	0.295	21.636364	2.163636	0.258586	80	180	80-180	corridor
95c	Guyomerais Phase 3	2	2	20	1	FALSE	RURAL	1.317738	0.225	69.7	3.668421	0.296491	180	230	180-230	corridor
95d	Guyomerais Phase 4	1	1	53	1	TRUE	RURAL	1.127667	0.12	231.433962	4.450653	0.13532	225	275	mid 3rd c.	courtyard
96	Villa du Questel	1	1	11	0	TRUE	RURAL	1.465502	0.295	29.454545	2.945455	0.432323	50	400	1st - 4th c.	corridor
97	Villa de Kéradennec	2	1	33	1	TRUE	RURAL	1.161158	0.171	130.484848	4.077652	0.198558	250	300	end 3rd c.	courtyard
98	Villa de Valy-Cloistre	2	2	15	0	TRUE	RURAL	1.097486	0.259	39.866667	2.847619	0.284249	69	169	Vespasian - Lucius Verus	corridor
99	La Villa du Perennou	1	3	14	0	FALSE	RURAL	1.488524	0.267	44	3.384615	0.397436	250	350	end 3rd/start 4th c.	winged-corridor
100	L'habitat de Kergréac'h	1	1	6	0	FALSE	RURAL	0.859599	0.349	8	1.6	0.3	100	200	2nd c.	hall
101	Villa du Mané-Véchen	1	5	29	1	FALSE	RURAL	1.181451	0.184	110.172414	3.934729	0.217387	218	244	Elagabalus - Gordian III	courtyard
102	Tréalvé	1	1	12	0	FALSE	RURAL	1.169589	0.285	29.333333	2.666667	0.333333	253	274	Gallienus - Tetricus	corridor
103	Talhouët	1	1	12	0	FALSE	RURAL	1.297182	0.285	31.333333	2.848485	0.369697	100	200	2nd c.	winged-corridor
104	Etifontaine	1	1	12	0	TRUE	RURAL	1.286551	0.285	31.666667	2.833333	0.366667	81	96	Domitian	hall
105a	Domus de l'îlot B, phase 1	1	1	31	1	TRUE	URBAN	1.048191	0.178	111.16129	3.705376	0.186578	100	200	2nd c.	courtyard
105b	Domus de l'îlot B, phase 2	1	1	29	1	TRUE	URBAN	1.145261	0.184	107.655172	3.844828	0.210728	100	300	2nd - 3rd c.	courtyard
106	Andilly-en-Bassigny	1	2	36	1	TRUE	RURAL	1.399988	0.163	170.777778	4.879365	0.228198	70		70 - 3rd c.	winged-corridor
107	Colmier-le-Bas	1	1	39	1	TRUE	RURAL	1.347877	0.155	184.871795	4.865047	0.208921	25	225	start 1st c. - end 2nd/start 3rd c.	courtyard
108	La Charnonniére	1	1	9	0	FALSE	RURAL	1.101596	0.317	17.777778	2.222222	0.349206	100	300	2nd - 3rd c.	corridor
109	Luzy-sur-Marne	1	2	6	0	FALSE	RURAL	1.910221	0.349	11.666667	2.333333	0.666667	117	138	Hadrian	hall
110	Hambach 59	1	3	37	0	TRUE	RURAL	1.480588	0.16	185.243243	5.145646	0.236894	50	200	late 1st - 2nd c.	winged-corridor
111a	Hambach 512/1	1	1	9	0	FALSE	RURAL	1.151669	0.317	18.222222	2.277778	0.365079	50	150	late 1st - 2nd c.	corridor
111b	Hambach 512/2	1	2	23	0	FALSE	RURAL	1.424689	0.209	90.782609	4.126482	0.29776	150	200	2nd c.	corridor
112	Braunsfeld II	1	1	12	0	TRUE	RURAL	0.999467	0.285	26.666667	2.424242	0.284848	50	200	late 1st - 2nd c.	corridor

