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The Eternal City? Economic evidence and the changing nature of urban spaces in Late Antique Rome.

by

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ABSTRACT

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THE ETERNAL CITY? ECONOMIC EVIDENCE AND THE CHANGING NATURE OF URBAN SPACES IN LATE ANTIQUE ROME

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This thesis examines the amphora assemblages from a series of excavated Late Antique waste deposits within the city of Rome. The data from these assemblages is interrogated quantitatively and spatially in order to address questions of the nature of supply within the urban centres of the Late Empire and to understand the changing urban socio-political environment of the Late Antique period with particular reference to Rome. In order to do this, the thesis draws upon a wide range of approaches to the available evidence which must be understood holistically. The principal tenets of the approach are reliant upon a contextual evaluation of the material which informs our understanding of the city in Late Antiquity.

This thesis sets out the background to the study of these assemblages through a discussion of the principal approaches which have been taken to studying the economy and food supply of Rome. An overview of the pertinent archaeological approaches to trade and exchange and the prevailing understanding of the nature of the city of Rome are then discussed in order to fully contextualised this work within the current understanding of the topographical, geographical and historical background of the city.

This research studies the movement of amphorae both into the city and also within the intra-urban area. The locations of the deposits are studied with the intention of understanding the pattern of this movement of goods within the city and also of the motivation behind the selection of the deposition sites. This research provides an interpretation of the changing nature of Late Antique urban spaces within Rome and offers an explanation for the rationale behind this process. The thesis sets out to re-prioritise the role of archaeological data within the discussion of this period and to demonstrate that it is possible to discuss the changing nature of the city of Rome on the basis of solid archaeological data.

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List of abbreviations used

BABesch	Bulletin Antieke Beschaving
BullCom	Bulletino della Commissione archeologica comunale di Roma.
CAA	Computer Applications in Archaeology
CAD	Computer Aided Design
CIL	Corpus Inscriptionum Latinarum
Cod.Theod	Codex Theodosianus
EVE	Estimated Vessel Equivalence
GIS	Geographical Information System
JRA	Journal of Roman Archaeology
JRS	Journal of Roman Studies
LTUR	Lexicon Topographicum Urbis Romae
MNV	Minimum Number of Vessels
PBSR	Papers of the British School at Rome
SHA	Scriptores Historiae Augustae
SRIT	Società Romana e Impero Tardoantico
TIN	Triangulated Irregular Network

Chapter 1: Introduction

This study addresses questions about the nature of food supply within the urban centres of the Late Empire and the changing socio-political environment of Late Antiquity[1]. The supply of staple foodstuffs was such a key component in the economy of the Roman Empire that it impacted on almost all aspects of Roman life in some way. The distinction between economic and social practice will be shown to be demonstrably false and counterproductive to understanding the complexity of life in Late Roman urban spaces[2]. This will be achieved through a clear demonstration of the value of economic evidence in the interpretation of social activity and the fundamental importance of economic activity to urban life. This study will create a framework and a methodology for the interpretation of socio-economic life in the Late Roman world through analytical techniques applied to a largely ceramic-based corpus of data. The results of this study have the potential to fundamentally alter our view of life in Late Antique cities.

The primary focus of this research is a series of ceramic assemblages from the city of Rome relating to the period between the 4th and 6th Centuries. Through a study of this particular period, a methodology has been developed and refined in order to answer the specific questions outlined below. Though Rome was the centre of its empire for centuries and has frequently been used as a yardstick for understanding the archaeology of the provinces, it is perhaps the least typical urban centre within the Empire and surprisingly little is known about many facets of everyday life in the city. Until recently, the focus of excavators on large public monuments and the continuous occupation of the city from antiquity to the present day has left us a rich but heavily biased archaeological record. The combination of this and the persistent notion of a perceived "decline and fall" in historical and archaeological research until recent years has left the study of everyday life in Late Antiquity very much on the periphery of academic discourse. These traditional notions of a declining city in the Late Antique and early medieval periods are not supported by the archaeological evidence which is slowly becoming available and represent one of several entrenched perspectives to which this research will offer alternative interpretations.

Aims of the research project

One of the most striking features within the archaeological record of the city of Rome is the widespread presence of waste deposits in the Late Antique and early medieval

[1] For the purposes of this research, Late Antiquity is taken to refer to the period between the 4th and 6th Centuries A.D.

[2] The Late Roman period can be defined as beginning in the mid 3rd Century A.D. and ending with the abdication of Romulus Augustulus in A.D. 476.

periods. This phenomenon is well known yet poorly understood and represents an under utilised source of evidence for understanding the way in which urban spaces were occupied and used in the Late Roman period. There is a significant quantity of ceramic material contained within these deposits, through a contextual and quantitative study of this material an insight into these patterns of occupation and abandonment can be provided. These deposits have been recorded on a number of sites within the city but although the majority of the excavations were completed some time ago the process of publication has only just begun. These ubiquitous sources of archaeological material offer a rich source of evidence for addressing economic and socio-political questions pertaining to urban life in the Late Empire however to date they have been given insufficient attention by archaeologists and historians trying to understand the nature of urban life in Late Antiquity. The availability of this data now enables the framing of specific questions as to how goods were being moved around the city, as opposed to simply assessing which goods were present within the limits of the urban area. One of the fundamental questions pertaining to changes in the fabric of the urban landscape in Late Antiquity is to understand the means and locations through which the urban authorities were disposing of the detritus of this supply and through this to understand the means of distribution of the foodstuffs. The significance of the scale of the supply of imported foodstuffs for notions of a declining Late Antique population within the city and the effect of the disintegration of the Western Empire as a political unit in the 5th Century upon the continued supply of these goods to the Capital, are questions which this research will address. Both of these are significant in challenging preconceived notions of the scaling down of urban life between the High Empire and Late Antiquity. This thesis will demonstrate that essentially economic data can be suited to answering questions pertaining to the socio-political organisation of life in Late Roman urban spaces and provide a means of understanding the changes undergone by the urban fabric during this transitional period.

Justification of the research project

The justification for this research relies on a single supposition, upon which the conclusions and validity of this thesis rest. As the most basic of human needs, the provision of food to urban populations unable to meet their own subsistence requirements must remain the most pressing concern of any governing body. This is well documented in respect of the Roman government and is a large part of the background to this study which will be discussed fully in a later chapter of this work. Whilst there is little direct evidence for the goods concerned, there is a significant but vastly underdeveloped corpus of archaeological and epigraphic data pertaining to associated activities and materials such

as shipping containers and the architectural remains of production and storage facilities. These remains, their use and disposal or abandonment have a close relationship with the social practices of the people who used and interacted with them, the nature of which will be explored through this research. It is therefore, not the intent of this work to merely produce a synopsis of the means used to ensure a continued adequate supply of basic foodstuffs to the population of Rome. Although it is inescapable that in undertaking this study it will shed some light on the practices of supplying food to the urban population, this is only part of the story. Through this research a different perspective will be presented, one based on the archaeological evidence and upon the nature and significance of the *Annona* in the Late Empire. It is intended that this study will build upon this foundation to explore the lacunae in the use of evidence related to this process and attempt to redress these shortcomings. This is necessary in order to elucidate the changing nature of social and political interaction within urban spaces of Late Antique Rome and through that to offer a new understanding of the transition from the Classical world to Late Antiquity. This study is the first to use a series of urban deposits in a fully integrated manner for this purpose, overcoming the shortcomings of previous studies by taking a holistic rather than a site-specific approach to the data.

The most prevalent forms of evidence to have been recovered from excavated examples of these deposits are the various forms of ceramic vessels used widely in antiquity. For the purposes of this research the primary data collection has been focussed on the remains of amphorae as these represent a bulk material suited to the application of statistical analyses due to the large quantities recovered. In addition the presence of this material in the archaeological record is unlikely to have been influenced by factors such as taste, as it is an essentially functional material which did not have value as a commodity in its own right. The aim of this research is therefore to understand the processes that led to the formation of these waste deposits through a study of the amphorae and thereby an appreciation of the changing urban landscape of Late Antique Rome.

Research approach and data sources

The approach taken in this research is derived from and develops upon a long tradition of studying amphorae in order to understand economic and distributive processes. A discussion of how this has been attempted in the past and the applicability of the evidence for this purpose is presented in later chapters of this thesis[3]. The specific approach employed here relies heavily on a quantitative analysis of the amphora remains from a number of sites within the urban centre of Rome. The research advances the state of ceramic quantification by advocating a new methodology for comparing ceramic

[3] Chp's 3 and 5

assemblages based on the density of the remains within each assemblage. This will be discussed in detail in the methodology chapter[4].

This thesis examines archaeological material from selected assemblages within the city of Rome. Rome, despite its prominence, is perhaps one of the least well-understood cities of Late Antiquity and much is assumed about life in the city during this period. The historical sources reveal a great deal of the views held by the literate and elite about life in the capital of the High Empire, but these are, by their nature, unable to provide a comprehensive record. Furthermore, the archaeological record within the city is often confusing and muddled. More than two millennia of occupation have left a very rich but also extremely complicated and fragmented archaeological legacy which presents a particular set of problems to the putative student of this period in its history.

Due to the nature of the archaeological record and the history of publication for these late deposits it has been necessary to gain access to a large quantity of unpublished archaeological data, much of which has not yet been explored to the full extent of its potential as no synthetic or rigorously quantitative studies have been attempted. This material can be used to answer both fundamental questions about patterns in the distribution of foodstuffs, and their reflection of the social and political circumstances of the Late Empire. In this light, a limited but intensive evaluation of carefully chosen case studies will be used to elucidate the detail in specific examples of food supply and societal interaction, through which we may garner understanding of the wider picture. The case studies have been chosen in order to provide a representative sample of the variety of urban sites within the city and will be discussed individually, in detail further into this thesis. By prioritising the archaeological data this research brings a fresh perspective to these issues, one that is not determined by the weight of historical literature and will for the first time be fully exploiting this under utilised source of evidence.

The implications of the study

Through a study of the new data available for the Late Roman period, this project will redress the current gaps in our knowledge and construct an interpretative framework for life in the city. Critically this research will demonstrate the potential for an archaeologically based interpretation of the changing nature of the Late Antique urban landscape both within Rome as the focus of this study and also the potential application of this approach to other sites. This research offers the possibility of moving the study of Roman economic systems and food supply beyond the historically focussed and biased state in which it currently resides through the application of quantitative and spatial means of interrogating the archaeological evidence. This research will demonstrate the potential

[4] Chp. 6.

of an integrated and contextual approach to the archaeological data for answering not just economic questions but also those relating to the use of space and changing nature of the relationship between the population and urban spaces in Late Antiquity. Furthermore, this research offers a very significant step forward in the specific understanding of the nature of Rome in Late Antiquity. The spiritual centre of the Empire has been subject to generalisations and ill informed statements for far too long. This research will, for the first time fix the interpretation of the city in this key period of its history firmly on the basis of pertinent archaeological evidence rather than inference from comparative data from other sites and a palimpsest of information more readily applicable to the earlier Imperial period.

Chapter 2: Studies of Roman food supply

Economic historians have attempted to reconstruct the nature of the Roman Economy by basing their argument upon the requirements of the Imperial government to provide the army and the large urban population of Rome with staple foodstuffs[5]. This general study of the economy through food supply has traditionally been dominated by investigations of the *Annona*. Whilst ostensibly quite a simple concept, the reality of the *Annona* supply and hence its very definition are somewhat difficult to characterise. It is only through an understanding of the usage of the term in the ancient literature and also by an appreciation of the role and the importance of the *Annona* within the overall provisioning of the city in antiquity, that we can come to understand how previous studies of the *Annona* have defined the area of research concerned with the Roman Economy. The *Annona* was an extremely important consideration for the ruling elite classes as their continued social status depended upon maintaining social order through a stable food supply and thus featured in the texts and legal documents which have formed the basis of classical studies of the economy. These classical texts provide our best opportunity to understand and explain the concept of *annona*, thus enabling it to be contextualised within the political and economic life of the Late Roman Empire and thereby informing the archaeological approach which this thesis advocates.

The *Annona*

One of the earliest usages of the term *annona* in connection with the food supply of Rome can be traced back to shortages experienced in the city during the late Republic in the time of Pompey the Great[6]. This is the first actual reference to an *annona* in relation to Rome, and it is important to understand the context in which the phrase is used and what exactly is meant by the use of the word itself. Rickman's study[7] refers to a lieutenant of Pompey's during what was described as his *cura annonae;* the quotation originates from a passage in the letters of Cicero[8] which indicates Pompey's responsibility for ensuring the food supply of Rome during a time of crisis. Pompey was granted powers '*omnis potestas rei frumentariae toto orbe terrarum*'[9] by the senate. The significance of this particular passage concerns the use of "*rei frumentariae*" to specifically indicate distribution of grain whereas the "*cura annonae*" appears to relate to Pompey's responsibility for ensuring the uninterrupted supply to the city. Whilst Pompey certainly had responsibilities for the *Annona*, there is no reason to suppose that it was either the free distribution of food or that at this time the term *"cura annonae"* referred to duties which were exactly the same as

[5] Principally this involved the distribution of grain.
[6] Rickman 1980: 55
[7] ibid: 56
[8] Cicero, *Ad Familiam* 13.75
[9] Cicero, *Ad Atticus* 4.1.6-7.

would be exercised by a *Praefectus Annonae* under the Empire. Rather, "*cura annonae*" should be seen as defining Pompey's responsibility for ensuring the reliable yearly supplies of food to the city of Rome in the exceptional circumstances of the late 1st Century shortages.

This distinction may require some further clarification before moving on to discuss later usages of the term *annona* and other aspects pertaining to the current state of knowledge about the food supply. The terms *res frumentarius, frumentationes* and *annona* have been variously used to describe the distribution of food within the city of Rome. There is however a significant distinction between the meanings of these words which may not be fully appreciated by the casual reader. When the ancient sources use *frumentationes*, it is in a context where the explicit intention is to describe the act of giving food as a gift or free dole to the people, whether as part of an organised system or ad hoc arrangements to suit political expediency. Detailed studies of the beneficiaries of the *frumentationes* have been undertaken which attempt to define those sections of the populace which were eligible for these distributions[10].

This is a very important definition to make for understanding the mechanisms of the *Annona*. If the *frumentationes* are the free distributions of grain to certain sections of the population of Rome then *annona* as used within the ancient sources must refer to the yearly imports of grain[11] needed to supply the population as a whole. Contrary to suggestions that imported grain was only a small part of the total consumed[12], for Rome at least this can convincingly be argued not to be the case. The particular demographic situation of Rome would suggest that significant imports were needed to maintain the population of the city. The huge scale of warehousing and dockside installations for the processing of these goods at Ostia and Portus would support this argument.[13]. The overall level of importation can therefore be argued to exceed the demands of the relatively restricted *frumentationes*. Thus in the Late Empire when we talk of the *Annona* there is no semantic distinction between grain for free distribution and that which can reasonably be supposed to have been sold in the marketplace. Whilst there were certainly different destinations intended for the imports, there seems to have been no official distinction made between the goods destined for *frumentationes* and for sale to sections of the populace not eligible for the dole. The historical sources state that between A.D. 8 and 14 the first Equestrian *Praefectus Annonae* was created[14]. This alone is seen by Rickman as the single act which may indicate 'the beginning of anything that might be called an imperial system'[15] in regard to

[10] Virlouvet 1995: 205-235.
[11] This would of course be later expanded to include other types of foodstuff such as olive oil, wine etc.
[12] Erdkamp 2005: 206.
[13] See Rickman 1971; Keay et. al 2005
[14] Rickman 1980: 63-64; Tacitus. Annales. 1.7. Tacitus refers to Seius Strabo and C. Turranius, "*ille praetoriarum cohortium praefectus, hic annonae*".
[15] Rickman 1980: 66

the supply of food to Rome. The link between this position and the Emperor is clear from the later actions of Tiberius[16]. The further addition of an imperial procurator at Ostia in A.D. 44 strengthened the role of the Imperial government in controlling the supply of goods to Rome[17]. Later reference to the corn supply as *annona* was made regarding Claudius' concerns for the supply of food to the city and his grant of privileges to those shippers who would serve the *Annona* for a period of six years[18]. Though this still does not give any real definition to the term beyond a concern with the supply of food to Rome its use reinforces the idea that it was the *frumentationes* which were the free distributions of grain and other foodstuffs whilst the term *annona* was used to describe the annual imports of grain to feed the city.

Scholars of the textual sources have suggested that Imperial involvement in the supply of grain to Rome was prompted by a desire to maintain even and fair prices for basic foodstuffs rather than to simply distribute them for free[19]. The *Lex Iulia de Annona*[20] was deemed to be serving this purpose; indeed it suggests that in some instances there was active intervention in the market on the part of the imperial government. However the means by which the government influenced the price of goods entering the city may also have been less direct. Keith Hopkins' article *Taxes and trade in the Roman Empire*,[21] was written with the intent of clarifying the impact of the changing systems of Roman taxation upon the level of trade within the Empire. The arguments later refined by the author[22], argue for the plausibility of using general models to account for economic activity and the impact of the political necessities of the Empire upon the economy of the territory it controlled. Their relevance here relates to the perceived link between taxation levied in money and "in kind" on the provinces of the Roman Empire and the use of these taxes to supply the need for basic foodstuffs in Rome. In the late Republic and early Roman Empire[23] the imposition of monetary taxes by the Roman state is supposed to have increased the volume of trade. Monetary taxes levied in conquered provinces were spent

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[16] Rickman 1980: 74; Tacitus. *Annales*. 3.54; 15.36.
[17] Dio 60. 24.3
[18] Suetonius, *Claudius*. 18-19. The use of "*Annonaque*" to describe the focus of Claudius' concern seems to suggest the grain supply as a whole. Claudius was concerned for the whole of Rome's need for food, not just that of the hypothesised 150,000 recipients of the *frumentationes*. This is a semantic distinction but one which has important implications for the way that the food supply is treated in archaeological studies.
[19] There are republican precedents for both these positions. The *Lex Sempronia Frumentaria* of 123BC guarantees a constant price for grain being distributed to Roman Citizens and the *Lex Clodia Frumentaria* of 58BC makes the monthly distributions free. See Van Berchem, D. 1975. pp 15-16.
[20] See Garnsey 1983a: 127.
[21] 1980. pp 101-125.
[22] Hopkins 2002. The arguments later refined by the author, argue for the plausibility of using general models to account for economic activity
[23] Defined chronologically by the author as the period between 200BC and A.D. 400 (Hopkins 1980: 101), a period in which there was also a marked degree of political change.

in Rome, in Italy or on the armies at the frontiers[24]. The need to raise cash in order to pay taxes gave rise to the necessity of exporting or in some other way converting goods into money. In effect the system is self-perpetuating so long as the overall quantity of coinage available within the system remains constant[25].

Traditionally the *Annona* is described as being grain which was provided by the state for consumption by sections of the Roman population. Sirks defines the *Annona* as being the term which 'originally signified "yearly return" viz., the yield from the land' which 'later on... is used to denote the bread given out in the free distributions'[26]. An external source of foodstuffs has been seen to be particularly important in maintaining the population of Rome[27] and the exact nature of the involvement of the state in this supply has long been debated. Many scholars have seen the state as being responsible for providing the entirety of Rome's grain supply[28]. Whilst this position has largely been discredited[29] in favour of a model whereby there is some non-regulated importation of foodstuffs, there remains a debate as to the level of involvement which the state maintained in the supply of grain to Rome[30]. Some historically focussed accounts would suggest that the majority of the grain supplied to Rome was "State Grain" derived from either taxes in kind on the part of tribute-paying provinces or rents paid in kind from the tenants of *ager publicus* or imperial estates[31]. This does not automatically preclude the state from also purchasing grain when necessary, merely that the basis of the *Annona* was the supply of "imperial grain"[32]. However, as the state never maintained a transport fleet or merchant navy[33] then this would seem to indicate a very real lack of commitment on the part of the government to investing in the infrastructure to ensure that the needs of the Roman population were met.

Key to understanding what is meant by the concept of *Annona* within the modern literature is an appreciation for the way in which the term has come into the academic consciousness. The development of the term as a usage for grain supply to the city can

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[24] Hopkins 1980: 101. The entirety of the Empire was presumably paying tax to the centre, being the Imperial Government from where it was re-distributed as necessary.
[25] Viewed in terms of the annona, the state demanded grain in exchange for money which the provincials then use to pay their taxes. While the system functions, the state is in effect simply reclaiming its own money.
[26] Sirks 1991: 10
[27] Casson 1984: 96.
[28] For early examples of this position see: DarSag i 276-77 (1893); Marquardt 1873; Hershfeldt. 1905: 235.
[29] Despite rather convincing arguments for the involvement of private enterprise, this issue was still a topic of discussion among historians during the 1980s. Casson 1984; Rickman 1980.
[30] See Erdkamp 2005: 258-316.
[31] Garnsey 1983 offers this hypothesis, based on the existence of some epigraphic evidence for the state taking one third of the crop on an imperial estate in North Africa CIL VIII 25902 I 25ff; also De Romanis 2003 for the changing level of taxation on North African land.
[32] Garnsey 1983: 120-21.
[33] As suggested by Mattingly & Aldrete 2000: 145 on the basis of : Rickman 1980: 17 & Garnsey 1983: 121-26.

probably be traced back to a passage in Sallust recording rioting due to "*annonae intolerabilis saevitia*"[34]. Accepting that this usage may have influenced the development of the term *annona* within modern scholarship, it does not tie the concept down to being either "state grain" or freely traded supplies arriving in the city. The usage as interpreted by Garnsey refers to 'an extreme grain shortage'[35] and not specifically to the mechanism by which the grain had reached (or in this case failed to reach) the city.

The discussion has shown that a precise definition of the *Annona* is historiographically somewhat illusive. The term has been, and continues to be used to mean a number of things relating to the supply of foodstuffs within the Roman Empire. This issue can only be adequately addressed through a critical evaluation of the usage of the term in the historical sources. The most convincing historical argument for the nature of *annona* itself remains the passage of Cicero referring to the *cura annonae* of Pompey. Based on the available evidence the term *Annona* will be understood here to relate to the total yearly imports of grain[36] to the city of Rome. How this is represented in the archaeological record, and the effect (if any) that this would have on our understanding of the mechanisms of food supply are questions which will be addressed during the course of this chapter. Having arrived at a working definition of the concept of *Annona*, there remain a number of variables which must be at least acknowledged before this study can be undertaken. It is not really acceptable to blithely use historical literature divorced by a period of several hundred years to inform this study of the *Annona* in the Late Empire without some critical appreciation of the practical differences between these periods and the problems which this encompasses.