113	Flerzheim	1	1	20	0	TRUE	RURAL	0.943471	0.225	55.3	2.910526	0.212281	50	200	late 1st - 2nd c.	winged-corridor
114	Vaasrade	1	1	15	0	TRUE	RURAL	1.323772	0.259	45.2	3.228571	0.342857	100	270		winged-corridor
115a	Voerendaal I	1	1	15	0	FALSE	RURAL	1.001317	0.259	37.6	2.685714	0.259341	50	200		winged-corridor
116	Ravensbosch-Vogelsang	1	1	23	0	TRUE	RURAL	1.694856	0.209	103.826087	4.719368	0.354225	100	300		winged-corridor
115b	Voerendaal II	1	3	12	0	TRUE	RURAL	1.41414	0.285	33.166667	3.015152	0.40303	200	400		corridor
117	Stolberg	1	2	23	0	TRUE	RURAL	1.377861	0.209	88.521739	4.023715	0.287973	150	300		winged-corridor
118a	Blankenheim I	1	1	25	0	TRUE	RURAL	1.833335	0.2	125.2	5.216667	0.366667	50	100		winged-corridor
118b	Blankenheim II	1	1	26	0	TRUE	RURAL	1.864209	0.196	134.615385	5.384615	0.365385	125	175		corridor
118c	Blankenheim III	1	1	43	0	TRUE	RURAL	1.657247	0.146	250.325581	5.960133	0.241958	175	300		corridor
119	Ahrweiler III	1	2	40	0	TRUE	RURAL	1.21281	0.153	176.5	4.525641	0.18556	100	300		corridor
120	Hambach 132	1	1	15	0	TRUE	RURAL	1.470857	0.259	48.666667	3.47619	0.380952	100	300		corridor
121	Hambach 56/III	1	1	17	0	TRUE	RURAL	0.992447	0.244	45.058824	2.816176	0.242157	200	300		winged-corridor
122	Les Quarante	1	1	9	0	FALSE	RURAL	1.70247	0.317	23.111111	2.888889	0.539683	96	192	Antonine	winged-corridor
123a	Villa du Bois Brûlé, phase 1	1	1	10	0	TRUE	RURAL	0.962235	0.306	19.6	2.177778	0.294444	98	120	Trajan - Marcus Aurelius	corridor
123b	Villa du Bois Brûlé, phase 2	2	2	16	0	TRUE	RURAL	1.152534	0.251	45.375	3.025	0.289286	120	150	Trajan - Marcus Aurelius	winged-corridor
123c	Villa du Bois Brûlé, phase 3	1	1	17	0	TRUE	RURAL	1.394246	0.244	56.823529	3.551471	0.340196	150	180	Trajan - Marcus Aurelius	winged-corridor
124	Fontaine Bouillette	1	1	19	0	FALSE	RURAL	1.075177	0.231	56	3.111111	0.248366	200	400	3rd - 4th c.	corridor
125	Le Diéné	1	1	11	0	FALSE	RURAL	1.684644	0.295	32.363636	3.236364	0.49697	0	400	indigenous - 4th c.	winged-corridor
126	La Fergant	1	1	7	0	FALSE	RURAL	1.064426	0.34	11.428571	1.904762	0.361905	138	161	Antoninus Pius	corridor
127	Le Camp Rolland	1	1	9	0	FALSE	RURAL	0.921306	0.317	16	2	0.285714	50	100	1st c.	corridor
128	La Sole du Bis Pont	1	1	9	0	FALSE	RURAL	0.701016	0.317	14.222222	1.777778	0.222222	41	68	Claudius - Nero	winged-corridor
129	La Butte Grise	1	1	9	0	FALSE	RURAL	1.301886	0.317	19.555556	2.444444	0.412698	100	400	2nd - 4th c.	corridor