The *Annona* in the Late Roman Empire

As has been intimated briefly in the previous section, the *Annona* underwent a number of extremely significant changes both in its nature and in the mechanisms by which it was ensured. From the early, ad-hoc and exceptional granting of power to Pompey there can be seen to be an increasing institutionalisation of the state involvement with maintaining the *Annona* supply. Alongside this are a number of changes within the political situation in the Empire which are associated with changes in the *Annona*. Perhaps the two most well known of these in the later Empire are the addition of oil to the Roman *Annona* under Septimius Severus[37] and the diversion of the Egyptian grain fleet to feed Constantinople in A.D. 324[38]. Of these, the foundation of Constantinople and subsequent diversion of Egyptian grain to feed its population is the more significant to our

[34] Garnsey 1988: 200. Quoting a passage from Sallust, Hist. 2. 45
[35] ibid.
[36] In the particular period of this study the *Annona* will also include oil and after Aurelian wine and meat.
[37] SHA Severus. 18,3.
[38] Durliat, 1990: 44.

understanding of the mechanisms of supply. This is the only discernable historical event in the Late Roman period which affects the source of supply of these goods rather than their destination or constituents. Though historical sources suggest that the Alexandrian fleet was deemed to be of paramount importance in supplying Rome[39], other historical tracts suggest that in fact Africa was always a more substantial contributor to Rome[40]. Rickman has suggested that the more coherent nature of the arrival of the grain bearing ships from Egypt would have rendered their arrival more impressive and hence more important in the popular consciousness[41]. Even from a purely historical viewpoint this remains debatable and without additional contemporary accounts to compare with, it will never be anything else. The most obviously interesting archaeological question regarding food supply in the early 4th Century is whether there is a correlation in the archaeological record with the increasing reliance on grain imports from the Western Mediterranean. In particular whether the proportion of African goods among imports to Rome changes in any discernable way.

Since the inception of the *Annona* supply to Rome the nature of the goods of which it comprised were also subject to some variation. Initially, in the late Republic *Annona* referred specifically to grain imported for the population of Rome or sections thereof. During the reign of Septimius Severus a supply of olive oil was added[42]. Further additions were made to the *Annona*, with wine and meat being included as provision for the Roman population under Aurelian[43]. These changes in the goods supplied are really of secondary concern. There is no reason to suppose that they represented a shift in dietary habits among the population, rather their primary significance is as indicators of political will and the perceived necessity in placating the urban masses. The addition of oil to the dole by Septimius Severus and the Aurelianic addition of wine have a bearing upon this study in that by their nature, they require a container in order to be transported. The amphorae in which much of these liquid goods would have been moved provide the most reliable form of evidence for food distribution. The foodstuffs associated with the *Annona* themselves and the literary evidence whilst allowing alternative approaches to questions regarding the food supply system both labour under the limitations discussed above.

Whilst the available literary sources attest to the movement of foodstuffs and give us a useful background against which to examine the movement of these goods over long distances, they do not for the most part allow a particularly detailed investigation of the

[39] Sallust *Epistles*. 77.
[40] Josephus: Bellum Judiacum, 2, 283.
[41] Rickman 1980: 71.
[42] SHA Severus. 18,3.
[43] SHA Aurelian. 32,2; 48,1

patterns or mechanisms of their final distribution to be undertaken[44]. Despite this, there is some detailed evidence for certain aspects of the movement of goods and the economic implications of this. Emin Tengström concentrated his work on the supply of grain from the North African provinces. His study of literary and epigraphic sources is particularly apt for illuminating the situation, as reported in the textual sources, in the very area with which this study is primarily concerned. Tengström relies heavily on the *Codex Theodosianus* for his primary source material and it is the laws collected in this work which provide the starting point for the philological understanding of the supply of grain to Rome[45]. Furthermore, Tengström is very thorough in defining a number of distinct phases in the movement of these goods[46]. In order to make significant advances within this particular field we must employ other forms of evidence which can reveal details about the actual practices of exchange rather than the ideal reflected in the legislation. For this we must primarily rely upon archaeologically recovered material to provide a less subjective and more quantitatively significant corpus of data to be brought to bear on these questions. This approach is not entirely unproblematic and a discussion of the practicability of using archaeological data for studying Roman economics and its particular applicability to this study follows[47].

Textual approaches to economic studies

The strengths of the textual approach to economic studies are apparent through the many studies of the legal machinery employed to control the food supply of Rome. The ability of historically based synthetic works to address these issues are a useful starting point for anyone wishing to study the implications of the grain trade for life in Rome[48]. The historical sources offer an unparalleled opportunity to understand the intention of some of those involved in the organisation of the supply of foodstuffs to the city of Rome. They also offer an insight into the importance attributed to the arrival of staple foodstuffs from overseas and the panicked responses which might ensue if the regular supply was not maintained[49].

The demands of a system whereby large quantities of foodstuffs were being transported have been interpreted as leading to increased economic activity in the High Empire. Traditionally, this is not seen as holding true for the Late Empire. It has been suggested that once taxes began to be levied in kind trade was limited[50] as the amount of

[44] See Tengström 1974.
[45] Tengström 1974: 9-10.
[46] Tengström 1974: 11-12.
[47] See Chp. 3.
[48] Many of these focus on the various laws enacted e.g. Harris 2003: 301
[49] Seneca *Epistles.* 77; Tacitus. *Historia* 4. 38.
[50] This is surely not the case. It has been shown from the evidence of shipwrecks in the Mediterranean that many different types of cargo were carried together onboard ship. It is now also widely accepted that the

money moving through the provinces was reduced. This is however a very simplistic and narrow view on the imperatives of exchange. The idea that goods cannot be traded or exchanged without recourse to monetary value is tied too closely to capitalist ideology and fails to appreciate the many alternative arrangements which are possible. Large-scale regional exchange, itself the result of many small-scale local transactions[51], does not in this case occur solely due to the presence of coinage. A command economy or barter system would be able to produce much the same effect on the movement of goods[52]. Hopkins interpreted the primary impact of the *Annona* as being a necessity for increased production within regional exchange networks, which came about in order to meet the needs of the state. He explains the mechanisms behind this as supporting populations of local artisans who could export their goods for cash[53]. Whilst the occurrence of this phenomenon is attributed to economically unsophisticated regions, it would seem sensible to suggest that the presence of these artisans argues exactly the opposite as only a fairly sophisticated economy could support a sizeable population not actively involved in producing for the subsistence base[54]. Rather than being a brake on economic sophistication, the levying of taxes in kind can be seen as nothing more than an increasingly direct attempt by the central Government to provide basic goods without needing recourse to scarce resources of precious metals in the Late Roman period. Whilst this may have led to a reduction in the amount of coinage in circulation it should not be interpreted as an indication of a less sophisticated economy purely on this basis. In the development of studies of the Roman economy two formative positions emerged in the late 1970s and early 1980s, which have shaped and in many ways continue to define the nature of the debate and so deserve some considered discussion here.

The "Cambridge School"

The majority of historical studies have been focussed on what are essentially subjective opinions or quantification on the basis of recorded figures[55]. However a number of studies, particularly those of Peter Garnsey, have attempted to use the historical data to address questions pertaining to the social ramifications of the necessity of

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inducements offered to shippers working for the state by transporting the annona, encouraged them to trade along their state underwritten routes as the financial risk which they faced had been reduced by service to the *annona*.

[51] A point which now is widely accepted, see Horden & Purcell 2000, but for the time was extremely insightful. There was then and I believe still is a tendency to dissociate the long distance exchange which is the focus of much research from local distributions which both depended upon it and made possible the agglomeration of such large quantities of material for purposes such as the feeding of the populations of Rome and Constantinople.

[52] See Horden & Purcell 2000: 365-367.

[53] Hopkins does not quite go so far as to say that taxation is responsible for the proliferation of provincial goods during the course of the Empire but that seems to be the gist of the argument.

[54] Zeder 1991

[55] For example Loane's study which quotes the figures given in Dio, 83, 13 or Josephus: Bellum Judiacum, 2, 283.

importing grain and other foodstuffs into the city of Rome. From the 5th Century BC, following the defeat and conquest of Veii, Rome had the capacity to draw on external sources to supplement the foodstuffs supplied from its immediate hinterland[56]. If this was, as is commonly accepted, an ad hoc process at least until the institution of the Gracchan Grain Law it must have served the purpose of providing a platform from which those with the financial and political power could exert their patronage and gain popular favour[57]. It was not until the consolidation of power under Augustus that there could be seen to be a significant, consistent involvement on the part of the Roman government in the food supply of the city[58]. The means by which the supply of grain reached the designated recipients has received a great deal of study from ancient historians and some archaeologists. Indeed, it is one of the central themes of this research. However, very few scholars have attempted to look beyond the obvious traces of large-scale distribution[59]. Whilst it is my belief that historical evidence alone is insufficient to answer these questions of the nature of the distributive process and the implications of this for urban society, it is interesting to note that the impetus for the study of these questions comes from an historical rather than archaeological perspective.

One of the most problematic aspects of the historical approach to the *Annona* is the perceived necessity of recourse to estimations of quantities, both of grain imported and of population[60]. This quantitative approach, when based upon historical evidence is by nature painting a fractured picture of the food supply of Rome. The temporal range of the sources is impressive but they can at best only represent a very brief snapshot of the information available to the author at the time of writing. The utilisation of the historical sources in this manner, especially in older historical writing can be exemplified by the conflation of documents from vastly different time periods to attempt quantification of the grain necessary to be imported for Rome[61]. This simplistic treatment of the sources as direct evidence for quantification of the supply and distribution of grain to Rome is by no means the only way they have been used, the lack of a continuous narrative is however the most obvious shortcoming of this type of evidence. The other major limiting factor in an exclusively historical approach is more intrinsic to the nature of the material. Textual evidence is by definition the product of the act of writing, which must be considered to be

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[56] Garnsey 1988: 181
[57] ibid. 197.
[58] Ibid: 218.
[59] See Garnsey 1998: 226.
[60] The quantitative approach seems particularly prevalent among historians eg. Garnsey 1983; Hopkins 1980; Virlouvet 2000. The period of publication for these arguments suggests strongly that they must be seen as occupying a place within a particular academic discourse.
[61] This occurs in Loane 1979. The figures for extraordinary distribution given in Dio for the mid first century BC are conflated with the quantities given by Josephus for grain provided from Africa and Egypt. This conflation of disparate sources is also applied to later periods with the surplus left by Septimius Severus.

an intentional process, undertaken with the purpose of representing information to the reader. This holds true for all forms of written evidence from ancient literature to *ostraca* recording shipping manifests. As such these writings represent a conscious selection and filtering of information in order to record that which the author feels to be appropriate, useful or most suitable to support the position which he or she desired to communicate.

The "Carandinian position"

Wickham saw the Carandinian position as laid out in *Società Romana e Impero Tardoantico volume III*[62], as 'falling within two linked fields: the theory of the slave model of production and the issue of the role of commerce in Mediterranean Roman society'[63]. Carandini's approach to the question of slavery is significantly different to that of the historical school of Finley, Hopkins, Whittaker et al. Carandini and his associates focus on the treatment of slaves and the means of their exploitation, rather than the overall number of slaves[64]. They argue that tenant farming was more able to weather seasonal and annual differences in production as the subsistence base was independent of the process of extracting profit. This effectively would render investment in tenant farming much safer in the unpredictable environmental conditions of the ancient Mediterranean than the use of plantation slaves who would have consumed a fixed level of produce no matter the success of the harvest. This is contrary to much of the received wisdom, which suggests that the end of the "slave estates" signalled a general decline in prosperity. The hard-line "subsistence economy" minimalism of Finley or Garnsey is irreconcilable with Carandini's assertions that the nature of the ceramic record demands some level of economic exchange. The reality was probably a combination of factors including market exchange, a command economy and redistribution through taxes and payment in kind[65]

Wickham's own appraisal of the issues raised in SRIT III states that, 'the exchange of the late Roman Mediterranean was dominated by Africa'[66]. The period between the late 2nd Century and the late 3rd sees the emergence and rapid rise to dominance of African Red Slip ware and of African oil amphorae in the archaeological record. Indeed, these two categories of ceramic goods are prevalent in this period to an unmatched extent. This is obviously an important phenomenon but one which is still not fully understood, and often not directly addressed. Carandini regards this phenomenon as due to commercial pressures which bring about a huge transformation in the African economy during this

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[62] Giardina (ed). 1986. Hereafter referred to as SRIT III.
[63]Wickham 1988: 186
[64] Hopkins et al. appear to be obsessed with the number of people held as slaves, a preoccupation which may explain why certain of the so-called "Cambridge School" have been so dismissive of ceramic evidence.
[65] Erdkamp 2005: 146.
[66] Wickham 1988: 190.

period[67]. The model advanced by Carandini and Panella explains the micro-economic processes at work, but does not do so for macroeconomics[68]. Their model does not adequately explain the origins or the demise of the complete dominance of the market by African ceramics. They did however succeed in bringing more attention to this debate than had hitherto been accorded it by the wider academic community. With the benefit of hindsight, this work whilst unable to produce answers to all the questions one may wish to ask has steered discussion to the point where more answers may now reasonably be expected from the material evidence.

The supply of grain to Rome is crucial to the explanation of Roman economics. Accepting that Africa was the primary source of grain for import to Rome, the quantities necessary in excess of the subsistence base must have been concomitant with increased specialisation in production and the development of an extensive transport infrastructure[69]. The combination of specialisation and the lower shipping costs afforded by the demands of the *Annona*[70] are seen to have led to the first exports of other African goods to Ostia. Carandini and Panella may dispute with good reason that this does not explain their penetration into the wider markets of the Mediterranean. It was however to give African products a greater degree of commercial stability in comparison to goods produced elsewhere. Wickham therefore disagrees with Carandini, stating that it was ultimately the needs of the state which permitted a degree of commercial sophistication to develop[71]. Evidence for the continued involvement of the government in the supply of foodstuffs in the Late Empire can be suggested from, amongst other things, the identification of a *Statio Annonae* in the *Forum Boarium*[72]. This is admittedly somewhat tenuously dependent upon the placement of a dedication to a Constantinian *Praefectus Annonae* outside the structure. However, wherever the exact location of this building, it was constructed in the 4th Century A.D. as an addition to the temple of *Ceres*, *Liber* and *Libera*. Rickman suggests that the long association of the *aediles*[73] with *Ceres* and the location of the temple are indicative of a longer-term link between the temple building and the *Prefectus Annonae*. This may be reflected in both the placement of the inscription and the elaboration of the building as the role of the *Prefectus Annonae* became more extensive.

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[67] Carrandini 1986: 3-19. In. SRIT III. He also concedes a limited non-commercial influence but this is seen as subordinate to commercial pressures.
[68] See Carandini 1986 & Panella 1986 for a more theoretical overview and practical approach respectively.
[69] Wickham 1988: 191.
[70] The Government underwriting of vessels employed in shipping the *Annona* would have significantly lowered the running costs for any enterprise involved in this activity.
[71] Wickham 1988: 192. If this analysis of the initial impetus being provided by the state is correct, it would seem reasonable to surmise that the eventual disappearance of African goods in the late Sixth century can be linked to the contraction of the Eastern Empire and increased threat to the Exarchate posed by the Arab expansion along the southern coast of the Mediterranean.
[72] Now part of the structure of the church of S. Maria in Cosmedin.
[73] Rickman 1980: 81.

Without this support from the state, the costs for African goods would have increased, thereby making production for export impracticable. There are however, problems with using the Roman model to explain economic behaviour with respect to other urban centres[74]. Whilst the urban population of Rome was partly supplied through the *Annona*, this interventionist stance was not extended to the other cities of the Empire before the diversion of Egyptian grain to feed the population of Constantinople after its foundation during the reign of Constantine[75].

Recent additions to the corpus of archaeological material pertaining to exchange and food supply in the Late Empire have come to play an increasingly significant role in the development of our understanding of the mechanisms through which we address these issues. The available archaeological evidence can be usefully divided into two basic categories. Firstly, the remains of the buildings and structures associated with the storage and movement of foodstuffs and secondly we have the material remains of the containers in which the foodstuffs were transported. The ways in which these types of evidence can be used vary, as different approaches are necessary depending upon the archaeological material present. The available sources of archaeological evidence for studying economic questions or interrogating evidence of an essentially economic character will be discussed in the following chapter[76].

Urban spaces and model cities

Any discussion of ancient economies in the Classical or Early Medieval period cannot escape the essentially urban character of those societies. As such, the role of the city within the economies of ancient societies has been often discussed and bears some consideration here. Whilst it is perfectly reasonable to talk of cities as centres of consumption, there is a danger in falling into oversimplification of the "Consumer City" model proposed by Weber[77]. Whilst one could never accuse Weber himself of making unqualified generalisations, the models which he proposed have been devalued through vulgar attempts to apply them to historical situations[78]. The suitability of urban environments as case studies for the assessment of Roman economic activity will be questioned and the problems inherent in this approach will be discussed in the following section along with the suitability of and reasons for choosing the sites identified for this research.

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[74] Garnsey 1999. re-enforces the Carandinian position that the market plays a greater role in ensuring food supply to non-producers and that Rome, Constantinople etc. are exceptions rather than the rule.
[75] Rickman 1980: 198; Sirks 1991: 193 –8; *Codex Theodosanus* 14.16.2; Symacchus Epistles. 3. 82, 4. 54, 7. 63.
[76] Chp. 3.
[77] Weber. 1958.
[78] For example Morley (1996) attempts to define Rome as a Consumer City.

The realisation that Weberian ideal types of "Consumer" and "Producer" cities are not really applicable to actual historical examples, particularly not to Classical cities, can be traced at least as far back as Moses Finley's "Ancient Economy"[79]. Finley quite rightly argues that it is a pointless exercise to attempt to define what it means for a settlement to be considered a city. The nature of the city changes through time and between different geographical locations, the city is a socio-political construct, specific to the ideology of the group to whom the city belongs[80]. The city is a "conceptual prototype of the town which its inhabitants construct mentally"[81]. Further to this Finley argues for the practical invalidity of Weber's ideal "Consumer City" on the basis that as at least a portion of any urban population cannot be involved in production sufficient for their own subsistence, all cities are in some sense "Consumer Cities"[82]. More recent attempts to re-define the city in a less explicitly economic role[83] have been welcome however they have been sometimes guilty of divorcing themselves from economy entirely[84]. Other authors have further exposed the weaknesses inherent in trying to apply the consumer city model to studies of Roman urbanism[85]. What all these studies have so far failed to do is to find a meaningful paradigm for addressing socio-economic issues with regard to the ancient city. Weber himself suggested that the conceptual fusing of politico-economic and purely economic factors are insufficient to explain the nature of the city[86]. One could argue that the Pirenne Thesis[87] was an early attempt to address the relationship between changes in the fabric of cities from late antiquity into the middle ages and the changing socio-economic situation of the time. It was of course a generalised history and as such has since been subject to much discussion[88]. Uncritical use of ideal types and models, whether Weberian or otherwise, is clearly unacceptable given the wide range of variety which can be seen within ancient urban centres from even a cursory examination of the archaeological and architectural records. A less generalised approach is needed which accepts that each city, village or even farmstead must be considered on its own merits through a detailed

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[79] Finley, M. 1973. pp 123 - 124.
[80] Leone 1999: 121.
[81] Rykwert 1976: 25. This is however seen by Rykwert through the physical manifestation of this "conceptual plan" through architecture and in many cases the use of orthogonal street grids. Despite the limited nature of his vision, the principle of the concept of a city being in the mind of its inhabitants is valid.
[82]Finley 1973: 125.
[83] E.g. Lomas. 1997. Suggests that the Weberian models may be suitable for economic studies. This is clearly untrue however her interest in rehabilitating the city as a social space is important for understanding the key role which the city played in the Roman Empire.
[84] Lomas. 1997: 22; Parkins. 1997a: 86-7. Parkins focuses on the elite involvement with the city without really questioning Weber's hypothesis or the foundations of his model.
[85] Mattingly 1997; Whittaker 1995. Though Whittaker believed the Consumer city to be the best model available. Even Mattingly only rails against the apparent lack of a new paradigm rather than actually attempting to define one.
[86] Weber 1958.
[87] Pirenne 1925
[88] See Havinghurst. 1958. for a synopsis of the issues; Hodges & Whitehouse. 1983 offers a discussion of how archaeological evidence may be applied to testing the Pirenne Thesis.

investigation of the archaeological material culture. It is only through approaching the material from a bottom-up perspective that we can dissociate discourse from the ideal types which are the natural product of an historical perspective conditioned by essentially administrative sources which attempt to classify urban sites for their own purposes[89]. In defining late antique cities, it has been said that the city had 'a juridical and political status, a particular social situation, and a given idea also of what constituted a town'[90]. Whilst it may be fair to say that the fabric of urban spaces were undergoing a process of change in Late Antiquity, this did not necessarily indicate a change in their perceived role or their legitimacy as cities[91]. Relatively recent work has attempted to address the issue of the changing uses of urban spaces and the way in which they were inhabited through detailed study of specific sites[92]. In the case of the Piazza Ferrari in Rimini, this appears to show a continued occupation through late antiquity, though it is noted that this particular site is seen against a background of a more general dispersal or lowering of the population as a whole during this period[93].

I would argue that the city is a key component in the politico-economic organisation of the Roman Imperial System, if such a thing can be said to exist[94]. Despite the overwhelming likelihood that there was little conformity in the execution of Imperial doctrine across the geographical scope of the Empire, the fact remains that the central authority did, on several recorded occasions make attempts to influence or control the economy[95]. The political and economic focus of the Empire on the great cities of the Mediterranean, which must result from such large agglomerations of population, cannot be ignored. Whilst there remains little consensus on the nature or complexity of Roman economy[96], the key role of the city in the Roman Empire at least until the fall of the West is well documented[97]. The economic imperative cannot be separated from social conditions, whether one wishes to focus on social considerations or the economy, the two are inseparable and their interaction is the catalyst for the dynamic socio-economic situation which an examination of the archaeological record reveals. This thesis set out to investigate the impact that economic practice had upon the socio-political life of Roman

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[89] As an example, previous foci of research on defining cities as either Municipia, Colonia or Vici etc. offer little insight into the daily activities of the majority of the population who would have inhabited these sites. Likewise, once we accept that a variety of activities are being carried out within a city, as previously discussed definition as of a site as a "Consumer City" becomes irrelevant.

[90] Spieser 2001 7.

[91] Slater & Higgins 2000.

[92] See Ortali 2003; Verslype & Brulet 2004

[93] Ortali 2003.

[94] See Haldon 1999: 247-8.

[95] Most notably the Price Edicts of Diocletian (See Momsen 1851) and Claudius' incentives to shippers willing to serve the *Annona*. Suetonius, *Claudius*. 18-19.

[96] Hodges and Whitehouse (1983) in discussing the influence of the Pirenne Thesis and the possibilities of testing its relevance through archaeological material are still firmly rooted in the economic minimalism of Finley et al.

[97] Haldon 1999.

citizens. Whilst the inverse is also undoubtedly true[98], it is the ways in which the relatively high archaeological visibility of the detritus of economic behaviour can be used to elucidate socio-political practices laying behind its formation which provide a more enlightening means of improving our understanding of life in Late Antiquity. The cities of the Late Roman Empire must be considered to be key elements in understanding this question. As centres of economic practice the city provides a rich archaeological record through which the questions of changing socio-economic conditions and practice may be examined. The city is also an important locale for the testing of hypotheses pertaining to the locality of socio-political practice. As it is rash to accept wide generalisations as to the nature of Late Antique trade and exchange, it is even more perilous to accept general statements as to the nature of social practice in this or any other period. Cities are eminently suitable sites for examining the individuality of such practices, as due to the agglomeration of population even in the supposedly demographically reduced state of the Late Antique period studies of practice within an urban environment will reflect the actions of a much larger number of people than one might expect at a rural site. It would be wrong to say that cities occupy a privileged position in terms of their ability to tell us about an overarching Roman Economy. However, they are privileged in terms of the variety and diversity of material culture available for study and as such provide a very useful test-bed for developing methodologies and theories for investigating the interpretation of this essentially economic data.

The current state of economic studies

As previously discussed, there are effectively two positions, formulated in the late 1970s and early 1980s upon which current scholarship regarding this issue has been based[99]. Firstly the heavily historically based approach favoured by the "Cambridge School" of Garnsey, Hopkins et al. and secondly the more archaeologically orientated work first espoused by the predominantly Italian scholars such as Carandini and Panella. Whilst these may seem to be widely different, they are in fact closely linked and as Wickham states[100] much of Carandini's work was focused on refuting the arguments of Finley and the "Cambridge School" for the widespread reliance on a slave economy. They are in essence two sides of the same coin and initially, it seems that any application to wider economic concerns was a secondary effect of this primary focus on slave labour. More recent scholarship has placed increased emphasis on wider economic processes, however the vast majority are still heavily reliant upon this by now dated material for their

[98] This is following fairly standard Structuration theory. See Giddens 1984 for an introduction to the concept

[99] Even recently the central place of population numbers and the role of the state have been prioritised. See Villedieu 2003.

[100] Wickham 1988: 185.

data and interpretative framework[101]. Very little scholarship on this issue attempts to offer an interpretation based on the new data which is being produced through excavation in Rome and other major cities of the Mediterranean[102]. There are a number of very useful works dealing with the historical sources but next to no synthetic archaeological works which attempt to fully explain the distribution of goods and hence the economic systems of the Late Empire.

The current state of knowledge regarding food supply to Rome and the economy of the Late Empire is therefore somewhat fractured and stagnant. Even recent syntheses of the economy of the Late Empire, particularly in relation to the supply of foodstuffs to Rome rely on source material which is rooted in the scholarship of the "Cambridge School"[103]. There are incredibly detailed studies of a few individual sites yet no real attempt has been made to synthesise the available data and thus create a wider understanding of the socio-political issues of this period. This lack of a synthetic comparison means that whilst some generalised interpretations can be drawn from the data, they are necessarily based upon isolated corpora and thus can only be fitted into existing economic frameworks. In isolation, the available data cannot form the basis of a new interpretation. For this, it is necessary to look beyond the current state of the discipline and for new ways of using the available evidence.

[101] Eg. Temin 2001.

[102] For example see: Fulford & Peacock 1984; 1994; Humphrey 1976-1982

[103] See Jaïdi 2003 for both a recent attempt to synthesise the *Annona* in the Late Empire and also for bibliographic details which have changed little since 1990.

Chapter 3: Archaeological evidence for trade/exchange

Foodstuffs, proxies and containers

Initially much of the work investigating the economy of the later Roman Empire through archaeological evidence was conducted by Italian scholars, as a result of advances made in the 1970s and '80s in the field of ceramic studies. Key to the presentation of this research was the third volume of "*Società Romana e Impero Tardoantico*"[104]. This work was primarily orientated with an archaeological focus and hence provided a fresh perspective on the issues which had been dominated by historical discourse. A review article by Chris Wickham in the Journal of Roman Studies[105] brought this work to the attention of the wider discipline in Britain. It also explored the relationship between the work of the Italian scholars, led by Andrea Carandini and the then established, text based paradigm for understanding the Late Roman economy.

Whilst by far the greatest mass transit of goods for the *Annona* concerned the supply of grain to Rome and later Constantinople, the possibility of recovering direct evidence of these shipments is remote at best. As the proxy evidence for this trade is limited to the structures used to store and process the grain, one cannot attempt to interrogate this facet of the exchange mechanisms of the Empire through this medium. Whilst such structures show the use of grain within the Empire they cannot be used to show either the distribution patterns once the grain has left the storage facilities or the scale of said distribution nor the original provenance of the grain. In order to understand the *Annona* we must turn to the other goods which were shipped alongside the grain following the Severan reforms of the 3rd Century A.D. The principal *Annona* commodity, which can be traced through proxy evidence, is olive oil. This was a staple of Mediterranean life, not just as a food product but also for lighting and for use in bathing. Again, the oil itself does not survive well archaeologically and therefore except in the few cases where it has been possible to employ lipid residue analysis we must rely on the remains of the containers used for its transportation as evidence for its distribution and the scale of imports as part of the *Annona* system[106]. The amphorae which were utilised to transport oil and other liquid goods around the Mediterranean world in antiquity form a significant corpus of archaeological data and are prevalent in many excavated ceramic assemblages. There are however, two common misconceptions about amphora data which need to be addressed before their remains can feasibly be used as a source of evidence for this study. Although amphorae were undoubtedly a widespread and common means of transporting liquid goods, they were not the exclusive means of such transport.

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[104] Giardina, A. (ed.) 1986.
[105] Wickham, C. 1988.
[106] See Evershed 1993: 77; 90 for a discussion of the applicability of lipid studies to archaeological ceramics.

There are both epigraphic and iconographic references to the use of skins and it is not inconceivable that barrels were also used[107]. As the available data is merely a sample of the total ceramic population this will have no adverse effect upon the conclusions drawn from interpretation of the amphora data as long as a suitable methodology is employed which accounts for this incomplete recovery or preservation of the material within the archaeological record. The second misconception which must be addressed has been elucidated in recent work by Michel Bonifay[108]. The basic premise of his research being that contrary to established belief many North African amphorae were used as containers for *garum* and other fish products rather than oil. The study of food in the Roman Empire is then a complex matter as in almost all instances it is necessary to use proxies for the actual material. The poor preservation of organic material presents a very great challenge to the investigation of questions pertaining to foodstuffs. However, in the quality of the available proxy evidence for the late Roman period and in particular Late Roman sites within the Mediterranean are well appointed to be able to offer a means of addressing the questions and issues raised in this thesis.

Of the available archaeological evidence, it is the amphorae which provide the most useful means of approaching this question on a quantitative basis. Whereas other forms of portable material culture may be subject to vagaries of taste or fashion, purely functional objects such as amphorae will provide a truer reflection of the processes leading to the distributions of the goods they contained. Amphorae are in effect a part of, rather than a proxy for the commodities which they contained. Whilst as yet there are no all-encompassing syntheses of the material pertinent to the sites under consideration for this work, various excavation reports and hitherto unpublished data from key late antique sites in the centre of Rome provide an unmatched opportunity for reconstructing the distribution patterns resulting from the movement of foodstuffs from around the Empire and into the capital. This holds true for other sites just as much as for Rome which, due to its privileged position within both the political structure of the Empire and our available sources of evidence, must remain the primary focus of this thesis. The particular methodology to be employed in the examination and interpretation of these material data will be detailed later, but the combination of significant quantities of excavated material, extant warehousing and transport infrastructure offer an unparalleled opportunity to push forward the agenda of studies based on primarily economic data as a tool for understanding social practice. It also puts the focus back on the archaeological evidence itself and formulates a new approach to the study of this problem.

[107] Peña 1998a; as suggested by Egri 2007;
[108] See Bonifay 2005a

Before discussing the particular approach to be developed and used in this study, it is important to understand the strengths and weaknesses of an approach based upon studies of amphorae in relation to the material and sites which I have chosen. Recent refinements in the typologies and understanding of African ceramics[109] have given us the tools to fully investigate the implications of one of the most startling changes in the Roman ceramic record, the almost complete saturation of goods of African origin throughout the western Mediterranean. Concomitant with this gradual increase in our knowledge about the material itself is an increasing corpus of data from the major sites[110], linked to this is an increased interest in the later periods of archaeological sites[111]. Whilst there are problems of inference and questions arising from the impossibility of knowing what proportion of the total quantity of amphorae actually survive to be recovered archaeologically[112], this form of approach however offers the best means of directly addressing the material transported. Uncertainty over how complete the archaeological record can be considered to be is the principle problem with amphora based studies of the economy. It is this uncertainty and the inability of archaeologists to answer this question which has led to attempts to discredit the approach by some of those historians who are concerned with quantification of trade[113]. Whilst the point that there is no way of knowing how much material fails to survive in the archaeological record is valid[114], it does not mean that a study of this material is pointless or irrelevant. I would argue, and will demonstrate[115], that whilst a study of amphorae is very unlikely to ever be able to allow the absolute quantification of the goods which were present at a given site in antiquity, there are other issues which can be addressed very successfully through an archaeological study of the remains of amphorae.

The suitability of amphorae for addressing these problems has been clearly demonstrated through much of the data recovered from a number of sites and used within a number of research projects over the past 20 years. Notably a series of studies have defined patterns of distribution for these vessels across the Roman world[116]. Whilst these studies have been focussed more on long distance trade and exchange, the principle analytical tool being a determination of the presence or absence of goods of various

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[109] In particular Bonifay 2005 and work carried out by David Peacock in establishing petrographic links between ceramics and kiln-sites. Peacock et al. 1989; 1990.

[110] The two are very closely linked as the more that is known about the material, the more likely it is to be recorded and retained at excavated sites.

[111] This is typified by the excavations at the *Crypta Balbi* in Rome.

[112] See Orton 2000: 40-42.

[113] E.g. Duncan Jones 1974. A study which is overwhelmingly concerned with historical sources for grain prices and attempting to reconstruct population sizes.

[114] This is true for many reasons. Partial excavation of sites, discarding of material by previous excavators not interested in, or unable to understand the material or the disposal of material in antiquity in ways which are not archaeologically recoverable are all possibilities.

[115] The methodology for this study will be fully discussed in Chapter 6.

[116] E.g. Reynolds. 1995; Eiring & Lund (eds) 2004.

provenances at the sites investigated, they prove the ability of the data to answer the questions asked of it. Although the simplistic trade routes represented by neat lines on a map[117] have been somewhat discredited through the development of more complex and nuanced models of exchange[118], the basic tenets of the position; that through appraisal of the goods present at a site it is possible to reconstruct both patterns of exchange and patterns of consumption remain valid. Furthermore, recent studies have shown how a detailed appraisal of the ceramic material from a specific site or group of sites can be used to derive a more fine-grained interpretation of socio-economic practice[119].

Archaeological evidence for the *Annona* in the Late Empire

As previously stated there have been a number of studies dealing with the Roman *Annona* and the supply of foodstuffs to the city during the Imperial period. Documentary sources relating to the organisation of the supply of grain for Rome have been explored and an overall impression of the mechanisms of the supply can be understood[120]. However, very little has been explicitly written on the nature of these mechanisms of supply in the Late Empire or late Antique periods. Indeed the most accessible work on this subject, Emin Tengström's 'Bread for the people' is over 30 years old[121]. Despite its age, this work remains a useful synopsis of the available historical evidence for the *Annona* in the Late Empire as it was conceived as an exceedingly comprehensive review of the available evidence. Despite the increasing emergence of archaeological evidence as a source for understanding the process of the movement of goods via the *Annona* this work and its reliance on the historical sources provides a background against which the archaeological material can be interrogated.

In attempting to trace the origins of the supply, one is limited in this study by the lack of stamped amphorae, without such evidence it is difficult to ascribe closely located sources or destinations to many of these containers. It is even more difficult to assess the extent to which these amphorae represent a conscious effort by the state to manipulate or control the supply of oil to the city of Rome. And hence the questions asked of the historical and epigraphic evidence are naturally different from those for which the archaeological evidence has the greatest potential to answer. Questions of origin are difficult to answer even where there is better evidence available for study than is the case for the Late Antique period. It is also the case that often the questions asked of the archaeological data lead to highly variable answers. Studies of Baetican Dressel 20 amphorae used extensively in the movement of oil until the mid 3rd Century and often

[117] For a recent example see Young 2001.
[118] Kingsley. 1996; Kingsley & Decker (eds) 2001.
[119] Ikäheimo 2004.
[120] Christol 1994.
[121] Tengström 1974.

found to be stamped or otherwise marked, have led to contradictory interpretations as to the nature of the oil supply from Baetica. At one extreme Remesal Rodríguez argues that the needs of the state to redistribute the necessary goods to the armies and the city of Rome were the driving force behind the early imperial economy[122]. At the other is the view that the stamps on Baetican Dressel 20s represent a purely commercial notation and therefore that the amphorae themselves are moved due to purely commercial motivations[123]. These two views are based on the same sets of evidence but offer widely divergent interpretations of their significance. As can be seen, even in this situation where there is a great deal of evidence available, widely different interpretations for the form of the Roman economy can be formed from the same sets of data. Although there is very little textual information available for study here, that which is available can be employed to some significant effect.

The greatest problem facing the archaeologist in studying ancient trade is that of relating the extant or excavated archaeological remains to the processes involved in the movement of those goods. In one particular example we are privileged to have an insight into this process and through this an understanding of not only the mechanisms of the supply of oil to Rome but also an insight into the limitations of the archaeological record where the study of amphorae as a proxy for oil are concerned. Whilst a series of *ostraca* recovered from the *Ilôt de l'Amirauté* in Carthage are specifically relating information about the movement of goods through the port of Carthage, the information which they reveal is applicable elsewhere, it is particularly enlightening for this study as the period from which the evidence is derived is central to the temporal boundaries set for this thesis and the ultimate destination for a significant proportion of the oil is recorded as being the city of Rome.

Archaeological epigraphic evidence for the state oil supply from the Ilôt de l'Amirauté; Carthage.

The extraordinary find of a deposit on the Ilôt de l'Amirauté in Carthage of at least 32 *ostraca* containing information on the organisation of the oil supply through Carthage by the Direction des Antiquites de Tunisie in 1911 allows a more detailed appreciation of some of the mechanisms at work in the movement of olive oil within *Africa Proconsularis* and between that province and Rome[124]. This is particularly important as many African amphorae lack the stamps found on Baetican Dressel 20 amphorae and these *ostraca* therefore represent the only primary textual evidence for the administration of the oil supply. A study of these documents enables much more detail to be added to

[122] 1998: 198
[123] Domergue 1998: 212
[124] Fig. 1.

interpretations of the mechanisms behind the supply of oil. The *ostraca* in question all date to a period in A.D. 373 and are concerned with the reception and storage of oil in Carthage. They form two distinct groups based on their content, the first of which concerns the importation of the oil and the second of which is concerned with storage. As such it seems logical to examine the data in two groups corresponding to the different purposes of the *ostraca* themselves.

Fig 1: Excavated remains on the *Ilôt de l'Amiraute*, Carthage.

Group 1: oil imports.

The first group is the smaller of the two, consisting of only 6 examples. They are however surprisingly informative. At the most simple level they give quantities of oil received in terms of the number of containers and their type. All of the identified containers are described on the *ostraca* as "Caproreses Light Centenaria". These would appear to represent a type of container which had a capacity sufficient to accommodate one hundredweight of oil[125]. The imports are also dated. Interestingly the dates cluster toward the beginning of February A.D. 373 with the first three on the 3rd, 14th and 15th of that month. The remaining three *ostraca* record dates from the beginning of March until late July of the same year[126]. This range of dates can plausibly be used to make two inferences, one relating to the collection of the oil at Carthage and the second pertaining to the subsequent shipment of the oil to Rome. Primarily the range of dates argues against a single annual collection of oil at the ports. Clearly small vessels were bringing reasonably large quantities of oil to the harbours and storehouses of Carthage throughout the first

[125] Peña 1998a: 129.
[126] Peña 1998a: 123-130.

part of the year. The notation on the *ostraca* of the *horrea* to which the oil was then sent is highly suggestive of transhipment at the port onto larger vessels, which would then make the trip to Rome. Admittedly this is a very small sample size; it does however serve as a possible indicator to the likely shipping season. Any vessels heading for Rome would wish to do so before the autumn if practicable in order to commence the return journey before winter made the sea unsafe. Looking at the specific figures it is interesting to note that all of the shipments consisted of approximately 220 amphorae although there is no indication of what type these were. There would appear therefore to be a standardisation in the size of the vessels employed in moving the oil to the port. Whilst a detailed appraisal of the maritime technology in use is beyond the scope of this research, understanding the capacities and draft of the vessels in use may enable a more thorough investigation of other possible transhipment nodes at coastal or riverine sites within the North African provinces. Also the two shipments on the 14th and 15th of February both had 208 of their amphorae accepted by the authorities whilst others were rejected. This appears to reflect either a quota system or perhaps more likely the imposition of quality control by the provincial authorities as has been suggested for the trade in grain[127]. Generalising about the total number of imports over the period represented here is dangerous as there is no way of knowing how many other *ostraca* have been lost. It is however, useful in suggesting that even if the trade was not driven by imperial demands, there was extensive involvement on the part of the imperial authorities in assessing the quantities of oil being moved through the ports of Carthage.

Group 2: oil storage.

The second group of *ostraca* contain a much greater quantity of statistical information regarding the amount of oil stored in the warehouses of Carthage. There are seventeen *ostraca* in this group which are further divided into subgroups designated as A, B and C based on the format of the information inscribed on the surface[128]. The reading of these *ostraca* seems to be slightly more problematic than the first group. However, they are potentially more useful in providing some idea of the storage capacity of the *horrea* at Carthage. Furthermore, a number of the *ostraca* in this group contain references to the '*o(lei?) R(omae?) c(anon?)*' or "Rome oil levy"[129]. From this data it may be possible to determine the proportion of the oil coming into Carthage which was destined for Rome as part of the *Annona* supply. Perhaps even more importantly their date ranges are given in the form of a specific date again tending towards the beginning of the year though

[127] See Tengström 1974: 38-39; *Cod Theod.* 14. 15. 2.
[128] Peña 1998a: 130
[129] Peña 1998a: 137

continuing until October[130]. This is strongly suggestive of a period of activity in the measuring of the oil stored in Carthage in preparation for its transportation during the practicable shipping season which ended with the beginning of the autumn. As these *ostraca* are from a single group it is quite possible that other records would have related to other periods of time.

The reference to the oil levy for Rome which appears on several of the type 2 *ostraca* (No's 13, 14, 16, 18 & 19) is important as it provides tangible evidence to the involvement of the ports of Carthage in supplying the oil for the *Annona* to Rome. It also provides some information on the way in which the oil was arriving in Carthage as the quantities are all numerated in terms of oilskins as well as Centenaria, the latter presumably being amphorae of hundredweight capacity. This is not merely a convention as both numbers of oilskins and volume in Centenaria are recorded together '*o(lei?) R(omae?) c(anon?) as(copae) N(umero) CCC[XCI] et K(e)N^{T}(enaria) [8XCI]*'[131], the important part of the text being the "*et*" which signifies both oilskins and Centenaria. This therefore has important implications for the interpretation of amphora data not only from the sites in Carthage but also for all Late Antique deposits particularly in Rome where this oil was bound. If at this time amphorae were not the only containers used for the shipment of oil then the total quantity moving through the region could be far greater than has previously been thought. It also possibly offers a partial explanation for the reduction in the absolute numbers of amphorae found in the period after *Monte Testaccio* passes out of use.

As mentioned earlier, the quantity of oil for the Rome levy was recorded firstly in numbers of oilskins and then in Centenaria. These figures allow one to suggest a very rough approximation of the proportion of the oil passing through the storehouses at Carthage which was given over to supplying the needs of the city of Rome through the Annona. From the data on *ostrakon* 13 it may be possible to form a rough estimate of the volume of an "oilskin"[132], although obviously this rests on the fundamental assumption that all oilskins contained an equal quantity of oil. This data shows that the recorded total of 188 oilskins contained 156 Cwt. of oil. Allowing the above assumption to stand, it can be hypothesised that each oilskin contained approximately 0.83 Cwt. (2dp). Whilst this may be a reasonable proposal to make for that particular day it would not seem to hold true over the rest of the *ostraca*, for example on No. 16, 22 oilskins are recorded as containing 38 Cwt in total. Each oilskin would therefore contain 1.73 Cwt., a much higher quantity than those on *ostraca* 13. Whilst the possibility of different sized oilskins being

[130] For example see Peña 1998a: 131
[131] Peña 1998a: 137: No. 14
[132] Peña 1998a: 136.

used is completely reasonable, the fragmentary nature of the *ostraca* means that there is insufficient data to extrapolate figures for all of them.