130	Zouafques	1	1	19	1	FALSE	RURAL	1.110918	0.231	57.263158	3.181287	0.256622	275	400	end 3rd - 4th c.	winged-corridor
131	Mont-Saint-Vaast	1	1	11	0	FALSE	RURAL	0.958739	0.295	22.727273	2.272727	0.282828	75	150	end 1st - start 2nd c.	corridor
132a	Villa gallo-romaine, Hamblain-les-Prés, phase 1	1	3	16	0	FALSE	RURAL	1.010243	0.251	41.625	2.775	0.253571	81	400	Domitian - 4th c.	corridor
132b	Villa gallo-romaine, Hamblain-les-Prés, phase 2	1	1	28	0	FALSE	RURAL	1.097601	0.188	99.428571	3.68254	0.206349	81	400	Domitian - 4th c.	winged-corridor
133a	Maison 1, Palais des Sports (Insula 15), phase 3	1	3	23	1	FALSE	URBAN	1.358048	0.209	87.565217	3.980237	0.283832	60	80	60 - 80	courtyard
133b	Maison 1, Palais des Sports (Insula 15), phase 4	1	4	24	1	FALSE	URBAN	1.330376	0.205	92	4	0.272727	69	81	Vespasian - Titus	courtyard
133c	Maison 1, Palais des Sports (Insula 15), phase 5	1	2	12	1	FALSE	URBAN	1.042	0.285	27.333333	2.484848	0.29697	125	175	mid 2nd c.	courtyard
134a	Maison 2, Palais des Sports (Insula 15), phase 3	1	1	17	1	FALSE	URBAN	0.952266	0.244	43.882353	2.742647	0.232353	60	80	60 - 80	courtyard
134b	Maison 2, Palais des Sports (Insula 15), phase 4	1	1	16	2	FALSE	URBAN	0.820526	0.251	36.625	2.441667	0.205952	69	81	Vespasian - Titus	courtyard
134c	Maison 2, Palais des Sports (Insula 15), phase 5	1	1	22	1	FALSE	URBAN	1.041794	0.214	67.818182	3.229437	0.222944	125	175	mid 2nd c.	courtyard
135a	Maison 3, Palais des Sports (Insula 15), phase 4	1	1	32	1	FALSE	URBAN	1.182644	0.174	126.6875	4.086694	0.20578	69	81	Vespasian - Titus	courtyard
135b	Maison 3, Palais des Sports (Insula 15), phase 5	1	1	32	1	FALSE	URBAN	1.268385	0.174	133.625	4.310484	0.220699	125	175	mid 2nd c.	courtyard
136a	Maison 4, Palais des Sports (Insula 15), phase 4	1	1	26	1	FALSE	URBAN	1.18001	0.196	94.384615	3.775385	0.231282	69	81	Vespasian - Titus	courtyard

136b	Maison 4, Palais des Sports (Insula 15), phase 5	1	1	44	1	FALSE	URBAN	1.262979	0.144	207.227273	4.819239	0.181869	125	175	mid 2nd c.	courtyard
137	Villa des Routis	1	2	24	1	TRUE	RURAL	1.105434	0.205	80.333333	3.492754	0.226614	50	300	1st - 3rd c.	courtyard
138	Villa de Brain-sur-Allonnes	1	1	6	0	FALSE	RURAL	1.146132	0.349	9	1.8	0.4	180	275	180/225 - 275	corridor
139	Grand Tell	2	3	12	0	TRUE	RURAL	1.031365	0.285	27.166667	2.469697	0.293939	100	300	end 1st/begin 2nd - 3rd c.	corridor
140	La Perrière	1	1	8	0	FALSE	RURAL	1.342915	0.328	16.25	2.321429	0.440476	100	200	2nd c.	corridor
141	Villa de la Grifferie	1	1	21	0	TRUE	RURAL	1.059468	0.22	64.285714	3.214286	0.233083	100	400	2nd - 4th c.	winged-corridor
142	Ferme de Gennes	1	1	7	0	TRUE	RURAL	1.62465	0.34	14.285714	2.380952	0.552381	271	274	Tetricus	hall
143	Roullé	1	1	6	0	FALSE	RURAL	1.623688	0.349	10.666667	2.133333	0.566667	50	200	1st - 2nd c.	hall
144	La Cour	2	5	15	1	TRUE	RURAL	1.272857	0.259	44	3.142857	0.32967	150	225	2nd half 2nd - begin 3rd c.	winged-corridor
145	NE Building, Les Terres-Noires	1	2	17	0	FALSE	RURAL	1.317906	0.244	54.588235	3.411765	0.321569	100	325	2nd - early 4th c.	corridor
146	Villa de l'Eros, Les Terres-Noires	2	3	24	0	TRUE	RURAL	1.589063	0.205	105.416667	4.583333	0.325758	175	325	end 2nd - start 4th c.	winged-corridor
147	La Mare-Champtier	1	1	8	0	FALSE	RURAL	1.23403	0.328	15.5	2.214286	0.404762	200	300	3rd c.	hall
148	Place de la Haute Vielle Tour	1	1	17	2	TRUE	URBAN	1.607201	0.244	63.058824	3.941176	0.392157	100	200	2nd c.	courtyard
149	Villa de la Pinsonne	1	1	19	1	TRUE	RURAL	1.265792	0.231	62.736842	3.48538	0.292398	25	175	start 1st - end 2nd c.	corridor
150a	Villa de Saint-Herblain, Phase 1	1	1	5	0	FALSE	RURAL	1.515151	0.352	7.2	1.8	0.533333	50	200	mid 1st - 2nd c.	hall
150b	Villa de Saint-Herblain, Phase 2	1	1	7	0	FALSE	RURAL	1.400559	0.34	13.142857	2.190476	0.47619	150	200	2nd half 2nd c.	corridor
150c	Villa de Saint-Herblain, Phase 3	1	1	15	0	TRUE	RURAL	1.906459	0.259	58.933333	4.209524	0.493773	200	300	3rd c.	corridor
150d	Villa de Saint-Herblain, Phase 4	1	1	13	0	TRUE	RURAL	1.435761	0.276	38.153846	3.179487	0.39627	306	337	Constantine	corridor
151	Bois du Châtel	1	1	8	0	FALSE	RURAL	1.23403	0.328	15.5	2.214286	0.404762	100	300	2nd - 3rd c.	corridor

152	Chemin de Montereau	1	1	7	0	FALSE	RURAL	1.288515	0.34	12.571429	2.095238	0.438095	300	400	4th c.	corridor
153	Les Bagneaux	1	3	16	0	FALSE	RURAL	1.508251	0.251	54.75	3.65	0.378571	100	130	1st/start 2nd - 120/130	corridor
154	La Cave aux Fées	1	1	15	0	TRUE	RURAL	1.284174	0.259	44.266667	3.161905	0.332601	50	300	1st - 3rd c.	corridor
155	Villa des Quatorze Acres	1	2	7	1	FALSE	RURAL	1.400559	0.34	13.142857	2.190476	0.47619	271	383	Tetricus - Gratian	hall
156a	Bollendorf, Phase 1	1	1	8	1	FALSE	RURAL	0.871079	0.328	13	1.857143	0.285714	100	225	2nd - early 3rd c.	corridor
156b	Bollendorf, Phase 2	1	1	14	1	TRUE	RURAL	0.960337	0.267	33	2.538462	0.25641	250	400	250 - 4th c.	corridor
157	Grémecey	1	2	14	1	FALSE	RURAL	1.296457	0.267	40	3.076923	0.346154	100	300	2nd - 3rd c.	corridor
158	Kaiservilla Konz	1	2	63	0	TRUE	RURAL	1.422157	0.115	371.269841	5.988223	0.163548	300	400	4th c.	winged-corridor
159	Palatiolum	1	1	44	1	TRUE	RURAL	1.113715	0.144	187.818182	4.367865	0.160375	300	650	300-650	courtyard