If the quantities of oil recorded are not in uniform denominations one is left with the rather vexing question of exactly what use it is to know that the oil levy for Rome consisted of 161 oilskins. Absolute quantification once again proves to be elusive. There still remains the possibility of a relative comparison within the data from each individual *ostraca*, the patterns observed as the result of such an examination may still be useful to this study. The problem inherent in this is that as previously stated the quantities are recorded in two formats, namely numbers of oilskins and weights in Centenaria. In order to compare these two methods of quantification it is necessary to employ some form of convention. Experiments on *ostraca* 14 allow the following projections to be made, albeit though they are probably only relevant to this particular record[133]. Firstly 49 Byzacena oilskins must roughly equal 115 Cwt. of oil, therefore 1 oilskin carries 2.35 Cwt. Accepting that a Centenaria carries 1 Cwt[134], it would follow that the oil levy for Rome consisted of approximately 2,010 Cwt. of oil. Following this line of reasoning it quickly becomes apparent that the figures on the *ostraca* simply do not add up and that the containers actually exceed the total given for the quantity of oil stored. One must therefore regretfully assume that although a standard measure may have been employed, the total volume of the oilskins was not constant. There does however appear to be a correlation, at least for the Tebelbucitan area, between oilskins and amphorae. In general the numbers are either 300:50 or 446:65 a ratio of between 6 & 7:1[135]. This has obvious implications for understanding the extent to which archaeological evidence derived from the remains of amphorae might be underestimating the magnitude of the supply.

The importance of the ostraca.

As we have seen, the type 1 *ostraca* dealing with quantities of oil imported record volumes only as Centenaria, direct comparison between the two types of *ostraca* is not then possible in this instance. This could easily be allowed for if one knew the volume of an oilskin. However, as the storage manifests (Type 2 *ostraca*) deal only with the denomination and type of container in which the oil arrives, this is impossible. Unfortunately the oilskins also seem not to have had a consistent volume, or at least did not contain a uniform volume of oil. Furthermore the point at which a distinction is made between the general supply and the oil destined for Rome as part of the Annona is unclear. The administration of the port certainly sees the "Rome Oil Levy" as distinct by this point, it being recorded as weighed and stored as a separate entity. However one explains the

[133] Peña 1998a: 136-7
[134] Peña 1998a: 129
[135] Peña 1998a: 130-143.

distinction between the oil for Rome and the general supply, it is acknowledged in the records of the port authorities and must have been clear in the minds of those responsible for the shipments. It should be noted that this distinction is derived from purely legal and administrative documentary sources, though they are closer to the trade itself than many textual references. The vast majority of the data available from amphora remains in the archaeological record does not allow such a differentiation to be appreciated from the material evidence alone.

The importance of the *ostraca* is then, that they do refer to specific quantities of oil destined for Rome as part of an oil levy. This levy can only really be interpreted as part of the *Annona* for even if it was not that in name, it surely was in form. The limitations of the data in thwarting attempts at some form of quantitative analysis should not be seen as a total failure of the data to provide any meaningful insight into the role of Carthage in the *Annona* supply. Unfortunately, at this time there is insufficient data for detailed discussion of the quantities of oil to be a practical reality. What remains is the record of the activities of the oil measurers at Carthage and an undeniable link between the *Ilôt de l'Amirauté* in the Circular Harbour and the supply of oil as part of the *Annona* to Rome. These *ostraca* may also provide the only tangible separation between oil containers pertaining to the *Annona* supply and those transported for other purposes and in other capacities.

In comparison with the evidence from Baetican Dressel 20 amphorae at *Monte Testaccio*, this data is surprisingly clear. Although it may be true to say that prior to the arrival of the oil in Carthage there is no certainty of imperial involvement, once the oil arrives there is assuredly a conception of some of the oil serving a different purpose from that which will be sold on the open market. Furthermore one must expect this distinction to become increasingly real as the oil reaches Rome and is finally distributed free to those sections of the populous eligible to receive it.

Shipping and long distance transport

Climatic inconsistencies and annual differences within the Mediterranean worked to promote a system whereby shortfalls in production were compensated for through the movement and storage of surplus from other areas[136]. Various seagoing vessels, some of them with very large capacities were available for the transportation of goods in the Roman world[137]. The duration of the voyages necessary to move goods across the Mediterranean has also been the subject of some discussion as the restricted sailing season impacted heavily on the ability to safely utilise marine transport[138]. It is clear that sea

[136] Erdkamp 2005: 145; Horden & Purcell.2000: 152.
[137] Casson 1971.
[138] Kolb 2000: 318; McCormick 2001: 481.

borne transport was in many ways more effective for the movement of large quantities than overland routes but that some overland transport was obviously required in order for agricultural products to arrive at the port of origin in the first place[139]. The fact that it would have been necessary to move goods at least a short distance overland argues that this may well have been much more common than is often suggested. Whilst sea borne transportation of bulk goods would have been an obvious solution over long distances this may not have held true for all types of transportation. Indeed, it has been suggested that land transport was in fact more efficient than other forms of transport[140]. For example, in eighteenth century Britain the comparative cheapness of riverine and sea transport did not lead to it becoming the dominant method used despite the relatively static technological development of overland transport[141]. Whilst it is undoubtedly true that overland transport made an important contribution to the movement of goods around the Empire, the movement of large quantities of bulk goods would naturally be considered more easily accomplished on the water where greater quantities could be aggregated and less physical effort would be required to move them.

Shipwreck evidence

Any study of long distance trade and transportation of goods should include at least a brief synopsis of the evidence from the numerous shipwrecks investigated around the Mediterranean. Whilst it may be fair to say that evidence from a shipwreck 'provides a unique kind of evidence about ancient trade'[142], the material derived from such sites is not without its limitations. Not least of these limitations are the incorrect, if not deliberately misleading reporting of sites which have historically occurred as a result of the division between "divers" and "archaeologists". This is caused by a breakdown in communication, which is often mirrored in the reporting of metal detecting finds on land. These problems with the reporting and possible looting of sites tie in to the particular preservation problems which beset underwater sites. In addition to this, underwater sites also suffer from the reduced visibility inherent in the process of discovery through diving. Similarly, the inaccessibility of the deep sea has led to a preponderance of those sites recorded being located in coastal areas[143]. It is possible however, to reconstruct the nature of the trading process through the cargo carried on the ships recovered as wreck sites[144]. The Mediterranean in particular has shown its potential as an archaeological resource, the maritime character of the lands bordering it and the preponderance of sea borne commerce from the Bronze Age onwards have left a rich legacy of sunken material

[139] Laurence 1998; 1999: 98; Rickman 1991.
[140] Laurence 1999: 95.
[141] Pawson 1977: 27-29.
[142] Parker 1992: 3.
[143] See McCann 1994: xvii.
[144] Parker 1992: 21-22.

culture[145]. The potential of shipwrecks to provide evidence for ancient trade and maritime life in antiquity has been repeatedly stressed by marine archaeologists[146]. It has been suggested that to fully realise the potential of shipwreck archaeology it is necessary to formulate more detailed and specific research questions, expand the range of the discipline to include less well-defined wreck sites and to increase publication rates[147]. Whilst amphorae are one of the most common cargoes recovered from shipwrecks it is the possibilities and problems of this source of evidence, which must now be addressed. Whilst wrecks such as the "Isis" discovered off Skerki Bank in the central Mediterranean presents an associated group of material in transit, it is only enlightening in so much as it reveals that the amphorae in its hold had been transported from North Africa[148]. Again, whilst demonstrating the probable route of the quick, deep-water route between Carthage and Rome, and that there was a degree of cabotage practiced along this route in addition to the directed trade of the supply of Rome[149] the ultimate destination of the cargo is, and must remain unknown. Such deep-water shipwrecks and the recovery of material from them can only be of benefit to our wider understanding of the methods of transhipment of goods over long distances. However, the long distance trade between North Africa and Rome is well attested and despite the lacuna in our understanding for the precise nature of the shipments, enough is known to establish that it did occur and that it was important to the population of Rome. Interesting though the shipwrecks are, they are not directly relevant to the questions being asked in this thesis. The possibilities for evidence from shipwrecks are therefore of far more importance to studies of the movement of goods between and into sites for which less information is readily available through other sources.

Storage/processing facilities

Within the remit of studying the economy through archaeological sources it would be unthinkable not to discuss the facilities which were used to store the goods at various points along their journeys and also to discuss those structures which facilitated the processing of commercial goods where such are archaeologically visible. This approach obviously privileges certain activities which leave archaeologically or architecturally recoverable traces. One of the most visible of these traces are the vast *horrea* which occur in many Roman towns and are particularly noted in respect of the shipment of goods to

[145] See Frost 1964 for an early appreciation of the potential of underwater archaeology in the Mediterranean. Bass 1975 offers a summary of the important underwater excavations of Cape Gelidonya and Yassi Ada.
[146] See Gibbins 1990; Kingsley 2000 for more recent exponents of the uses of maritime archaeology and particularly shipwrecks.
[147] Kingsley 2003: 127.
[148] McCann 1994: 22-37.
[149] McCann 2004.

Rome[150]. These storehouses are effectively proxies for the goods which they contained though it is possible to determine their potential use as grain stores through the presence of *suspensurae* floors[151]. Whilst this is not possible for other types of goods, there are distinctive remains of some processing activities such as those relating to the fermentation of *garum*[152] and the dying of clothing[153]. Whilst these architectural proxies for economic activity do not reveal much about the goods themselves, they are extremely useful in determining specific zones within an urban area which may have had a particularly close affinity to economic practices.

[150] See Rickman 1971; also Peña 1998a as discussed below for a detailed evaluation of the mechanisms of the oil supply to Rome and use of horrea at Carthage for storing goods destined for consumption in the capital.
[151] Rickman 1971: 293-297.
[152] Eg. McCann. 1979.
[153] Eg. Wilson 2001:273-281.

Chapter 4: Archaeological background to Late Imperial Rome

Understanding the city

Our understanding of Late Antique Rome is somewhat fractured. The landscape was one which still retained much of the character of the Early Imperial period. The persistence of monuments as ruins notwithstanding, the evidence of the *Forma Urbis Marmorae* shows Late Antiquity is clearly a polemic landscape with several issues contributing to the debate that these were actively considered to be part of the cityscape in the 3rd Century. Where synthetic works have been attempted they are necessarily superficial and often reliant upon historical sources[154]. The greatest change in the urban landscape has traditionally been seen to be the creation of the first Christian churches in the fourth century. Rome by the early fourth century was superficially similar to how it had been in earlier centuries but the shift of focus of the Empire under the Tetrarchs divorced the city from its position of real political importance[155], an act which would effect the nature of the urban fabric of the city by reducing the imperative for public munificence and encouraging sections of the population to migrate with the Imperial court[156]. Whilst many synopses of Rome in the Republican and Early Imperial periods are available, their use in this undertaking is somewhat dubious[157]. By the early fourth century Rome was once again a city defined by its walls, the twelve mile circuit built by Aurelian and Probus and subsequently elaborated by a series of emperors[158]. The circuit of the walls enclosed an area of approximately 12Km^2 on the East bank of the Tiber and an additional 1Km^2 in *Transtiberim*[159]. One of the perennial questions relating to the city is in some ways both topographical and geographical in so much as it concerns the degree to which the intra-urban area was densely occupied and which areas within the walls were occupied at a given time. The *Forma Urbis* and the *Regionaries* give a fairly clear indication of a city densely occupied yet with intra-urban green spaces now divided by the new walls[160].

There are therefore several issues which must be addressed in order to properly contextualise the background of this study. The selection of case studies for this research is conditioned by a number of factors; the geography of the city, the history of archaeological investigation in the city and the nature of the late antique population and their habitations all effect the choice of suitable sites and assemblages for studying the

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[154] See Lançon 2000.
[155] Krautheimer 1980.
[156] Krautheimer 1980: 5.
[157] Pignatorre 1932
[158] Krautheimer 1983: 7.
[159] Areas derived from plan.
[160] Krautheimer 1983: 8-12.

movement of goods within the late antique city[161]. Whilst the nature of the city can be considered to have been dynamic, the principal constraint and determinant in its foundation and the nature of subsequent modification is the natural topography of the area. This chapter discusses the geographical location and constraints of the city, a brief history of the more important developments in the archaeological investigation of the city, the implications of this for our understanding of Rome in Late Antiquity and the issues which must be considered in trying to develop this understanding. All of these strands influence the selection process to a greater or lesser extent, not only by conditioning which sites are most suitable for study but also understanding the questions which may reasonably be asked of them. The past 25 years have seen an increasing attention to the early medieval period and Late Antiquity[162]. Such publications have provided not only a background against which to assess the changing nature of the city in this period but also the work which they discuss represents the initial impetus to study this period in detail.

Topographic background

Human action is one of, if not the major contributory factor to landscape change. This is often strikingly visible in the rural landscape, and there is also clear evidence of such processes within urban spaces. The creation of a settlement is obviously one way in which a formerly rural landscape is fundamentally altered however, within this now urban space it is possible to see changes occurring as a direct result of the actions of its inhabitants. This has been investigated for the city of Rome with some quite striking results. Whilst the Centro Storico lies under a minimum of 2-5m of debris accumulated through human action, the alluvial plain has yet deeper deposits of up to 10m and in the channels of the tributaries running into the Tiber up to 15m of debris has accumulated[163]. Whilst this is reflecting the modern ground levels the process of accumulation has been an ongoing one and must be considered when looking at the archaeological record of the city.

Hills

The hills of Rome are an enduring part of the mythology of the city. They do however, have a much more practical resonance within the geographical location of the settlements which would become the city of Rome. The hills themselves are the remnants of eroded tuffs left behind after volcanic eruptions in the *Monte Sabatini* and *Colli Albani*[164]. The *Capitoline*, *Palatine*, *Aventine*, *Esquiline*, *Caelian*, *Viminal* and *Quirinal* hills all have their own individual characteristics. Particularly in that the Eastern hills are more like promontories rather than the easily recognizable and discrete *Capitoline*, *Palatine* and

[161] A detailed discussion of the selection process can be found at the beginning of the following chapter.
[162] Eg. Coates-Stevens 1996; Arena et al. 2001; Paroli & Venditelli 2004.
[163] Heiken et al 2005: 88.
[164] Heiken et al. 2005: 28.

Aventine. In many ways, Rome is its hills. They condition the topography of the city and habitability of certain areas to such an extent that they must not be ignored. Problematically the nature of their impact upon urban planning or the growth of the city is an underdeveloped field of study. Furthermore the impact that these dominant topographical features must have had upon the location of archaeological sites and structures must be incorporated into any synthetic study of the archaeology of the city.

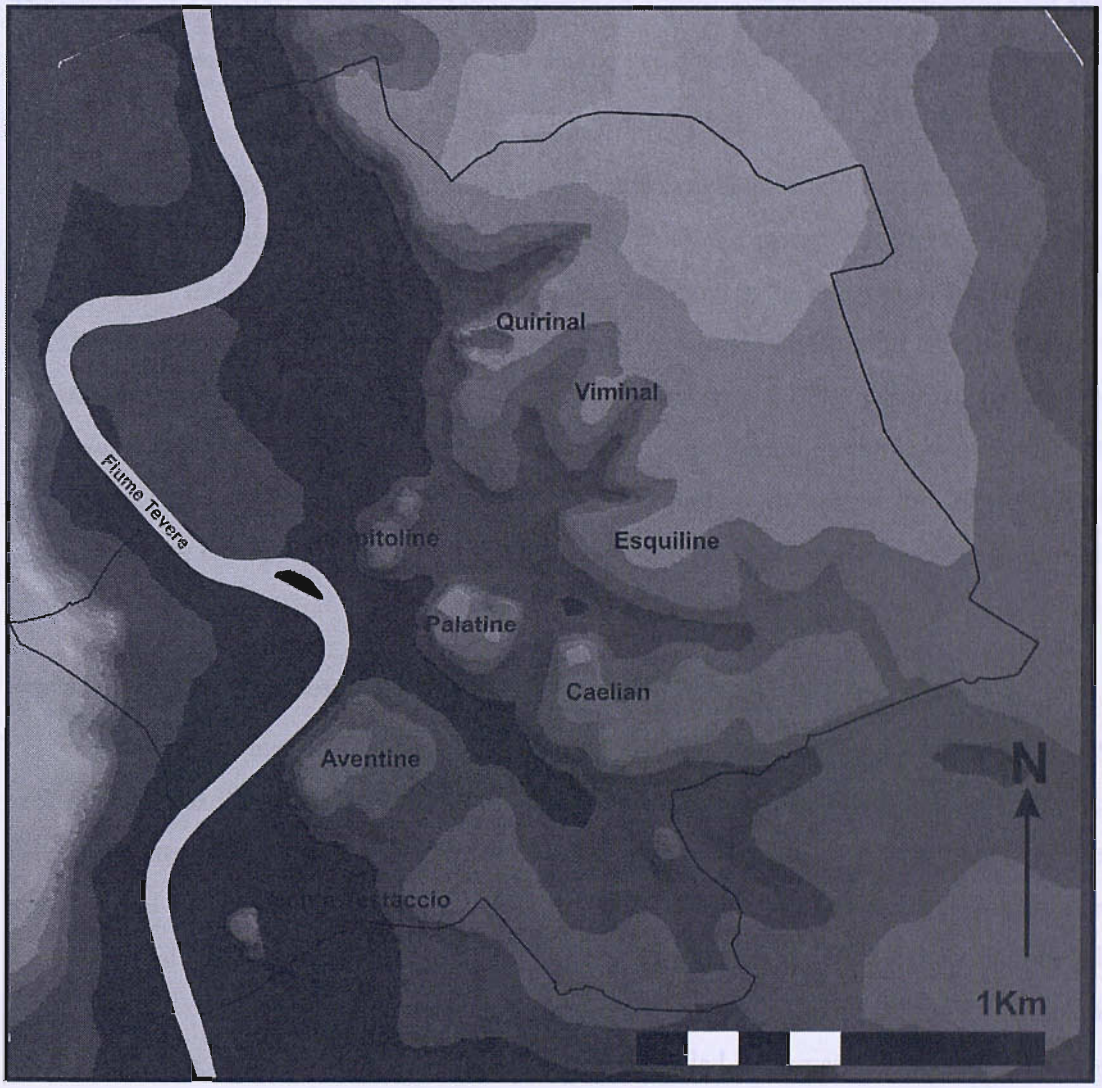

Fig 2: Natural topography of the late antique city

River/ valley

If the hills of Rome are important, the Tiber is crucial. Without the river, there would be no hills. The Tiber follows a structural depression in the tuffs which comprise the region around the city[165]. As previously stated, the topographical relief of the city is a direct result of the erosion of volcanic deposits by the action of the river. The river is also the umbilical cord which connects Rome to the Mediterranean and the possibilities of overseas contacts which that maritime character promises[166]. Rome is then a city defined

[165] Heiken et al. 2005: 11.
[166] See Tchernia 2003

by the action of water on the volcanic bedrock. Many of the modern streets of Rome run along what were once tributaries of the Tiber[167]. This connectivity is crucial to understanding the development of the city. Geographically fractured by the watercourses, Roman engineering schemes such as the *Cloaca Maxima* not only overcame the natural divisions but also turned them to the advantage of the city[168]. Whilst this may hold true for the tributaries and the agglomeration of the prehistoric hilltop settlements into the Metropolis of Classical Rome, the Tiber remained a very real perceptual barrier and the area of *Transtiberim* was considered to some degree peripheral throughout antiquity.

Settlement location

The major topographic features within the area which would become Rome have influenced the locations of settlement in the area from the prehistoric period up to the modern day. Early settlements were restricted to the high ground, overlooking the river and the crossings to the west bank and Etruscan territory. By the period of this research the urban area had expanded to include the low lying areas of the *Campus Martius*, the *Transtiberim* and a large area on top of the plateau of the *Pincian* to the northwest of the earlier city. Despite continued discussion over the precise nature of the use of space within the city, by the Late Empire the Aurelianic walls had come to define the boundary of the urban area.

Studies of the archaeology of Rome

The central historical area of the city of Rome, which is encompassed by the study area selected for this thesis, presents a rich but complex archaeological resource. Despite the availability of this evidence, the focus of much interest and research has been the monumental aspect of this record[169]. Recently there has been an attempt to publicise the archaeological work being undertaken in the city through exhibition and its associated publication[170]. However, whilst this is a useful resource for background information on the recent work undertaken, it fails to provide any detailed information on the bulk finds from the sites discussed. A detailed appraisal of the archaeological background of Rome would represent an enormous undertaking and is beyond the scope of this work. However it is important to form an understanding of the pertinent details of this background in order to contextualise the data to be studies as part of this thesis. A broad synopsis of the available information is necessary, with particular attention paid to the central areas of the ancient city in order that a more thorough understanding of both the

[167] Heiken et al. 2005: 85.
[168] LTUR I: 288-290.
[169] Tomei 2006a: 39.
[170] Tomei 2006

available archaeological evidence and also the changing priorities of the archaeologists working in Rome can be attained.

Renaissance

The beginning of archaeology in Rome has been described as occurring under the French occupation of 1809-1814[171]. Indeed, it is during the early part of the nineteenth century that the first synthetic archaeological surveys of the city were produced[172]. One of the most comprehensive attempts to collate information about the archaeology of Rome was undertaken by Rodolfo Lanciani and published in a number of forms in the late nineteenth and the early years of the twentieth centuries[173]. Indeed, Lanciani proves to be a pivotal figure in the historiography of Rome and its monuments, providing commentary on earlier interventions[174]. A great number of the early excavations carried out in Rome were not of an archaeological nature, they did however serve to expose a number of monuments although in the process damaged or destroyed a number of others[175]. Until 1686 it seems that the primary concern was with the re-use of ancient monuments as a source of building material rather than valuable antiquities in their own right[176]. By the eighteenth century this had changed, a great deal of material was excavated in order to make the ancient monuments visible[177]. During the reign of Pius VII there was a concerted effort to uncover and preserve the ancient monuments of Rome though seemingly little was done to discover new remains[178]. Contrary to modern understanding, knowledge of the archaeological remains of ancient Rome was fragmented and limited to those monuments which survived in some form until the nineteenth century. It was not until the end of that century that a new impetus would lead to the systematic exploration of large areas of the city leading to the publication of archaeological materials by some of the most famous names in Italian archaeology.

Roma Capita

Alongside his attempt to consolidate the history of excavation within the city, Rodolfo Lanciani was responsible for introducing what might be described as a topographical understanding of the archaeology of the city. The textual approach to recording the archaeology of the city was accompanied by his extensively detailed 1:1000 scale plan[179]. Though the accuracy of the plan has subsequently been questioned[180], at the

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171 Ridley 1992: xix.
172 Eg. Nibby 1819.
173 Lanciani 1897; Lanciani 1902-1912
174 Lanciani 1899.
175 See Ridley 1992: 11-14.
176 See Ridley 1992: 15; Mariotti 1892.
177 Ridley 1992: 24-29; see also Pietrangeli 1958.
178 Ridley 1992: 35-46.
179 Lanciani 1910
180 Tortorici 1988; Romano et al. 2002: 30.

time it represented a significant advance in understanding the distribution of the archaeological remains across the city. This was also the period in which the central areas of the city began to be opened up with extensive excavations being undertaken in the *Fora* and on the *Palatine*[181]. These excavations were undertaken with the intent of elucidating the Imperial past of Rome and concomitantly with the creation of Rome as the new capital of a unified Italy.