Appendix C – Insular Data Sources

Item Number	Site Name	Source
1	Abermagwr	Chapman, et al. 2011: 319-466; Chapman, et al. 2012: 271-422.
2	Ancaster	Morris 1979, Fig. 35.
3a	Bancroft 1.5	Frere, et al. 1987: 301-377.
3b	Bancroft 2	Frere, et al. 1987: 301-377.
3c	Bancroft 3	Frere, et al. 1987: 301-377.
4	Barcombe	Burnham, et al. 2003: 293-359.
5	Barnsley Park	Grew, et al. 1981: 345-417
6	Barton Court Farm	Wilson 1975: 220-294.
7	Beadlam	Wilson 1970: 268-315.
8	Beddington	Frere, et al. 1982b: 279-356.
9	Begbroke/Blenheim	Frere, et al. 1986: 363-454.
10a	Bignor (whole complex)	Keppie, et al. 2001: 311-385.
10b	Bignor (main structure)	Keppie, et al. 2001: 311-385.
11	Boughspring	Neal and Walker 1988: 191-197.
12a	Boxmoor 1	Neal 1970: 156-162.
12b	Boxmoor 2	Neal 1970: 156-162.
12c	Boxmoor 3	Neal 1970: 156-162.
12d	Boxmoor 4	Neal 1970: 156-162.

12e	Boxmoor 5A	Neal 1970: 156-162.
12f	Boxmoor 5B	Neal 1970: 156-162.
13	Brading	Rivet 1969. Fig. 2.1.
14	Bradley Hill	Wilson 1972: 298-367.
15	Brantingham	Liversidge, et al. 1973: 84-106.
16	Brislington	Collingwood 1930: Fig. 28
17a	Brixworth 1	Wilson 1972: 298-367.
17b	Brixworth 3	Wilson 1972: 298-367.
18a	Bucknowle 1	Frere and Tomlin 1991: 221-311.
18b	Bucknowle 2	Frere and Tomlin 1991: 221-311.
18c	Bucknowle 3	Frere and Tomlin 1991: 221-311.
19a	Caerwent, House I.28N Phase 1	Johnson 1996
19b	Caerwent, House I.28N, Phase 3	Johnson 1996
20	Caerwent, House VII	Johnson 1996
21a	Carisbrooke 1	Collingwood 1930, Fig. 34
21b	Carisbrooke 2	Collingwood 1930, Fig. 34
22	Castlefield	Morris 1979, Fig. 36
23	Castor-Mill Hill	Johnston 1978: 71-93
24	Cefn Graeanog	Morris 1979, Fig. 36
25	Chedworth	Keppie, et al. 1998: 365-445.
26	Beeches Road, Cirencester	Morris 1979, Fig. 36
27a	Cirencester, Building XII, 1	Wilson 1974b: 396-480.
27b	Cirencester, Building XII, 2	Wilson 1974b: 396-480.

28a	Clanville 1	Morris 1979, Fig. 36
28b	Clanville 2	Morris 1979, Fig. 36
29a	Clear Cupboard 1	Hadman 1978: Fig. 45
29b	Clear Cupboard 2	Hadman 1978: Fig. 45
29c	Clear Cupboard 3	Hadman 1978: Fig. 45
29d	Clear Cupboard 4	Hadman 1978: Fig. 45
30	Colerne	Smith 1978a: 351-358
31	Combley	Goodburn 1976: 290-392
32	Cotterstock	Upex 2001: 57-91
33a	Cox Green 1	Smith 1978a: 351-358
33b	Cox Green 2	Smith 1978a: 351-358
33c	Cox Green 3	Smith 1978a: 351-358
34a	Denton 2	Morris 1979, Fig. 37
34b	Denton 3	Morris 1979, Fig. 37
35	Ditches	Frere, et al. 1986: 363-454.
36	Dorchester	Wacher 1998, Fig. 44
37	Drayton II	Burnham, et al. 1993: 267-322
38	East Grimstead	Morris 1979, Fig. 37
39	Eaton-by-Tarporley	Rankov, et al. 1982: 327-422
40a	Ely Early 1	Wheeler 1921: 67-85
40b	Ely Early 2	Wheeler 1921: 67-85
40c	Ely Middle	Wheeler 1921: 67-85

40d	Ely Late	Wheeler 1921: 67-85
41a	Engleton 1	Rivet 1969. Fig. 2.1.
41b	Engleton 2	Rivet 1969. Fig. 2.1.
41c	Engleton 3	Rivet 1969. Fig. 2.1.
41d	Engleton 4	Rivet 1969. Fig. 2.1.
42	Exning	Rivet 1969. Fig. 2.6
43	Finkley	Collingwood 1930, Fig. 34
44	Folkestone	Cosh 2001: 219-242
45a	Frocester Court 1	Goodburn, et al. 1979: 267-356
45b	Frocester Court 2	Goodburn, et al. 1979: 267-356
45c	Frocester Court 3	Goodburn, et al. 1979: 267-356
46a	Gadebridge 1	Johnson 1996
46b	Gadebridge 2	Johnson 1996
47a	Gatcombe 1	Morris 1979, Fig. 37
47b	Gatcombe 2	Morris 1979, Fig. 37
48	Gayton Thorpe	Smith, D. J. 1978: 117-148
49	Gloucester	Johnson 1996
50	Godmanchester	Wilson 1973: 270-337
51a	Gorhambury 1	Grew, et al. 1980: 345-417
51b	Gorhambury 2	Grew, et al. 1980: 345-417
51c	Gorhambury 3	Grew, et al. 1980: 345-417
51d	Gorhambury 4	Grew, et al. 1980: 345-417
52a	Great Casterton 2	Morris 1979, Fig. 37

52b	Great Casterton 3	Morris 1979, Fig. 37
53	Great Staughton	Rivet 1969, Fig. 2.1
54a	Great Witcombe 1	Ellis 1995: 163-178
54b	Great Witcombe 2	Ellis 1995: 163-178
55	Halstock	Frere, et al. 1986: 363-454.
56a	Hambleden 1 (Mill End Villa)	Farley 1983: 256-259
56b	Hambleden 2 (Mill End Villa)	Farley 1983: 256-259
57	Holbury	Morris 1979, Fig. 38
58a	Holcombe 1	Smith 1978b: 149-186
58b	Holcombe 2	Smith 1978b: 149-186
58c	Holcombe 3	Smith 1978b: 149-186
58d	Holcombe 4	Smith 1978b: 149-186
59a	Holme House 1	Wilson 1971: 242-304
59b	Holme House 2	Wilson 1971: 242-304
60a	Huntsham 1	Morris 1979, Fig. 38
60b	Huntsham 2	Morris 1979, Fig. 38
61	Montacute-Ham Hill	Beattie and Phythian-Adams 1913: 127-133.
62	Iwerne	Rivet 1969, Fig. 2.6
63	Keynsham	Ellis 1995: 163-178
64	Kings Weston Park	Smith, D. J. 1978: 117-148
65a	Landwade 2a	Morris 1979, Fig. 38
65b	Landwade 2c	Morris 1979, Fig. 38

66	Lippen Wood	Morris 1979, Fig. 38
67	Little Chester	Frere, et al. 1989: 636-454
68a	Littlecote Park 1	Frere, et al. 1992: 255-323
68b	Littlecote Park 2	Frere, et al. 1992: 255-323
68c	Littlecote Park 3	Frere, et al. 1992: 255-323
68d	Littlecote Park 4	Frere, et al. 1992: 255-323
69	Llantwit Major	Hogg and Smith 1974: 225-250
70	Lockleys	Ellis 1995: 163-178
71a	Lullingstone 1	Meates 1979
71b	Lullingstone 2	Meates 1979
71c	Lullingstone 3/4	Meates 1979
72a	Mansfield Woodhouse 2	Morris 1979, Fig. 39
72b	Mansfield Woodhouse 3	Morris 1979, Fig. 39
73	Newport	Cosh 2001: 219-242
74	Newton St. Loe	Johnston 1978: 71-93
75	North Leigh	Wilson 2004: 77-113
76a	Northchurch 1	Hadman 1978: Fig. 45
76b	Northchurch 2	Hadman 1978: Fig. 45
76c	Northchurch 3	Hadman 1978: Fig. 45
77	Norton Disney	Morris 1979, Fig. 39
78	Painted House	De la Bedoyere 1991
79a	Park Street 1	Percival 1976, Fig. 46
79b	Park Street 2	Percival 1976, Fig. 46