Mussolini

The relationship between political ideology and archaeology has also been explored in a general sense, as being a driving force behind the legitimisation of the regime[182]. Fascism, and Mussolini in particular have had a close and sometimes tense relationship with archaeology[183]. However, this should be seen within the context of the consciously close relationship between archaeology and the Italian state from its formation in 1870[184]. The legacy of Mussolini's vision to bring ancient and modern Rome together is strikingly visible in the shape of the Via dei Fori Imperiali in Rome[185]. Indeed, this obsession with Imperial Rome on the part of the Italian Fascists has been described as their only contribution to Italian culture[186]. The impact of Italian archaeologists in Libya and their changing ideological position has been discussed[187]. The role of "Il Duce" in shaping the current archaeological landscape of Italy and Rome in particular is however somewhat more contentious. A great deal of archaeological work was undertaken during the Fascist period in Italy, many of the key texts relating to the Fora are based on work carried out during this period, though many were published following the war[188]. More so even than the comprehensive work of Rodolfo Lancini, the recording of the excavations of the monumental heart of the city by Gatti, Lugli and others has underpinned much subsequent archaeological research as ever more comprehensive lists of the monuments are produced, or as more academically rigorous projects seek to either confirm or disprove the interpretations of the excavators[189]. The monumental focus of much of this work has continued throughout the intervening years and remains a significant part of the approach of modern archaeologists to the city. It was not however without problems and a decline in the standard of archaeological work was noticeable[190].

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[181] Eg. Boni 1901; Gatti 1911
[182] Eg. Kohl & Fawcett 1995.
[183] See Stone 1998: 257.
[184] Petter 2000; Guidi 1996.
[185] See Coulston & Dodge 2000a: 8; Ampolo 1984
[186] Canfora 1989.
[187] Altekamp 2004: 57-64.; Munzi 2004
[188] For example see Lugli 1946
[189] For the former see Lugli 1970; Carettoni 1960. The latter is evident in much of the work to be cited in this chapter.
[190] See Manacorda 1982a

"Modern"

Gazetteers of the known sites in Rome have been published on numerous occasions with the most notable providing a means to assess the developing understanding of the archaeological potential of the city and also acting as a comprehensive source of information about these sites[191]. The problem with addressing the archaeology of the city from the perspective of these publications is their focus on identifiable sites or monuments. Whilst this is perfectly adequate for a study of such structures and sites it is distinctly unhelpful if one wishes to examine the evidence from small-scale excavations or those undertaken in areas which are not associated with a large monument. In this respect, these gazetteers effectively ignore the existence of an archaeological record beyond the monumental and hence the largely architectural record they are based upon. For many years there have been a number of useful gazetteers containing exhaustive listings of the known archaeological sites in the city of Rome[192]. Recently however, the process of collation has been codified to an unprecedented degree through the creation of the Lexicon Topographicum Urbis Romae[193]. This work must be considered as the basic reference work for any detailed archaeological study of the city as it provides both useful descriptions of the known sites and also exhaustive bibliographies for those sites where published material exists. As such the Lexicon provides a significant means of assessing the contextual information which is available for the sites studied within the city of Rome as part of this thesis. The focus of much research associated with Rome upon the monuments is a critical issue and one which must be redressed.

There have also recently been a number of published works dealing with the archaeological evidence for food supply to the city of Rome. The pertinent issues raised and the shortcomings of the currently published material can be usefully illustrated through a cursory examination of the more recent studies. A paper written by Mattingly and Aldrete[194] positioned itself as a guide to the evidence available for understanding the mechanisms which provided foodstuffs to the city throughout the late Republican and Imperial periods. Such an undertaking is highly ambitious and not without problems, particularly for a relatively short article. As the authors themselves state, the system was almost constantly evolving and the archaeological evidence, which they address, spans the whole period. It is therefore imperative to understand not only the extent of the available knowledge but also the specific chronologies which define its relevance to particular

[191] In particular Steinby 1993-2000 but see also Platner & Ashby 1929; Nash 1961 Lanciani 1989 & Richardson 1992

[192] Richardson, 1992; Nash, 1961; Platner & Ashby 1929.

[193] Steinby 1993-2000; Fiocchi-Nicholai 2001-2005.

[194] Mattingly & Aldrete 2000

research questions[195]. As stated above, the classical sources provide an awareness that the supply of food to the urban population of Rome was a major concern of the government[196]. The article draws in the construction and improvement of the harbours at Portus under first Claudius and later Trajan. They also highlight the *Emporium*[197] district of Rome as being particularly important as a point of entry for goods moving into the city and briefly mention the impressive scale of *Monte Testaccio* and the high proportion of its components, which consist of Baetican oil amphorae. Whilst *Monte Testaccio* is by far the most visible indicator of the scale of amphorae and hence oil imports to Rome it is clearly in no way the only source of archaeological evidence. Excavations undertaken within the city over the last 30 years have revealed an increasingly significant quantity of material pertaining to the importation of various liquid or semi-liquid products from around the Mediterranean.

Where the limitations of such a wide-ranging attempt at synthesis are evident, other more recent, site specific studies have been more successful at shedding light on patterns of exchange and the distribution of goods in late antique Rome. Most notably and relevantly to this study have been the attempts to draw upon the increasing corpus of ceramic data to inform an understanding of the way in which the late antique city was being used[198]. A questioning of the established orthodoxy of unmitigated urban decline with the concomitant decline in economic activity through late antiquity and into the early middle ages is in itself not a new idea. However the proponents of this position have largely been historians with the archaeological evidence arguing to the contrary, although with significant exceptions[199]. It is now possible, through the increasing corpus of data from major urban sites within the empire to commit to a programme of research which sets out to assess the archaeological evidence pertaining to the uses of urban space during late antiquity and to assess the economic impact of these processes. This thesis presents a methodology applied to evidence derived from the major urban centre of the Western Empire in order to demonstrate the practicability and importance of this strand of research to the development of our knowledge of Western European societies. As previously stated, the Soprintendenza di Roma have recently organised an exhibition and

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[195] The confusion over chronological relevance is clearly illustrated by the authors' assertion that the city had a population of 1 million by the 2nd century AD yet discuss the republican period with reference to this same figure (ibid: 142) which was extremely unlikely to have been reached at this time.

[196] Robinson 1994: 144-51; Sirks 1991: 10-24.

[197] The *Emporium* contains a number of *horrea* which are of Republican date, whilst it seems likely that these continued in use into the Empire, little stratigraphic excavation has been conducted and no firm evidence is forthcoming. See Rickman 1971; 1980; Mocchegiani Carpano 1995.

[198] See De Sena & Dessales (eds) 2004 for discussions of archaeological approaches to the economy based on ceramics; also see Ikäheimo. 2003 for a detailed discussion of the implications which a detailed study of even part of the ceramic assemblage from a single site can have for understanding wider economic patterns.

[199] See Potter 1995: 90

publication with the intent of communicating recent archaeological work[200]. This includes a number of sites on the Palatine[201]. The excavations on the area of San Teodoro appear to suggest that in keeping with other areas around the hill there are a number of Severan structures, partially rebuilt in the 5th or 6th Century[202]. Work on the opposite side of the Palatine has shown that the beginning of structural developments there lay in the mid-Republican period and they remained in use until the 6th Century when they fell into disuse[203]. Adjacent to this area excavations at the *Meta Sudans* have revealed a sequence of construction from around the 4th Century BC, continuing into the Imperial period[204] and related to the structures on the eastern slope of the *Palatine*[205].

For the rest of the city, the majority of archaeological sites are known through the exigencies of rescue archaeology as a result of construction or demolition work. This has resulted in a patchwork of areas where we have information isolated by the vast majority of the urban area for which the archaeology is unknown. An attempt by the Soprintendenza to collate the information available at the time was made in 1985 with the publication in two volumes of information from individual sites within the city[206]. As previously stated the more recent archaeological investigations have been much more thoroughly published and less focused on the architectural remains to the exclusion of all other information. Despite this, the publication of works around the city in this format was important as it showed an increasing willingness to move away from the focus of antiquarian interest in identifiable monuments even if the primary theme of the publication was architectural. A major campaign of archaeological work has also been undertaken as preparation for the construction of the new Metro line in the city[207]. The increasing quantity of archaeological work conducted in the *Campus Martius* also offers an opportunity to begin to explore an area of the city about which surprisingly little is known[208]. Beyond these somewhat infrequent collections of information, regular albeit very brief updates are available through the annual *Bulletino della Comissione Archeologica Comunale di Roma*[209]. This annual publication is the main source of publication for archaeological notes by various archaeological works carried out under the auspices of the Soprintendenza around the city. There is seldom any great detail or finds information

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200 Tomei 2006

201 Pensabene 2006; Rocco 2006; Tomei 2006b; Villedieu 2006; Filippi 2006; Panella 2006

202 Rocco 2006: 53.

203 Panella 2006: 76-78.

204 Panella 2006a: 85-87.

205 Zeggio 2005.

206 Bietti Setieri et al. 1985. The first volume deals with sites in the Historic Centre whilst the second offers a synopsis of the sites within the walled area. A number of the excavations detailed in these volumes produced the late antique material which would finally be published in the second volume resulting from the Crypta Balbi excavations. Paroli & Venditelli 2004.

207 Tomei 2006c.

208 Virgili 2006; Rossetto 2006; Filippi, F. 2006.

209 Commonly referred to as BullCom, the journal has been in print since 1872.

however as a resource for keeping track of where work is being carried out it is a valuable source. The information derived from the *BullCom* reinforces our understanding of the overall pattern of archaeological information available in Rome to be widespread yet fragmented and restricted in the extent of the individual areas available. A rather useful and relatively current bibliographic resource can be found in the 2001 and 2003 editions[210].

[210] Andreussi 2003; Andreussi 2005.

Fig. 3: Fragment of the Severan Forma Urbis Marmorrae showing part of the Crypta Balbi

Forma Urbis Romae

The Severan *Forma Urbis Romae* provides a unique source for understanding the broad scope of the city in the late third century A.D. and has been the subject of much discussion pertaining to the location of the fragments, their accuracy and the purpose of the plan[211]. The potential importance of the Forma Urbis Marmorea or Marble Plan is inestimable in the formation of an effective research strategy for the understanding of imports of grain to the city of Rome. As an annotated representation of the city, the plan details a number of storage facilities along with other buildings considered worthy of representation by the planners.

The pre-eminent problem with the Marble Plan is its fragmentary nature, this is however not the only problem which faces the prospective student of the plan of Rome. Firstly the plan represents only a single phase in the occupation of the city, albeit one immediately preceding the period of this study. This can lead to problems due to assumptions about the nature of urban renewal and the persistence of particular buildings throughout the history of the city. It is tempting to think of the city as represented on maps (both marble and otherwise) to be unchanging, a static entity comprised of monumental buildings enduring unchanged from the days of the Republic. Such a view is of course completely untenable and in no way supported by either the archaeological or historical evidence.

[211] See Carrettoni et. al 1960; Rodríguez Almeida 1981

The second and more specific problem to be overcome only really comes to light after one has begun to investigate the Marble Plan in greater depth. Whilst the plan is generally taken to have been executed at a scale of 1:240, 'the extremes in extant fragments are widely spaced between 1:189 and 1:413'[212]. Dilke, makes the argument that these discrepancies are a result either of inaccurate carving of the plan or of a desire to enlarge the representations of important public buildings. Neither of these suggestions are beyond the pale of our expectations of the Roman government. To err is human and the creation of impressive public buildings is a well-documented trend throughout the Empire. The ideology behind public building and its relation to the prestige of the emperor and the empire as a whole has been discussed in some detail[213]. This however, does raise further issues regarding the suitability of using the *Forma Urbis* as a planning tool upon which to base a research strategy. Much of the discussion into the use of the *Forma Urbis* as a basis for studying the ancient city has revolved around the issue of the scale used for the plan and thereby the position and dimensions of the buildings represented by it. The calculation of the scale at which the marble plan was executed must have been based on excavated remains which tally with sections of the plan which still exist (or at least existed when Carettoni *et. al.* produced the first volume). The main problem with this is that those extant archaeological remains were likely to have been monumental. If the scale is based on such structures, then one immediately has a problem if prepared to accept that the "important public buildings" were executed at an increased scale. This in turn makes it hard to accept Dilke's argument for incompetence in the carving of the plan. For ease of calculation let us take the discrepancy to be between 1:200 and 1:400. The difference between these scales in respect of a building 20 metres long would be 5cm (10cm at 1:200 and half that for 1:400). A building 40 metres long would have a discrepancy of 10cm between the two extremes of scale. Obviously the larger the building the bigger this discrepancy would be.

It would be possible to account for this particular problem if we knew which buildings and methods were being used to determine the scales, the basic mathematical fact being that any absolute values applied as multipliers of an area, are the square of those regarding only lengths. In the absence of any indication as to where these extraordinarily precise numbers came from it is tempting to believe that the plan is executed not only badly but also at deliberately varied scales. This would make its use as a proxy for the storage facilities not known through excavation extremely difficult at best and nigh on impossible at worst[214]. Through a comparison of other storage sites for which there is

[212] Dilke 1985: 105
[213] Zanker 1988
[214] The necessity of studying food supply through proxies for the foodstuffs themselves is discussed further below p 68.

published archaeological evidence it is possible to determine capacities for individual grain bins. Therefore this enables us to ascertain the accuracy of the plan in these specific instances, as these dimensions will plausibly coincide with integer values in the Roman system of measurement. In other words, the dimensions are likely to involve measurements in whole Roman Feet. By using the excavated and planned evidence from those sites which are both published and tally with the surviving fragments of the plan, it should be possible to check the accuracy at least as far as to suggest for this category of building whether the discrepancies highlighted by Dilke are intentional or the slip of a chisel. This information can serve two purposes, firstly it allows a rough estimation of the available storage capacity of the city and hence its expected peak volume of supply. Secondly, any variation from the supposed normal scale should offer an insight into the importance ascribed to the storage facilities by the Severan administration.

One further potential source of error concerns the accuracy to which it was possible for the Roman *Mensores* to survey the city. A detailed examination of the *Groma*, the instrument by which the Roman surveyors carried out their task, can be found dating back to the beginning of the 20th Century[215]. This article goes into some considerable detail about the reconstruction of a *Groma* and also into the possible method of its use. Whilst relying on what is sometimes quite complicated mathematics and the "solid geometry" of Hygenius Gromaticus to find south, it seems fairly obvious that the apparatus could be used to acquire a simple distance measurement and give a bearing with only a working knowledge of Pythagoras' Theorem and an accurate means of measuring the distances involved[216]. So far as Dilke is concerned these measurements were achieved through the use of a wooden staff, ten Roman feet long[217]. The standard Roman foot or *Pes Monetalis* is approximately 0.296m long to 3 significant figures, an alternative measurement; the *Pes Drusianus*, has been suggested for use in the North Western provinces but is unlikely to bear any relevance here[218]. The significance of this being that the employment of a 3m long staff for the laying out of roads or the centuriation of land is a feasible, if not straightforward proposition. It is however more problematic when one is concerned with the measurement of existing structures and in particular the internal dimensions of those structures and their interrelationships within a busy urban environment. The lack of evidence for roman measures is limiting, however if we attribute the Roman surveyor with a little common sense then the plausibility of the Marble plan being based on a reasonably accurate survey is bolstered. One is therefore led to the inescapable conclusion that any error in the Marble Plan is a result of inaccuracy in

[215] Della Corte 1922
[216] Dilke 1985
[217] Dilke 1971: 73.
[218] Duncan-Jones 1980

the carving, either deliberately through a reflection of imperial ideology, the necessity of losing error accumulated through the surveying process or as a result of the exigencies of the process of carving[219].

Whilst the plan cannot be used with any certainty to attempt quantification of storage capacities, it is extremely useful as a tool for locating the *horrea*. The fragmentary nature of the plan does however; mean that this is only applicable where there are surviving pieces which can be accurately located within the city. We are fortunate in that the main commercial area of the city at the Emporium is one such area where fragments of the plan have been located.

Most recently, the Stanford Digital *Forma Urbis Romae* project has attempted to harness technology in order to advance our understanding of the location of the fragments of the plan and also to make this information more widely available[220]. This work has resulted in the discovery of 'a dozen new proposed fragment matchings and positionings'(sic)[221]. The resultant digital archive also provides a useful and accessible means of interrogating the data of the plan. However, there are drawbacks as the level of detail is insufficient to show marks from the sawing of the marble, its texture and characteristics such as colour and veining within the stone[222]. Potentially the most useful facet of the publication of the *Forma Urbis* data for this research is the ability to query the map fragments in order to assess the general character of urban areas[223]. This is still problematic however as the gaps in the plan enable only a very small proportion of the urban area to receive such attention.

Whist the surviving fragments of the plan are by no means a complete representation of the urban landscape, they offer an insight into the elements of the urban fabric which the map-makers thought important to record. Whilst the recorded detail of many areas may not be an absolutely accurate reflection of the urban topography, the general character of a given area has been shown in many cases to be fairly reflected on the plan. Despite the fragmentary nature of the plan in combination with excavation and extant architectural remains, this enables a generalised plan of urban areas to be generated which, whilst of limited value in specifically identifying the locations or dimensions of individual buildings, is very useful in assessing the character of wider urban spaces.

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[219] Discussion of the accuracy of British Ordnanace survey maps shows how error is, to a greater or lesser extent unavoidable in surveying. See Winterbotham 1913

[220] See Koller et al. 2006; also the project website http://formaurbis.stanford.edu/index.html

[221] Koller et al. 2006: 239.

[222] Koller et al. 2006: 240.

[223] Koller et al. 2006: 249.

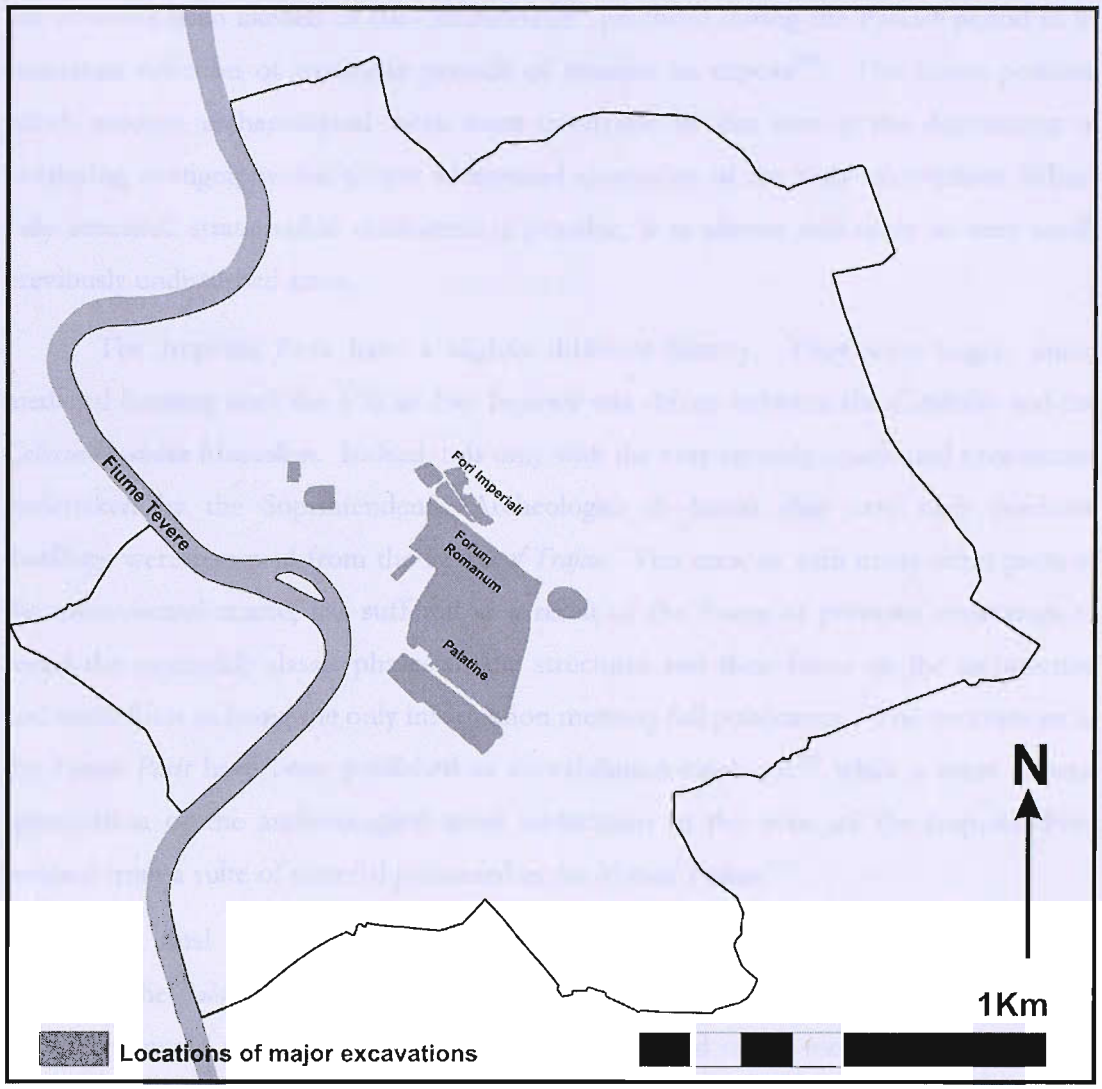

Fig. 4: Locations of major excavations within the city of Rome

The Roman Forum is perhaps the most logical place to begin discussing this archaeological background. Central within the city both geographically and politically throughout antiquity, it has been the focus of systematic, if not precisely rigorous scientific excavation for over a hundred years[224]. The difficulties, both technical and those resulting from previous exploration in undertaking scientific excavation within the forum area have been noted[225]. A detailed survey of the central area of the Forum was carried out in the early 1980s resulting in the publication of a number of large scale plans[226]. Whilst acknowledging the existence of archaeological strata, early excavations were, as has previously been stated, largely concerned with the discovery and identification of recognisable monuments[227]. In recent years this has begun to change with the increased level of scientific archaeological research being carried out as a result of the 2000 jubilee.