80a	Piddington 2	Burnham, et al. 1993: 267-322
80b	Piddington 3	Burnham, et al. 1993: 267-322
80c	Piddington 4	Burnham, et al. 1993: 267-322
80d	Piddington 5	Burnham, et al. 1993: 267-322
80e	Piddington 6	Burnham, et al. 1993: 267-322
80f	Piddington 7	Burnham, et al. 1993: 267-322
81	Pitney	Witts 2000, 306
82	Quinton	De la Bedoyere 1991
83	Rapsley	Morris 1979, Fig. 39
84a	Redlands Farm, Stanwick/Meadow Furlong 2b	Frere and Tomlin 1991: 221-311.
84b	Redlands Farm, Stanwick/Meadow Furlong 2c	Frere and Tomlin 1991: 221-311.
84c	Redlands Farm, Stanwick/Meadow Furlong 2d	Frere and Tomlin 1991: 221-311.
85	Rivenhall, Building 1	Rodwell, et al. 1973: 115-127
86	Rudston	Smith 1978b: 149-186
87	Sandwich	Goodburn, et al. 1979: 267-356
88	Sedgebrook	Frere, et al. 1989: 257-345
89	Silchester, Insula IX, House 1	Clarke and Fulford 2002: 129-166
90	Silchester, Insula VIII, House 1	Fulford 2015: 114-121
91	Silchester, Insula XIX, House 2	Fulford 2015: 114-121
92	Silchester Insula XXVIII, House 2	Fulford 2015: 114-121
93	Silchester Insula XXXIII, House 5	Fulford 2015: 114-121
94	Sparsholt - Complex	Wilson 1973: 270-337

95	Sparsholt - Villa	Wilson 1973: 270-337
96	Spoonley Wood	Rivet 1969: Fig. 2.6
97a	Stroud 1	Johnston 1978: 71-93
97b	Stroud 2	Johnston 1978: 71-93
98	Tarrant Hinton	Rankov, et al. 1982: 327-422
99a	Thistleton 1	Percival 1976: Fig. 45
99b	Thistleton 2	Percival 1976: Fig. 45
100	Verulamium, House	Neal 1978: 33-58
101a	Watergate 1	Frere, et al. 1985: 251-332
101b	Watergate 2	Frere, et al. 1985: 251-332
101c	Watergate 3	Frere, et al. 1985: 251-332
101d	Watergate 4	Frere, et al. 1985: 251-332
102	West Park, Rockbourne	Wilson 1972: 298-367.
103	Woodchester	Witts 2000, 317
104	Wraxall	Smith 1978a: 351-358
105	Fishbourne Proto-Palace	Cunliffe 1971
106	Fishbourne Flavian Palace	Cunliffe 1971

Appendix D – Continental Data Sources

Item Number	Site Name	Source
1	Villa de Loché	CAG 71/4, p 316
2	La Bussière	CAG 71/4, p 432
3	Ciry-le-Noble	CAG 71/4, p 441
4	Heurtebise est	CAG 89/1, p 197
5	Les Roches	CAG 89/1, p 288
6	Les Corbiers	CAG 89/1, p 326
7	La Cascade	CAG 89/1, p 333
8	Le Crot-au-Port	CAG 89/1, p 371
9	Le Tète de Fer, Principal Building	CAG 89/1, p 384
10	Attricourt	CAG 70, p 101
11	En Brûle-Bois	CAG 70, p 120
12	Brussey	CAG 70, p 148
13	Chassey-lès-Montbozon. Main house	CAG 70, p 168
14	Chassey-lès-Montbozon. Maison A	CAG 70, p 171
15	Chassey-lès-Montbozon. Maison B	CAG 70, p 171
16a	Frotey-lès-Lure 1	CAG 70, p 235
16b	Frotey-lès-Lure 2	CAG 70, p 235
17	Jonville	CAG 70, p 252
18	La villa Membrey	CAG 70, p 342
19	Villa du Magny	CAG 70, p 382
20	Les Caves	CAG 89/2, p 529
21	Les Mazières	CAG 89/2, p 561
22	Les Chagnats	CAG 89/2, p 578
23	La Villa Cérès	CAG 89/2, p 596
24	Les Fontaines Salées	CAG 89/2, p 609
25	Les Hauts de Briotte	CAG 89/2, p 614
26	Mont	CAG 58, p 68
27	Villars	CAG 58, p 71
28	Picarnon	CAG 58, p 105
29	Les Prés Pillats	CAG 58, p 226
30	Neuzy	CAG 58, p 237
31	Les Egliseries	CAG 25, p 292
32	Habitat aux Boutiques	CAG 25, p 342
33	Habitat gallo-romain, Belfort	CAG 90, p 451
34	Offemont (main villa)	CAG 90, p 475
35	Vernes Villa	CAG 21/3, p 138