[224] For example see Boni 1901; Vaglieri 1903; Hülsen 1910.
[225] Gjerstad 1952
[226] Giuliani & Verduci 1987.
[227] Boni 1901.

The proposed removal of the *Via dei Fori Imperiali* or its conversion into a pedestrian walk has however been likened to the "archaeology" practiced during the Fascist period in its conscious selection of particular periods of remains to expose[228]. The major problem which modern archaeological work must overcome in this area is the destruction of overlaying stratigraphy due to the widespread clearances of the early excavations. Where fully recorded stratigraphic excavation is possible, it is almost uniformly in very small, previously undisturbed areas.

The Imperial Fora have a slightly different history. They were largely under medieval housing until the *Via dei Fori Imperiali* was driven between the *Capitoline* and the *Colosseum* under Mussolini. Indeed, it is only with the very recently conducted excavations undertaken by the Soprintendenza Archeologica di Roma that very early medieval dwellings were removed from the *Forum of Trajan*. This area, as with many other parts of the monumental centre, has suffered as a result of the desire of previous excavators to reveal the ostensibly classic phases of the structures and their focus on the architecture and small-finds as being the only information meriting full publication. The excavations in the *Forum Pacis* have been published as an exhibition catalogue[229] while a more general appreciation of the archaeological work undertaken in the zone of the Imperial Fora resulted from a suite of material presented in the *Mercati Traiani*[230].

The final area, which fits within the open archaeological zone of the "*Centro Storico*", is the *Palatine*. Much has been written about the traditional centre of Rome[231] and in order to avoid repetition this discussion will be limited to the most recent work. Until recently the state of academic knowledge about the nature of the occupation of the hill in antiquity has been somewhat fractured. However, a recently published detailed study into the development of the palatial complexes on the hill provides a very useful source of information about the development of this central area[232]. Whilst it would be of little value to replicate the detail of this study here, certain aspects do warrant further consideration. The architectural development of the hill has also been discussed through work recently undertaken by a German team[233]. However, as the Late Antique period is the object of this study, the occupation of the *Palatine* during this period bears some further discussion. It has been suggested that despite some later additions the essential character of the Palatine had been established by the end of the Severan period[234]. This character has been summarised as a rebalancing of the relationship between the *Palatium* and the *Urbs*

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[228] Ghirardo 1990; for a discussion of the history of the *Via dei Fori Imperiali* see Barroero et al. 1983.
[229] Nota et al. 1986.
[230] Mattei 1983.
[231] E.g. Romanelli 1950; Bietti Sestieri et al 1995.
[232] Mar 2005.
[233] Wulf & Reidel 2006
[234] Mar 2005: 219.

whereby with the construction of the Temple of Heligobalus the populace were drawn up to the summit of the Palatine, breaking down the exclusive nature of the area as created by Domitian[235]. The archaeological record of the Palatine is exceptionally complex and whilst many investigations have been undertaken their publication often remains incomplete or lacking in material detail[236]. Many of the late antique deposits discussed in this thesis are located on or adjacent to the Palatine[237]. Being such a central location it has naturally been the focus of much historical interest, aided in recent years by its status as a protected archaeological area.

As mentioned earlier, the nature of the Late Antique city of Rome as seen through the archaeological evidence is extremely fractured[238]. The most comprehensive publication of this evidence has been the second of the major volumes resulting from the *Crypta Balbi* excavations and museum[239]. Despite this, the publication was intended to be neither a complete nor exhaustive assessment of all the archaeological work which had been carried out within Rome over the last 25 years[240]. Whilst there are also a number of other excavations that have been conducted within the city, many of them have been incompletely or inadequately published. The excavated contexts represent a number of structures with different functions and as such can be viewed as representing the diversity of the urban landscape in the Late Antique period. In the 4th Century the profound changes in the conception and function of public spaces found a particularly visible expression in Rome. Alongside this changes in domestic architecture led to the embellishment of high-status *Domus*. The period also sees changes in other forms of domestic architecture and in the locations in which these habitations were found[241].

The publications associated with the opening of the *Crypta Balbi* museum have increased the opportunities available to investigate the archaeological record of Late Antique Rome. Specifically it is now possible to discuss the archaeology of Late Antique Rome beyond the few sites which have been known and written about over the last 20 years. For much of this time the only sites to be widely known were the *Crypta Balbi* itself and the *Schola Praeconum*. Whilst work on Late Antique sites within the city has been carried out and in some cases partially published, it was not until the publication of various excavations conducted under the auspices of the Soprintendenza Archeologica di Roma that many of the less well reported or less obvious sites have come into the public

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235 Mar 2005: 235.
236 For example see Annex 1 in Mar 2005. The lack of detailed discussion of finds is understandable in the context of the work but is representative of the prevailing mode of publication for much work in the city.
237 See Chp 7
238 Though a discussion of extant and excavated architectural evidence for the *subura* can be found in: Spera 1999: 411-419.
239 Paroli & Venditelli 2004.
240 Paroli 2004: 11.
241 Santangeli Valenzani 2004.

domain[242]. Excavations carried out on the Palatine and around the historic centre of the city have provided a basis for this research[243], in addition to this several other sites are detailed though in some cases without the detailed material necessary for their inclusion as part of the dataset for this research. The sites on the *Caelian*[244], *Esquiline*[245], and in *Trastevere* have expanded the geographical scope of our understanding into the Late Antique period[246]. More recently a number of additional excavations undertaken in the city have revealed aspects of Late Antique life adjacent to the *Basilica of Maxentius*, in the valley of the *Colosseum* and along the proposed route of the new Metro C. Despite this, the range of published or otherwise accessible material is limited in comparison to the rich potential resource of the city as a whole. The Late Antique archaeological record is therefore very detailed for those sites which are known and have been studied, however the range of this information is somewhat restricted and much of the discussion of Late Antique Rome has hitherto been limited to obvious architectural features such as the walls or Churches.

Summary understanding

Between the evidence of the *Forma Urbis* and the archaeological evidence we actually have a reasonable overview of the Late Antique city, if not a specific understanding of the character of the urban environment across the majority of the city. There are several aspects of the urban environment which are well understood, yet that which we do not know is by far more prevalent. The topography of the archaeology of Late Antique Rome is conditioned both by the accepted understanding of the history of the city and also by the availability of sites to be excavated. This state of understanding has already been neatly summarised[247], the transition from the Classical city was thus a period of contraction both in terms of the population and of the area within the city which that population occupied. It was a period in which largesse was directed towards the Christian church rather than the old imperial monuments[248]. In all, it was a period of decline. This impression of the city is of course only one interpretation of events, the city was in fact undergoing a process of transformation with modifications being made to the urban fabric[249], this should perhaps then be seen as a process of shifting priorities rather than outright decline and disrepair. The distribution of ecclesiastical sites over this period is interesting to note[250], contrary to the more traditional view there is little evidence of the

[242] Paroli & Venditelli 2004.
[243] See Chp. 7 for a discussion of the sites selected for this study.
[244] Pacetti 2004; Vatta & Bertoldi 2004; Brandenburg 2004; Martin 2004.
[245] Guidobaldi et al. 2004.
[246] Foganolo 2004.
[247] Delogu 2001.
[248] Delogu 2001: 14.
[249] Meneghini & Santangeli Valenziani 2001.
[250] See Guidobaldi 2001; Fig 5.

distribution of the churches suggesting Christianity as peripheral to the life of the city in Late Antiquity.

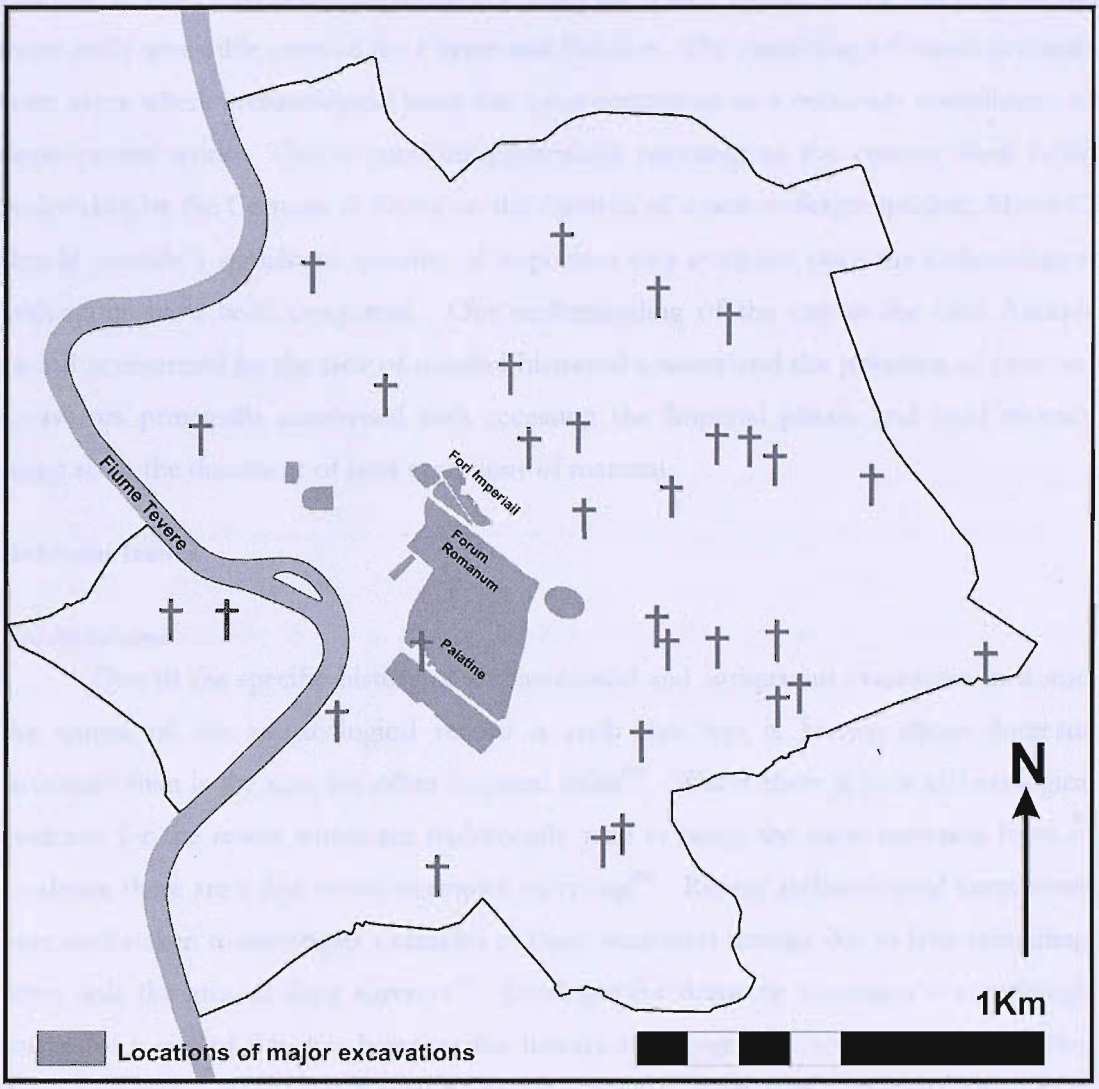

Fig. 5: Location of 4th/5th Century ecclesiastical sites

Lacunae and reasons

Whilst it is possible to generalise about the Late Antique urban landscape of Rome, it must be remembered that the evidence is derived from a series of very fractured sources. Archaeological investigations of the city are widely spaced with a bias towards the more easily accessible areas of the Forum and Palatine. The remaining information comes from areas where archaeological work has been conducted as a necessary compliment to development work. This is currently particularly pertinent as the current work being undertaken by the Comune di Roma on the creation of a new underground line; Metro C, should provide a significant quantity of important new evidence once the archaeological evaluations have been completed. Our understanding of the city in the Late Antique period is restricted by the lack of detailed historical sources and the priorities of previous excavators principally concerned with accessing the Imperial phases and until recently doing so to the detriment of later accretions of material.

Relevant issues

Residential areas

Due to the specific history of archaeological and antiquarian excavation in Rome, the nature of the archaeological record is such that less is known about domestic structures than is the case for other Imperial cities[251]. Whilst there is little archaeological evidence for the *insulae* which are traditionally seen as being the most common form of residence there are a few extant examples surviving[252]. Recent archaeological excavations have undertaken to investigate examples of these structures though due to later rebuilding, often only the ground floor survives[253]. Evidence for domestic structures is surprisingly scarce for a city of this size however the literary and epigraphic sources allow a further degree of interpretation to be made in areas where small scale excavation has been undertaken in areas of unknown character. Coates-Stevens work on housing in early medieval Rome argues that the idea of an early contraction of the occupied space into the *Campus Martius* is a fallacy, both for high status dwellings and 'less elevated householders'[254]. This argument, initially formed through appreciation of the available texts explains the lack of Late Antique or early medieval housing recovered through excavation as 'that during the 19th Century, when excavations were carried out in the right places... none of the right methods were used to apprehend such remains; conversely, now that archaeologists are using the right methods for such research, they tend to be

[251] For example Pompeii and more close at hand Ostia.
[252] Most prominently the *insula* on the slope of the *Capitoline* adjacent to the Victor Emmanuelle II monument.
[253] For example the *insula* adjacent to the exedra of the Crypta Balbi; the streets under the Vatican and Lateran basilicae and under the church of Ss Giovanni e Paolo. See Krautheimer 1980: 14.
[254] Coates-Stevens 1996: 239.

digging in the wrong places'[255]. This is clearly a very significant historical problem with the dataset and one which is common within urban archaeology. Very few late *Insulae* have been thoroughly excavated, with the majority simply being stripped back to earlier forms[256]

The two main types of urban residential structure in antiquity have been commonly categorised as *Insulae* or *Domus*, where the former consists of multiple occupancy and the latter usually a single family unit. Whilst these may be slightly artificial labels conditioned by usages in the historical sources, the principal distinction between multiple occupancy habitations and larger dwellings controlled by a single family is an important one[257]. The significance of different types of domestic structure within the urban landscape is primarily of interest because it impacts upon the density of construction and concomitantly habitation within the urban zone. The continuation or cessation of use of one, or both of these types of habitation is also important for understanding the way in which people were living in and interacting with the urban environment in Late Antiquity. It has long been accepted that domestic space reflects and to some extent conditions social relations[258]. Furthermore architecture is seen as a compromise between functional considerations and these social imperatives[259]. This approach has been applied to classical housing both in the Greek world and the Roman[260]. It is however perhaps more suited to the *Domus* than *Insulae*. Some work on *Insulae* has been carried out though it has been concerned mostly with understanding the usage of the building as a whole, the individual/s living within it and the habitability of the various areas within the structure. This was achieved largely through epigraphic evidence rather than attempting to understand how people were actually using the space[261]. Whilst this study is not concerned with the precise nature of the occupation and usage of space, this approach compliments the study and will allow an assessment to be made as to the nature of the deposits and their significance in interpreting the changes taking place within the urban environment. Whilst this may remain necessarily superficial to the extent of merely assessing whether an area is "in use" or not, understanding this distinction provides an important interpretative tool for this study.

Clearly there is perceived to be a significant distinction between the two main types of urban domestic structure despite there being little definitive evidence to that effect. However it is also important to remember that cities are not solely places where people reside, the urban landscape is a mixture of private spaces and also public spaces

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[255] Coates-Stevens 1996: 245.
[256] See Quilici 1986 for an example of an insula with some late material recovered.
[257] This dichotomy has been questioned by Wallace Hadrill 1994.
[258] eg. Altman & Gauvin 1981: 312; Donley-Reid 1990: 115; 119-121
[259] Rapoport 1969: 46-60
[260] See Nevitt 1999 & Wallace Hadrill 1994 respectively.
[261] See for example Pirson 1997

where people can interact. The Classical Roman city provides possibly one of the most obvious examples of this with the numerous fora and other designated public spaces known through both the literary sources and through archaeological excavations. The relationships between these spaces are less straightforward than might be expected.

Abandonment of Monuments

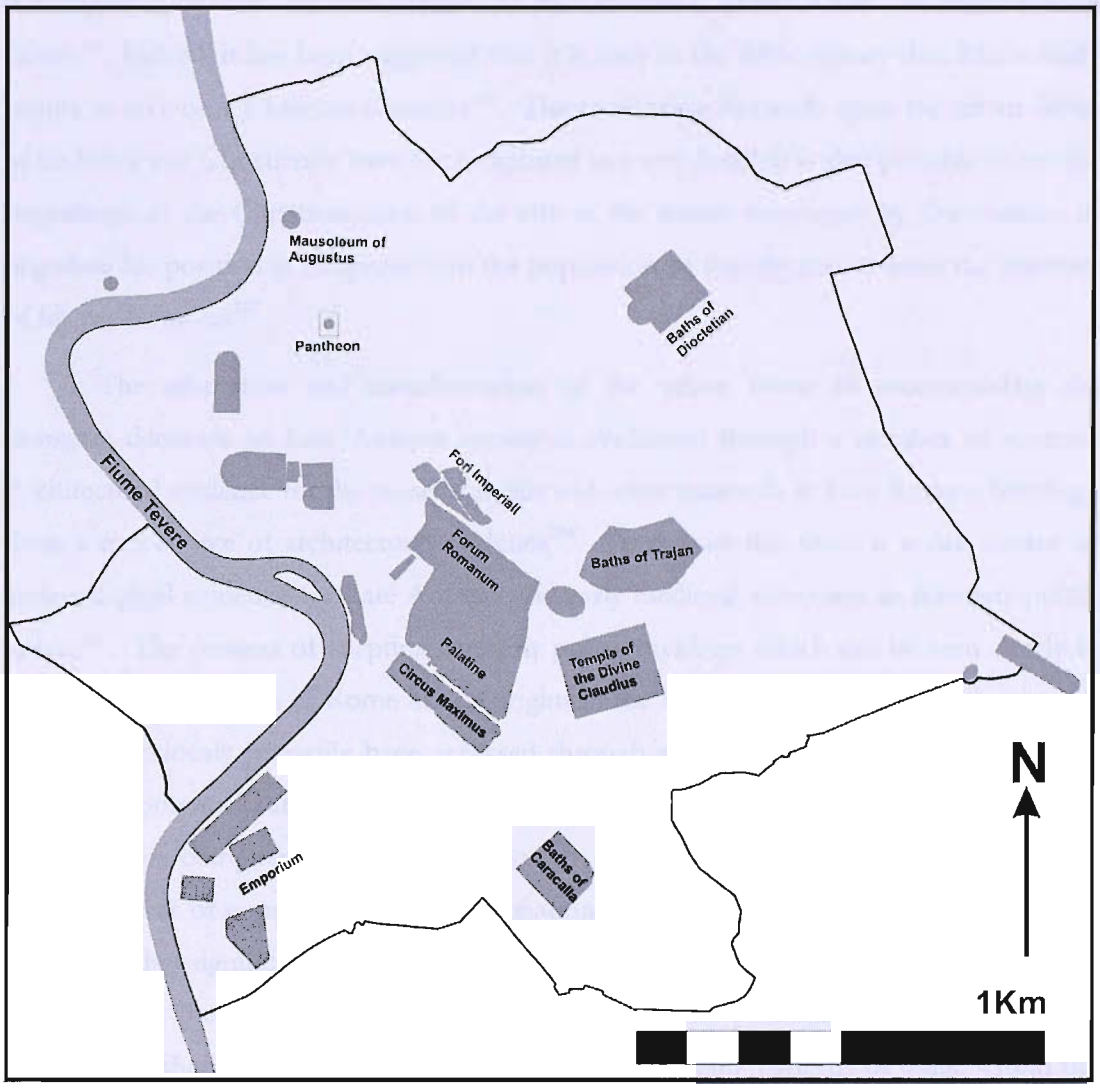

Fig. 6: The monumental landscape of Imperial Rome.

Probably the single most important change in the nature of monumental public architecture to be seen in the Late Antique cityscape is the shift from the construction of traditional classical structures such as theatres, temples, baths and basilicas to Christian ecclesiastical buildings. These buildings could not be adapted from the earlier Pagan religious structures, as their form did not suit the needs of the Christian ecclesiastical practices[262]. Given these limitations and as a result of the increasing permeation of Roman court ceremony into Christian ritual it was this which determined that the basilica became

[262] Krautheimer 1986: 41.

the dominant architectural type which was adopted for Christian practice[263]. Whilst elsewhere in the Empire the additional demands of the Imperial presence led to the construction of churches in architectural styles suitable for Imperial court ceremony, in fourth century Rome the basilica was by far the dominant form employed[264]. This shift did not however occur overnight, and prior to the accession of Constantine large scale building programmes had been carried out by Diocletian, Aurelian and Maxentius among others[265]. Indeed, it has been suggested that it is only in the fifth century that Rome really begins to take on a Christian character[266]. The conflicting demands upon the urban fabric of tradition and Christianity have been explored in some detail; it is also possible to see the beginnings of the Christianisation of the city as the means employed by Constantine to negotiate his position as Emperor with the population of the city and to erase the memory of his predecessors[267].

The adaptation and transformation of the urban fabric to accommodate the changing demands of Late Antique society is evidenced through a number of sources. Architectural evidence for the reuse of spolia and other materials in Late Antique buildings form a rich source of architectural evidence[268]. Further to this there is a rich source of archaeological evidence for Late Antique and early medieval structures in formerly public spaces[269]. The process of adapting formerly public buildings which can be seen clearly in the medieval structures of Rome has its origins in the Late Antique period. Again, though this has previously primarily been accessed through an architectural framework, there is significant potential for the archaeological remains to elucidate this process and offer an alternative or complementary interpretation[270]. This question feeds into the discussion over the issues of population and the occupation of areas of the city as discussed below[271]. There are also significant implications for the nature of the sites studied in this thesis to shed light on the changing landscape and to elucidate the patterns of occupation within the city. Furthermore, there are implications in the changing patterns of usage within the city to elucidate the relationships between the more recent additions to the urban landscape and the traditional landmarks of the built environment. The use of certain areas as waste deposits, which is a feature of the Late Antique city, has implications as to the use or occupation of such areas and is a thread which will be explored in this research.

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[263] Krautheimer 1986: 41-43; though the restricted typological progression suggested by Krautheimer has been questioned, see Coates-Stevens 1997.
[264] Krautheimer 1986: 87-92
[265] See Krautheimer 1980: 8 for summary; Curran 2000: 57-60 on specifically Maxentian buildings.
[266] Krautheimer 1980: 33.
[267] Curran 2000: 32.2
[268] Christie 2006 208; Coates-Stevens 2002.
[269] eg. in the Imperial Fora. See Meneghini 1989; 1993; 2000.
[270] Allison 2004: 203
[271] See pp 59-61.

Monte Testaccio

Any study of the food supply of Rome must address the most visible monument to long distance transportation and exchange in the city, *Monte Testaccio.* The site itself will be discussed in the context of the individual sites which comprise the dataset for this research[272]. The significance of *Monte Testaccio* for informing our understanding of the background to this study is threefold. Firstly, it offers evidence for the importation of oil in the period immediately preceding that of this study. Secondly, through the amphorae which constitute the hill, it offers a parallel which alongside the evidence from Carthage can reveal the implications of the supply of oil to Rome for the provincial organisation of the supply[273]. Thirdly, it clearly raises the question as to what the situation was for the supply of oil to Rome after the cessation of deposition on *Monte Testaccio.* In many ways, *Monte Testaccio* is key to understanding the importation of oil to Rome both for the period it is in use and for the subsequent centuries. The difficulty for this study being that as it has been suggested, the changing nature of the depositional process within Rome following the mid third century has meant that Late Roman economic evidence 'can be accumulated only by numerous small discoveries over a long period of time'[274]. Fortunately such a time has passed and the corpus of data is available to make such a detailed study possible. Given that the Roman population was unlikely to have shrunk significantly between the period in which *Testaccio* was used, we should be looking for an overall similar intensity of imports in order to satisfy the needs of the inhabitants of the city. Whilst the possibility of oil being transported in non-ceramic containers has been discussed[275], the data from *Monte Testaccio* offers a unique archaeological assemblage against which to compare the material recovered in excavations of Late Antique deposits.

Ceramic dumps

One of the most striking features of the archaeological record of late antique Rome are a series of ceramic deposits of varying sizes, a number of which form the primary dataset for this research project. Whilst ceramic material may not immediately seem pertinent to a discussion of changes in the fabric of the urban landscape the location and nature of these deposits renders them important in understanding the processes of abandonment undergone by many buildings and spaces in this period. It should be understood that for the most part these deposits are not solely constituted of ceramic material but also in many cases organic remains, faunal remains and also elements of building material. The presence of these deposits in Late Antiquity must be seen alongside the easily recognisable and clearly monumental scale of the deposition of amphorae in the

[272] See Chp. 7; p 130-132.
[273] See pp 26-31 for ostraca discussion
[274] Liebescheutz 2001: 9.
[275] See p 23.

early Empire at *Monte Testaccio*. Many of these deposits were discovered and excavated from the 1980s however, where published it was incompletely and often in inaccessible locations. More recently a number of these sites were re-evaluated and more thoroughly published as part of the series of publications resulting from the museum of the *Crypta Balbi*[276]. It is these ceramic deposits which offer the best opportunity for understanding not only the question of how and where the food supply was being directed within the city in Late Antiquity, but also the way in which the population of the city were using and occupying the urban spaces.

Population

As has previously been discussed, there are a number of historical sources, which touch upon issues concerned with the demography and population of the city of Rome[277]. One of the most glaring problems with these sources has been the way in which historians have attempted to use them to define the total population of the city[278]. Whilst a number of scholars have shown a degree of finesse in utilising historical sources to discuss the population of Rome[279], the temptation has seemingly remained too great for many to resist the vulgarisation of discussing total population numbers and the effect this would have on absolute quantities of foodstuffs required to provide for their subsistence. In part the futility of this approach is an artefact of the evidence available. The problems largely stem from a lack of contemporaneous sources to allow direct verification of the information they purport to contain[280]. This in itself results from an interaction of two sorts of inaccuracy, firstly the inability of the historian to identify bias in the few sources available and hence any inaccuracies introduced as a result of the priorities of the author. Secondly, the lack of contemporaneous sources has led to the conflation of information from quite disparate periods in order to support rather tenuous hypotheses[281]. Further attempts to deduce the population of the city have been based upon the few surviving remains of domestic structures in conjunction with the Regionary Catalogues and the Severan *Forma Urbis Marmorrae* with its inherent problems, discussed in the following section, and these are reflected in such work[282]. Whilst this study is itself not principally concerned with the population of Rome, it is prominent in much of the literature pertaining to economic studies and so deserves consideration here. It is also the actions of the population of the city, their changing social relationships and practices, which give rise to the archaeological

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276 Paroli & Venditelli 2004.
277 See Chp2
278 See Duncan Jones 1974: 273; Durliat 1990.
279 Particularly in relation to Famine and food supply. See for Example Garnesy 1988
280 For example the conflation of figures for grain supply from Africa in Josephus and the surplus left by Septimius Severus ans recrded in the SHA Severus.
281 See Hodges 1993; Krautheimer 1980.
282 See Calza 1941; von Gerkan 1940.

record upon which this research is based and hence an appreciation of the issues in studies of the Roman population is essential.

Judging the population of the city of Rome at any given period is at best an extremely difficult task. To undertake this for the Late Empire is even more so. To argue that the urban fabric of the city was not in a state of change by this period is to wilfully disregard the archaeological and architectural evidence[283]. However, one should not uncritically accept that this indicates a decline in population[284]. Whilst it may be quite reasonable to suggest that maintenance of the old monuments was less rigorous than in preceding centuries, this in itself does not argue that the habitable area of the city is either shrinking, or that the urban centre is less densely occupied. What is clear is that there is a shift in the way in which the urban spaces within Rome are being used and that however large the urban population, its members are negotiating a new relationship with the structure of the city within which they reside. Whilst the interrelationship between the buildings which constitute the physical manifestation of the city and the population are clearly important[285], it is imperative to discuss the general trends evident in the Late Imperial population of Rome before discussing specific strands of evidence which can be used to nuance the general pattern.

These trends within the population of Late Antique Rome are largely visible through the archaeological and architectural records as evidence for the abandonment or destruction of habitations. However there are also a number of other signifiers which can reveal much about the population of relatively restricted areas of the city within which scientific archaeological research has taken place. Principally among these are the detritus of foodstuffs, whether as a result of consumption, preparation or storage. Further to this it is possible to examine at least a section of the population through an understanding and investigation of burial practices and burial sites[286]. Archaeological examination of burials has proven to be extremely enlightening and can provide information on diet, burial practice and common pathologies as well as more catastrophic, episodic disease such as plagues[287]. All of this information is pertinent to understanding the demographic trends within the Late Antique population of Rome.

Whilst the study of population in Late Roman urban centres has often been undertaken for its own sake, this study aims to move beyond this level of analysis in order to determine the extent of the interrelationships between population, food supply and

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[283] See Coates-Stevens 1996.
[284] See Purcell 1999: 144 for a reasoned view.
[285] A detailed appraisal of the urban population is beyond the scope of this research though the actions of the population in shaping the urban spaces must be considered.
[286] See for example Egidi et al. 2003; Duday 2006 for a basic methodology.
[287] Eg. Gowland 2004; Gowland & Chamberlain 2005.

changing uses of the urban landscape. Although the population itself is perhaps the least visible of the three it is critically important as without people nothing else happens. Where this thesis does address issues of population it is not to determine a figure for the total population of the city. Such a task may well be ultimately quixotic, as the population of a large city such as Rome may well have included a large number of transients. Instead, this thesis will attempt to look at the ways in which the population were using the urban environment and through this and the material signifiers of this practice it may be possible to gain a further understanding of the broad trends in the fluctuation of the aggregate population of the city over time. These fluctuations will naturally have an impact upon the key themes being investigated in this thesis. Evidence for habitation and food supply are two of the more archaeologically visible means of investigating the nature of life in Late Antique Rome and warrant a more thorough discussion.

Port areas

The port installations of the City of Rome underwent a complex evolution from the Republican period and throughout the history of the city. Areas with traditional associations or roles may have altered their function throughout the history of the city[288]. These developments included the foundation of the riverine colony of Ostia at the mouth of the Tiber and the construction of the Imperial harbour complex at Portus. Indeed, in many ways the whole of the lower reach of the Tiber below the city itself can be considered to be a part of the port of Rome. This has often been the approach taken in studies into the archaeology of food supply to the city[289]. However, the facilities at Ostia certainly would have had a role in supplying that city itself rather than exclusively storing goods for transhipment to Rome. The harbours at Portus however were designed with the supply of Rome as their function. The scale of the facilities and the archaeological work undertaken there has provided a series of useful insights into the functioning of the harbours[290]. Particularly, excavations conducted by the Soprintendenza Archeologica di Ostia have shown that the walled area was occupied well into the Late Antique and early Medieval periods and that the ports were still, at least in part in use[291].

[288] Particularly pertinent is the proposal that the Porticus Aemilia had been constructed as a Navalia in the Republican period before being subsequently converted into a covered market by the period of this study. Cozza & Tucci 2006.

[289] See Mattingly and Aldrete 2000.

[290] See Keay et al 2005.

[291] See Keay et al. 2005: 56-57 for further information; Paroli 2001; 2004

Chapter 5: Ceramic materials in the archaeological record

Studying ceramics in the archaeological record

Broadly speaking there are two main approaches to studying ceramics within the archaeological record. Whilst these are not mutually exclusive there exists a difference in emphasis which can be pronounced. The first methodology relies upon a qualitative examination of the material in order to assess the typological variation in the ceramic forms present in the assemblage through the diagnostic sherds and thus to determine the number of complete vessels which this represented. The second approach is ostensibly more scientifically based in that it relies on complete quantification of the ceramic material in order to allow statistical processes to be applied to the dataset derived from the assemblage. The principal difference between these approaches therefore, relates to the degree of interpretation which can be undertaken on the basis of the data recovered. Whilst the more qualitative evaluation of the remains is useful in determining a type series for classifying assemblages, its utility for comparing data between assemblages is restricted. Quantitative approaches to the study of ceramic materials are not without their problems however they offer the best opportunity to formulate a methodology for the integrated study of a number of different assemblages.

Ceramic quantification

The role of statistical processes in archaeological research can be usefully summarised as providing a 'framework within which the mass of evidence can be sifted, and useful evidence detected'[292]. The application of methods of quantitative data analysis to archaeological materials was introduced through the advent of the "New Archaeology" in the 1960s[293]. During the 1970s a series of conscious attempts were made to convince archaeologists that quantitative methods were applicable to archaeological research and that such methods were not only necessary but also in fact desirable[294]. These statistical methods can be applied to either chronological concerns, i.e. dating of the deposit or material within it[295] or more commonly evidence of the distribution of material[296]. The approaches which can be taken to elaborate this evidence are varied and rooted in the statistical branch of mathematics. Cluster and correspondence analyses are regularly employed by archaeologists to determine patterns or groupings within a multivariate dataset[297], for the purposes of this study the initial data processing will rely only on very

[292] Orton 1980: 19.
[293] See Binford 1972; Sabloff 1998; Trigger 1989.
[294] e.g. Doran & Hodson 1975: 93; Hodder & Orton 1976.
[295] See Butzer 1982; Carver 1985; Evans & Millett 1991; Panella 1989.
[296] See Hodder & Orton 1976; Millett; 1979a; Redman 1979.
[297] Shennan 1988 provides a very useful introduction to the use of specific statistical processes in archaeological research

simple statistical tools with the use of more complex and intricate processes as the dataset is integrated and spatially interrogated through the use of a GIS. So completely has the discipline of archaeology accepted the use of statistical processes that they are now almost ubiquitous and the subject of more recent synthetic publications restating the principles of statistical analyses in archaeology and incorporating new developments in the field [298]. Indeed, there are specific series of journals and conferences dedicated to the use of statistics and computing in archaeology[299].

Beyond the use of particular statistical processes the understanding and selection of sampling strategies is also very important, particularly in the case of large assemblages where a study of the total population is impractical. Sampling within archaeological practice is not straightforward. Even an excavation using a total collection strategy will experience unintentional sampling as a result of the survival rate of the material[300] and the limits of the excavation. Beyond this there is a need for the statistical processes employed to reflect the samples which they are applied to[301]. The selection of a statistically relevant dataset is the first step in ensuring that meaningful information can be derived from the use of these processes. Quantitative methods can provide a particularly useful means of drawing out patterns and meaning from otherwise confusing datasets however the use of inappropriate processes or an insufficient dataset can lead to entirely erroneous conclusions.

The specific use of statistics in the study of archaeologically recovered ceramic assemblages has also received scholarly attention, focusing in particular on the survival and fragmentation of ceramic materials in the ground[302]. In this respect the key factor in understanding the state in which the material is found is based not in pure statistics but in an understanding of site formation processes and the effect which these will have on the population of data available for recovery and investigation by the archaeologist[303]. The role of statistics in informing this understanding is derived from the state of the pottery itself[304]. There is a statistical probability governing the likelihood of particular formation processes resulting in certain characteristics being found in the sherd assemblage. It is therefore possible to formulate a statistically derived basis for interpreting the means by which the ceramics entered that archaeological record and the processes they underwent prior to deposition. This has a particularly important role in the interpretation of residual deposits. As a number of the deposits studied in this project are either wholly or in part

[298] Baxter 2003.
[299] The CAA conferenceswhich have been running since 1983, Archeologia e Calcolatori etc.
[300] Orton 2000:1-2
[301] Orton 2000:208; 166
[302] Orton et al 1993: 32; Evans & Millett 1991
[303] Orton et al 1993: 207-215
[304] ibid: 215-216

constituted from residual material an understanding of the site formation processes and circumstances leading to the characteristics found within the ceramic dataset is invaluable in enabling a supportable interpretation to be formed. Despite this the main use of statistical processes in relation to ceramic material has been the investigation of distribution patterns.

Beyond the theory of applying statistical processes to the quantification of ceramic material in archaeological assemblages it is important to understand the actual quantitative measures used to define the size of such an assemblage. The most basic measure is a simple count of the sherds recovered. However this is problematic due to bias and variation in the data from different sites due to the degree of fragmentation undergone by the material[305]. Weight is also a commonly used measure however it also has problems with bias towards larger/heavier vessels within a single assemblage though it will tend to be invariant between different assemblages. Alongside these two basic measurements are a number of methods used to estimate the number of vessels represented by the material recovered. The principal method used by Italian ceramicists involves calculation of the minimum number of vessels (MNV) through a count of handles. It is also possible to estimate a minimum number of vessels from the weight of the recovered sherds for each type of vessel compared with the weight of a complete example. More commonly used in British studies[306] has been what is known as estimated vessel equivalence (EVE). The most common method of calculating EVE is to assess the number of complete vessels present in the assemblage through the proportion of complete vessel rims recovered. There are a number of problems associated with these methods. Both methods of calculating the minimum number of vessels are rather imprecise, calculation by weight fails to account for the nature of the sherds in the assemblage and is likely to lead to an underestimation of the number of vessels represented. Estimation of MNV by diagnostic sherds is problematic as it may over represent the number of vessels as there is no sure way to assess whether the deposit contains a representative sample of amphora parts or an overabundance of the diagnostic sherds used for the calculation. Whilst EVE is ostensibly the most useful of these derived measurements it too is not without problems[307]. It also suffers from a fundamental disadvantage when considering its applicability to this particular study in that the most common method of calculating EVE relies on the use of rim sherds alone to determine the number of vessels represented. As large numbers of amphorae[308] have their

[305] Orton 1989: 96

[306] Or those carried out by British archaeologists abroad. See Pyke, 2005. for a discussion of an attempt to apply EVE to amphorae recovered through excavation.

[307] Pollard 1991

[308] Particularly those of African provenance

feet, necks and rims removed prior to re-use this is clearly a critical drawback which is borne out by the large numbers of body sherds recovered in the archaeological record.

The key problem with the quantification of archaeological ceramics is in comparisons between sites 'Results from different contexts or from different sites, using different measures, cannot be compared with one another. Comparisons may in general be made if the same measure has been used on both sides'[309]. However, in practice any dataset derived from varied sources is unlikely to conform to this condition. In order to overcome the bias in the methods of measurement an alternative must be sought. The calculation of density has been shown to be a practicable solution where sufficient data is available[310] and is a concept with will be explored further in the following chapter.

Waste deposits

One of the striking features of late antique urban sites is the widespread presence of extensive areas of destruction and deposits relating to the disposal of waste. On some sites this has led to the identification of strata of so called "dark earth"[311] which have been associated with the widespread destruction and abandonment of the urban spaces. The definition of "dark earth" is rather variable[312]; in British archaeology it has acquired specific connotations pertaining to the perceived decline of urban population between the late Roman and early medieval periods[313]. Though in recent discourse it has become used for various late urban destruction or abandonment layers[314]. Concomitant with the presence of these large scale destruction layers are other more focussed deposits of waste in urban centres across the empire[315]. One of the features of these deposits is a high proportion of ceramic materials contained within them, including in particular a large quantity of amphorae. The amphorae within these dumps cannot be convincingly proven to relate directly to the places where their contents were used and as such should be considered to be secondary refuse[316]. Whilst this is problematic for the interpretation of amphorae distribution patterns, it does offer a useful perspective on the priorities and mechanisms associated with the disposal process.

The use of artefactual remains to elucidate the social processes leading to their entering the archaeological record and the use of the spaces within which they are recovered is not new[317]. It is however often overlooked when studying the urban

[309] Orton 1975: 31
[310] Sidrys 1977
[311] Gelichi 2000.
[312] For a discussion of the concept and its usages see Macphail et al. 2003; Galinié 2004.
[313] Loveluck 2004; Macphail & Linderholm 2004: 37.
[314] e.g. Leone 1999
[315] Such as many of the sites discussed in this thesis.
[316] According to the definition proposed by Schiffer (1976)
[317] See for example Berry 1997

environment in favour of more easily grasped changes in the architectural record[318]. This putative focus on the artefactual evidence as a means of interpreting changes in the usage of social space is of crucial importance to this study where the changes taking place in the Late Empire within the architectural framework of a city which is still more classical than medieval. More recently this approach to using artefactual evidence as a means of interpreting the use of space has been applied to Pompeian material[319]

There is no ideal solution to the disposal of the waste products produced by urban communities and the archaeological record demonstrates a variety of means employed. Whatever the mode of disposal, rubbish is almost always dumped in disused areas or at the very least away from human habitation[320]. Whilst very little is known about Roman attitudes to waste, increased awareness of the archaeological evidence is beginning to enhance a fragmented understanding of the practical arrangements involved in the disposal of waste. *Monte Testaccio*, located to the south of Rome adjacent to the riverine docks provides an unmistakable demonstration of the organised disposal of used amphorae[321]. Recent studies have focussed on the sewer systems present in a number of Roman towns[322] and have enhanced our understanding of this aspect of waste disposal without really addressing the issue of the disposal of solid household and commercial waste. However, the presence of such systems would appear to suggest that the functioning "Classical" Roman city or town would attempt to remove waste from the immediately inhabited area. The presence of Late Antique waste deposits is therefore highly significant in either representing a shift in the attitudes of the urban population to waste, their ability to remove it or the availability of unoccupied spaces within the urban area within which it was possible to dispose of some of this waste. The periodic epigraphic and literary references to clearances and rebuilding of monuments and public structures would argue that the ideal of a waste-free urban centre was very much still in the consciousness of the government if not all of the population[323]. The contextual interpretation of such deposits is therefore highly significant in understanding the social imperatives and systems which regulated the use of space in the Late Antique city.

This thesis aims to enhance our understanding of depositional process both to explain the economic significance of the ceramics found within the deposits and to better understand the mechanisms and imperatives behind the disposal process itself. Through the work undertaken it is becoming clear that the traditional idea of there being 'no public

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[318] This is particularly true of Pompeii, which forms the basis for many studies of Roman domestic space where much artefactual material has been lost through antiquarian excavations. Eg. Richardson 1988.
[319] Allison 2004.
[320] e.g. Kemp 1984; Platt 1976; Carver 1987; Rathje 1974; Rathje & McCarthy 1977
[321] Rodriguez-Almeida 1984; Blazquez 1995; 1999; 2001; 2003
[322] Gelichi 2000; Jansen 2000
[323] eg. CIL 6.1189; Marjoran, *Novel* 4.

service devoted to the disposal of rubbish'[324] in Rome is a fallacy and that in fact waste disposal in late antique Rome would appear to have been a highly regulated and carefully planned process. As the ceramic material derived from these deposits is critical to developing an understanding of the relationship between economic activity and late antique townscapes the methodology employed in their study is crucial to this thesis.

[324] Liebeschuetz 2000: 60.

Chapter 6: Methodology

Amphorae as a proxy indicator of trade

Using the remains of amphorae to trace the movement of the goods which they once contained has been an accepted practice in archaeology for some years. I do not therefore intend to provide a detailed appraisal of the suitability of such an approach here as it has been employed more than adequately in several instances in recent scholarship[325]. Furthermore the viability of ceramic data in general for use as a proxy to economic activity has been discussed recently in an article by Greene[326]. As I have previously argued, amphorae represent a more direct reflection of the goods which they contained than might at first be assumed by the term "proxy indicator". In fact the distribution patterns of the vessels themselves are reflective of the social practices associated with the distribution and consumption of their contents rather than as a direct result of demand for the vessels. As the determining factor in these patterns of distribution is the functional requirement to deliver liquid goods to locations where they are consumed, amphorae present a close proxy for the distribution of these goods. Other ceramic forms have been used in order to understand social processes, the degree of socio-cultural selection involved in the use of these items however makes them less suitable for answering these essentially economic questions. One must however be aware that the archaeologically recovered distribution patterns are not directly indicative of the distribution of the goods; rather they show the patterns of disposal of the containers after they have been emptied of their contents. This point is one which deserves more detailed discussion and will be addressed later in this chapter. What I intend instead, is to outline the relevance of this basic means of investigating one aspect of the archaeological record and the way in which it relates to the specific questions of my research to show the way in which the data derived from a relatively simple study of amphorae recovered by excavation and through surface collection can be harnessed to provide the basis of a more thorough understanding of the complex social systems at work in the Late Roman Empire.