36	Townhouse, Insula 55, space 99	CAG 21/3, p 264
37	Residence 1, Insula 57	CAG 21/3, p 270
38	Residence 2, Insula 57	CAG 21/3, p 270
39	Residence 1, Insula 63	CAG 21/3, p 272
40	Residence 2, Insula 63	CAG 21/3, p 272
41	Residence 3, Insula 63	CAG 21/3, p 272
42	La Pépinière	CAG 21/3, p 402
43	Villa de Chaintry	CAG 71/3, p 265
44	Presles	CAG 21/1, p 344
45	Villa des Longues Royes	CAG 21/2, p 167
46	Mazières	CAG 21/2, p 417
47	La Maison du Propriétaire	CAG 21/2, p 481
48a	La Maison des Escargotiers, Phase 1	CAG 21/2, p 486
48b	La Maison des Escargotiers, Phase 2	CAG 21/2, p 486
48c	La Maison des Escargotiers, Phase 3	CAG 21/2, p 486
49	Les Maselles à Thésée	CAG 41, p 57
50	Villa des Bordes à Pontlevoy	CAG 41, p 59
51	Les Bolleaux	CAG 41, p 74
52	Villa de Coulanges	CAG 41, p 91
53	Villa de Soulangé à Pouzay	CAG 37, p 43
54	La Grange Liénard	CAG 37, p 53
55	Villa de Cheillé	CAG 37, p 57
56	Villa de Châtigny	CAG 37, 107
57	Villa de Gannes	CAG 45, p 54
58	Charnay	CAG 36, p 212
59	Tronçay	CAG 18, p 185
60	La Touratte	CAG 18, p 220
61	Grosses Terres	CAG 18, p 244
62	Le Plaix	CAG 18, p 244
63	Domus des Epars	CAG 28, p 138
64	Habitat des rue Saint-André	CAG 28, p 148
65	Villa de Mienne	CAG 28, p 205
66	Aiguillettes	CAG 28, p 320
67a	Les Petit Didris, Phase 1	CAG 51/1, p 280
67b	Les Petit Didris, Phase 2	CAG 51/1, p 280
68	Salweise	CAG 57/1, p 227
69	Heidenschloss	CAG 57/1, p 270
70	La Villa de Reinheim	CAG 57/1, p 319
71	Château d'Urville	CAG 57/1, p 386
72a	Villa 1, Saint Ulrich, Phase 1	CAG 57/1, p 401
72b	Villa 1, Saint Ulrich, Phase 2	CAG 57/1, p 403
73	Le Grand Sareu	CAG 57/1, p 479
74	Larry	CAG 57/1, p 558

75	La Villa Haute	CAG 57/1, p 567
76	Renaucru	CAG 57/1, p 576
77	Heidenhauser	CAG 57/1, p 675
78	Heidenschloss	CAG 57/1, p 701
79	Grosswald	CAG 57/1, p 721
80	Au Sarrazin	CAG 54, p 142
81	La Marlerie	CAG 54, p 231
82	La Tâte de Villers	CAG 54, p 352
83	Bois de Lana	CAG 54, p 387
84	Villa zu Allenz im Maiengau	BJ 36, Tafel II
85	Villa bei Manderscheid in der Eifel	BJ 39, Tafel II
86	Villa bei Stahl im Kreise Bitburg	BJ 62, Tafel I
87	Villa C, Rottweil-Altstadt	BJ 172, p 204
88	Roman Villa, Broichweiden	BJ 177, p 579
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