Studying amphorae in ceramic assemblages

The initial antiquarian and epigraphic focus of amphora studies as typified by the late 19th century work of Heinrich Dressel[327] in time, led to the undertaking and refinement of a number of typological studies aimed at categorising the various forms of amphorae used in the ancient world[328]. Though the first research which viewed amphorae as more

[325] Keay 1984; Peacock & Williams 1986; Kingsley 2001; Bonifay 2005;
[326] Greene 2005.
[327] CIL 15/2 Tav II. Shows Dressel's typological series for the amphorae he studied. Dressel's main focus was upon recording the stamped and painted epigrams on the ceramic vessels.
[328] For example Lamboglia 1955; Almagro 1955; Callendar 1965.

than mere backing for inscriptions was published in the early 20th century, the major advances within typological studies of amphorae would only be made by the middle of that century[329]. In more recent years advances within the field of ceramic studies have allowed this process to continue with much more finesse and an appreciation not only of form and decoration but also of the specific petrological makeup of the fabric of the vessels[330]. As a result of the work of a number of scholars there exist a series of typologies for Late Roman amphorae which allow us to accurately categorise and provenance the material recovered from archaeological excavations such as those included in this study[331]. This process of typological classification forms the basis of any study of ceramic material and as such constitutes the first stage in the study of data collected from the ceramic assemblages under consideration in this thesis. Advances in scientific techniques related to fabric and contents analyses have led to a growth in the quantity and diversity among the types of data which can be recovered from these ceramic remains[332]. This has been concomitant with a shift in the research questions being addressed through assemblages of ceramic material. Though this material is still predominantly seen as being an indicator of economic activity in antiquity, there has been a recognition that the presence of ceramic goods at a site may not solely be due to economic imperatives[333]. Furthermore it has been possible through a combination of petrological analysis and detailed field survey to locate production sites for many ceramic vessels[334]. A petrological analysis of the ceramic material pertinent to this study would however be an extremely time consuming and ultimately unnecessary procedure to undertake[335]. The principle aim of the ceramic analysis to be undertaken as part of this thesis is to understand, on the basis of form and fabric the nature of the vessels which are being recovered from archaeological contexts within the zones under investigation in order to ascertain their broad geographical provenance and the chronology of their manufacture and use. To this end, the typologies which will be used to categorise the amphorae fragments are the principal Late Roman series which will be familiar to any ceramic specialist[336]. These range from Keay's typology of late Roman amphorae derived from finds on sites in Catalunya[337], Riley's typology of late Roman Eastern Mediterranean amphorae from finds at the University of Michigan

[329] Loeschcke 1909.
[330] For a general survey of early thin-sectioning work see Freestone, Johns & Potter 1982. More specific application of this type of study can be seen through the work done by Peacock et al. (1990) on the fabric of African ceramics.
[331] Primarily this begins with Keay 1984.
[332] For example see: Colombini et al. 2005; Kimpe et al. 2004; Passi et al. 1981.
[333] See Hawthorne 1997; 1998 for alternative explanations for the presence of ceramic material in the archaeological record.
[334] Peacock et al. 1989; 1990
[335] See Peacock (1977: 26) for discussion of utilising an approach based on geological methodology to the study of ceramics, advocating the application of more complex techniques only where necessary.
[336] As this study relies heavily on existing data much of this categorisation will already have been undertaken to some degree.
[337] Keay 1984.

excavations in Carthage[338] (both now over 20 years old) to recent reclassifications based on these works such as Bonifay's collation of late Roman African ceramics[339].

As previously stated, the initial impetus for typological studies of amphorae came from Heinrich Dressel's study of epigraphs found on amphorae for publication as part of the *Corpus Inscriptionum Latinarum*[340] between 1891 and 1899. Dressel's initial focus on the epigraphic element was accompanied by a table illustrating the shapes of the vessels which had been studied[341]. This was to form the basis of subsequent amphora studies, although due to the art-historical and epigraphic focus of Dressel's original work, it was to the detriment of many of them[342]. However, despite the bulk of the publication being a typology in the mould of Dressel, the work of Callender[343] showed an appreciation that the study of stamps alone was unsatisfactory and that 'there is a connexion, however vague and ill-defined it may be at present, between form and chronology and form and commodity'[344]. Despite not developing this theme fully in his work we can begin to see the realisation of the possibility of developing typological amphora studies for the purposes of understanding questions pertaining to the economy and to issues of supply. In the Mediterranean around the mid 20th Century there were also a number of important publications which built upon and modified Dressel's typology to varying degrees[345]. These works were later consolidated by Beltrán[346], although the majority of typologies up to this point were concerned with Republican and Early Imperial amphorae, scholars were beginning to show an interest in later material. The most significant advance in the study of Late Roman amphorae was the publication by Tchernia and Zevi of a study of Tunisian amphorae from the deposits excavated at Ostia[347]. This itself was further refined when the excavations at the *Terme della Nuotatore* were published and the typology for Late African amphorae was subdivided and expanded[348]. Major advances in the development of Late Roman amphora typologies became possible through the massive campaign of UNESCO excavations at Carthage which began during the 1970's[349]. All of this can perhaps be seen to culminate in the now dated but still invaluable study of Late Roman amphorae from Catalan deposits by Simon Keay[350] which for the first time attempted to present a unified

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338 Riley 1976; 1981.
339 Bonifay 2005.
340 CIL 15
341 CIL 15/2 Tav. II
342 Keay 1984: 71
343 Callender 1965
344 Callender 1965: v.
345 Principally Lamboglia 1955; Almagro 1955; Pelichet 1946
346 Beltrán 1970
347 1969. This study identified two types of amphorae, the "*Africana Grande*" and "*Piccolo*". In doing so it laid the foundations for the development of subsequent Late Roman amphora typologies.
348 Panella 1968; 1973; Manacorda 1977.
349 Fulford & Peacock. 1984; 1994; Riley 1976; 1981.
350 Keay 1984

typology which both expanded upon and included the earlier typologies of amphorae from Late Roman deposits irrespective of their provenance.

Ostensibly the last two decades have not produced such wide reaching typologies, instead there has been a return to more specific, site oriented typologies which merely fill in the gaps in existing typologies where new forms have been identified through excavation[351]. One area where there has been significant revision and a re-examination of Keay's typology has been in the identification and categorisation of the major typological classifications of African amphorae. A number of studies attempting to re-define these forms on the basis of new or re-studied evidence from North Africa[352] have culminated in the recent publication of a unified type series for Late Roman African amphorae[353]. Such a work is invaluable for the study of late antique deposits in the western Mediterranean as African amphorae are among the most varied and often the prevalent material recovered.

The state of the typological understanding of Late Roman amphorae from assemblages in the western Mediterranean is now sufficiently advanced that a study such as this can be undertaken with confidence in its ability to accurately define the provenance, form and probable function of the amphora remains within the archaeological deposits selected. It also provides an opportunity to rationalise the divergent typologies that have been employed over the years that these sites have been excavated. The lack of adequate typologies in the past has led to the situation where material from particular sites has been essentially unclassified. Whilst this is not an insurmountable problem for this research there is a very real problem with reusing such data without detailed re-study.

Data acquisition strategy

The data which will be used for this study comes from a series of excavations carried out at various times and by different groups of excavators under a wide range of conditions. Furthermore, the ceramic data has been studied, classified and tabulated by different individuals at times when there have been differences in the available typologies for classifying this material. As this primary data set is essentially second hand it is necessary to treat it with a degree of caution. Some of the problems inherent in re-use of third-party data have begun to be discussed in academic literature both explicitly[354] and implicitly[355] in acknowledgment of the growing recognition that published data does not represent a final definitive form and that new research questions can utilise existing data in ways which were not intended at the time of publication. This often requires an

[351] For example the Crypta Balbi type sequence.
[352] Principally Freed 1995; Bonifay 2005
[353] Bonifay 2005.
[354] Naylor & Richards 2005.
[355] Patterson (ed.) 2004.

amplification or refinement of published data[356] in order to render it suitable for answering the questions asked of it. The degree to which material must be re-studied is largely dependent upon the form of its publication and the new questions to be addressed. In the case of this research it has been necessary to undertake additional work on some of the material assemblages in order to determine the weights of various different classes of material as this was not done in the initial studies of the ceramic assemblages. It has also been necessary to check the data presented for inconsistencies with the material in storage and to re-tabulate the data in a format which is more accessible and relevant to this undertaking. The overall level of detail required for this study should be sufficient to demonstrate the regional provenances of the goods being transported to and within the city. To this end, a fairly coarse grained classification of the amphorae is sufficient to provide a suitable dataset. However, a more detailed breakdown allows for more nuanced comparisons to be made between the various assemblages which comprise the corpus for this study and as such where possible the ceramic material will be defined by typological form as well as broad geographical provenance on the basis of the fabric[357]. As this level of analysis has in some cases required a re-examination of the published material to be undertaken, where possible I have re-classified the material on the basis of a unified typology as well as the more commonly used schemes. Whilst this is not used in the text as the proliferation of typologies has largely settled to a few well known conventions used by ceramicists, it is useful to be able to compare typologies where the nomenclature used by the excavators differs from the current norms[358].

The archaeological perspective

This study is advancing the current state of knowledge regarding the subject of late antique urban spaces and the way in which ceramic data is approached and used in its application of the archaeological evidence to investigate distributive mechanisms within the city. Through a synthetic approach to selected sites within Rome and other cities of the Late Roman Empire it is possible to question and evaluate the generalisations which have been an unavoidable consequence of the specificity of the published material pertaining to this aspect of the discipline thus far[359]. The availability of archaeological evidence now also presents an opportunity to move away from interpretations of the wider economy which for historiographical reasons have been heavily influenced by

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[356] E.g. Patterson et al. 2004; Harrison et al. 2004

[357] The basic categories for this will depend upon the material encountered. Basic definitions of geographical provenance will take the form of regional labels e.g. African, Iberian, Italian, Gaulish, Eastern. For details of the equivalence between typological forms and geographical provenance see Appendix A.

[358] A comparative table is provided in Appendix B

[359] ie. Manacorda et al. Not to devalue the work that has gone before as without the quantities of material excavated and published (in particular by Sagui and others from the Crypta Balbi it would be impossible for a synthetic work such as this to be undertaken.

historical or epigraphic sources[360]. Whilst both of these types of evidence are valuable and can be used to elucidate the interpretations made on the basis of the archaeological material it is this which offers the greatest potential for understanding wider socio-political questions and as such will form the basis of this work. Archaeological material can also be said to reflect the actual state of the economy and distributions of foodstuffs rather than the ideal or perceived situation as represented in textual sources.

Archaeological material is shown to be particularly suitable as a form of evidence for understanding the socio-political implications of ancient economic practices when one considers the overall process involved in the movement of goods. This process can be conveniently described as consisting of four interdependent but distinct phases[361]. These will be defined here as: Production, Transhipment, Consumption and Deposition[362]. Of these it is the Deposition phase for which we have the most archaeological evidence from ceramic containers, although through techniques such as petrographic analysis it is possible to discover the likely production sites of particular vessels and thus, in consultation with other forms of evidence the likely Transhipment routes for their distribution. It is the phase of Consumption for which there is least evidence. Little material associated with the bulk goods studied here remains deposited at the site of its use and may have often never been present in the domestic contexts in which products like olive oil were consumed. The ceramic deposits which are recovered archaeologically are therefore indicative of the distributive process rather than the end use of the products which the vessels contained and of the disposal patterns of the material rather than of the consumption of their contents.

Understanding the depositional context

In order to derive a more nuanced and informative interpretation of the ceramic material it is essential to ensure that one has a thorough understanding of the context[363] in which these deposits took place. When dealing with ceramic material from archaeological deposits, particularly in the late Roman period, one is with very few exceptions invariably looking at waste deposits rather than accidental loss within active domestic settings. Of primary importance are the contextual relationships between groups of material within the deposit and between the deposits and their locale. The basic interpretations of the deposits are formed through an appreciation of the proportions of

[360] See Chp. 2.

[361] This offers a slightly more nuanced and explicit model for the lifespan of the goods than the traditional three step model of Production, Distribution and Consumption.

[362] Deposition has often previously been overlooked or confused with Consumption. I feel that by insisting on the separation of the two at this stage it makes explicit the possibility that deposition was not a casual act on the part of the consumer but involved conscious decisions.

[363] By which I mean both the actual stratigraphic context and the wider social and historical context.

different ceramic types within each context and each deposit. The first stage of the approach which will be followed here is to arrive at a proportion by weight and by sherd count of each category of material within a deposit[364]. By comparing this data with the known weights and volumes for complete examples of the appropriate types of amphorae it is possible, in principle, to give a range for the total number of whole amphorae that the deposit represents. Whilst this is not a particularly refined method of analysis it does give a rough order of magnitude for the total number of amphorae in the assemblage and hence its real significance. The contextual and density based comparison of material and assessment of the assemblages is however to be preferred as being a more specifically sound method of analysing the material.

As the material required for this study is primarily refuse and the dating of the deposits is not based on the ceramic material, residuality presents less of a problem than can otherwise be the case. The implications of residuality can therefore be somewhat mitigated when looking at disposal patterns and the changing usage of urban spaces as evidenced by their use as disposal sites. However, understanding the processes which lead to residuality in the assemblage is important in interpreting the patterns of distribution for the goods concerned. Additional dating evidence from coins and the techniques of construction used in any associated buildings can be utilised to refine the probable date of the deposit thereby determining the possible extent of any residuality in the amphorae remains. Where possible, this can be supported through a detailed examination of the amphora sherds to compare their average size and signs of wear. This can reveal details of the delay between the use of an amphora for its primary purpose of transporting goods, its destruction and subsequent disposal and also of any disturbance that the sherds may have undergone once deposited. It is assumed that in the majority of cases the material will not have been deposited at the location in which its contents were used. Furthermore, amphorae are likely not to have been discarded at a great temporal remove from the time of their last use unless found with specific evidence of re-use[365]. However, this is obviously an issue to be addressed on a site-by-site basis through an appreciation of the context in which the deposit has been made. As one does not rely on the amphorae themselves for all but the most basic of dating[366] and they are used primarily to show the depositional patterns rather than to demonstrate directly the pattern of distribution, residuality in fact becomes a very minor consideration in the preliminary phase of investigation. If one can account for residuality in the data and having derived an order of

[364] Initially material can simply be sorted to give classes such as Coarse Wares, Fine Wares, Amphorae and Lamps. Within this there will naturally be some material which resists classification. Following this, the amphorae can be sorted by type and by fabric into geographical and temporal groupings.
[365] This tends to be clear as re-use for construction or as drainage is archaeologically very distinctive.
[366] A *terminus post-quem* is secure with amphorae forms for which there is a reasonably clear beginning to production and use.

magnitude for the deposition of the material, this can be compared to the likely time span over which disposal was taking place and thus provide an assessment of the intensity of the deposit and thus the likely magnitude of consumption within the area.

In order to render deposits of different sizes comparable, it is essential to convert the basic figures into a form which is constant for all deposits. Sherd count is unsuitable as there is no way to account for the degree of fragmentation undergone by the material. Clearly weight alone, despite its accounting for fragmentation and being an internally consistent measurement within the deposit is also unsuitable as it only accounts for the ceramic remains themselves and not for the area or depth of excavation. In order to account for the size of the excavation in three dimensions it is desirable to know the total volume of the excavated material[367]. From this it is possible to simply convert the weight of the relevant ceramics into a density[368]. As a ratio of the two variables this will therefore allow direct comparison between deposits, both within a given site and between deposits from different sites.

The contextualisation of deposited material can be simplified by approaching the question through a model. In this instance one can describe the levels of contextualisation which it is necessary to consider as: The Deposit, The Site and The Region. These definitions remain necessarily vague as in different circumstances their exact nature and physical constituents will alter[369]. Of perhaps more importance to the wider regional picture is understanding the overall context of that deposit within its environment as the situation of a given deposit can reveal much about the way in which people were using their landscape[370]. This is particularly true in the context of Late Antique towns where waste deposits are found within buildings, and often in public spaces. In order to account for this, the study will attempt to discover the history of the areas where late deposits are found prior to the beginning of the depositional process in order to facilitate comparison and elucidate the changing attitudes of the urban population to these spaces. With this information it is possible to achieve a temporal and spatial distribution for the origin of the material across the study sites chosen for this project.

Reconstructing distribution systems from patterns of waste disposal

Whilst it is a relatively uncomplicated process to extrapolate depositional patterns from the ceramic material recovered during the course of archaeological investigation, it is

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[367] As advocated by Millett (1979a). This can be extrapolated by calculation from the dimensions of the trenches where specific information is unavailable.

[368] Density is equal to unit-mass per unit-volume (Kg/m^3).

[369] The basic unit of any interpretation is the deposit, often of several archaeological contexts but essentially integral. A site however may be a building, an insula, a street, or any number of things. Likewise a region may represent a small area within a large town, the entirety of a small one or a landscape.

[370] This applies equally to urban and rural landscapes although this study focuses primarily on the urban.

much more difficult to use this to interpret the distribution patterns of the goods themselves. In order to attempt this, it is necessary to re-visit the issue of residuality[371]. Whilst it is possible and entirely reasonable to make statements regarding the deposition patterns of these vessels with only a brief acknowledgement of the problem of residuality, it is an entirely different case when attempting to reconstruct the patterns of distribution for the goods which those vessels once contained. In essence, residuality in an archaeological context occurs where material is deposited or re-deposited after its acknowledged date of production and use or where material is deposited within an archaeological context which can be dated to a period subsequent to that of the material in question. Commonly this is seen with ceramic wares, which in some instances continued in use until broken, often years after they were first acquired and were then disposed of in later periods. With vessels such as amphorae which had a largely functional role, there is only a small chance of their continued use as containers of bulk goods long after the date of their production and residuality in this particular material is usually a result of either delayed deposition, re-deposition or reuse of the amphorae for a secondary purpose. Where reuse does occur[372] it is usually clear from the archaeological context and state of the sherds recovered that this has been the case. It is also highly probable that amphorae used for the transportation of olive oil were not re-used to any great extent due to the penetration of the oil into the fabric of the vessel which would subsequently become rancid upon exposure to the air[373]. Whilst this is the case, there are other factors which may contribute to elements of residuality in deposited amphorae remains.

The initial question which must be addressed is therefore what form of social practice, in this instance, does residuality of the material represent? From a purely theoretical perspective and before examining the archaeological evidence it is possible to advance a number of hypotheses. Through the archaeological evidence, this study must refine those ideas in order to arrive at the most likely explanation for the visible patterns in the archaeological record and hence enable an interpretation of the distribution patterns of these goods to be made with a reasonable degree of certainty. This issue is of vital importance in understanding the local patterns of distribution within a city or other small Region at the end of the supply chain. As previously stated, amphorae were highly unlikely to have been deposited long after they ceased to function as containers but are also unlikely to have been deposited at the location to which their contents were ultimately destined. Due to the volume of liquid they contained, most amphorae are unlikely to have been acquired by a small family to fulfil their immediate needs as, particularly in the case of

[371] Dealing with residuality is at best a complex process, not aided by the various different definitions which have been advanced over the years. See Evans & Millett 1991; Peña 1998.
[372] In the re-use of certain amphora types for building purposes or for drainage.
[373] See Kiritsakis & Dugan 1984.

oil, the contents would quickly spoil once the seal had been broken. We are therefore likely to be looking at the amphorae deposited as representing an intermediate stage between the long-distance shipment of the goods and the consumers of the produce. Residuality in the deposit can be identified in one of two ways. Firstly, the entire deposit can appear to be residual on the basis of numismatic evidence, from the stratigraphy or other means of dating independent from the ceramic material although it must be noted that this material may itself also be residual. Whilst the interpretation of such a deposit is dependent upon unravelling the reasons for this, the homogeneity of the deposit means that in most cases it can still be considered as a sealed stratigraphic context. Secondly, there may be some residual material present within a deposit which is otherwise chronologically homogenous. In the first instance one is not dealing with what should properly be described as residual material, the deposit could either be a re-deposit of earlier material or a delayed deposition of material for some purpose. The second instance is potentially the more problematic to interpret. Much depends upon the specific context of the deposit, however the presence of a significant quantity of residual material[374] would indicate a continuous or delayed deposition of material over a long period of time. By comparing the degree of residuality with the apparent formation process of the deposit, it is possible to form an opinion on the likelihood of whether it was the result of casual disposal of waste or the result of an ordered system of deposition. In this way and through an appreciation of the history of the sites where these deposits are formed it is possible to begin to construct a wider interpretation of the processes which led to the material being deposited.

In order to progress with the interpretation of the deposits from this point, it is necessary to employ a number of statistical tools to refine the comparisons between various deposits within the study areas. By investigating the frequency of deposits within the chosen study area, comparing this to the quantity of material recovered and the potential for other as yet unknown deposits within the area it is possible to form a model which can suggest the frequency of deposits within these areas. Whilst this is a somewhat hypothetical exercise, it allows a rough order of magnitude to be ascertained as the basis for a more rigorous interpretation based on individual site characteristics. Where the character of the urban fabric is known, it is possible to model the ease of access to the dump sites. In order to further refine this model, data pertaining to the structures, their proximity to other buildings and their access points can be combined with a three-dimensional terrain model of the ancient topography in order to assess the access costs for

[374] The exact nature of a "Significant Quantity" is obviously dependent upon context however it seems feasible to suggest that as a general rule, over 33% of the material being residual would constitute a significant quantity.

each deposit[375]. The combination of these models provides a fairly robust interpretative tool for attempting to understand the distributive patterns which may have resulted in the pattern of disposal which is directly recoverable from the archaeological record.

The key to understanding the significance of the various quantities of amphora remains found in excavated deposits is to ensure that as far as possible, a holistic view of the available data is taken. Whilst the existence of long distance trade can quite easily be demonstrated by the presence of goods or containers fabricated overseas, the more nuanced patterns of local distribution at the end of the supply chain are often far more difficult to convincingly describe. As many deposits of waste amphorae can be considered to be secondary refuse within the city, there is not a straightforward correlation between the locations of these deposits and the patterns of distribution. The relationships between different deposits in a given site can reveal something of the specific practice of waste disposal in that particular locale, however such a limited degree of interpretation is ultimately unsatisfactory. It is therefore important to understand the relationships between the sites which lie within a given area and to develop methodologies for directly comparing material assemblages from archaeological contexts within these sites. The number of deposits and their constituents, their size and the ease of access to them can reveal something of the thinking which led to their designation as refuse sites. Furthermore, the comparative approach advocated in this work renders the possibility of reconstructing the initial patterns of distribution for the goods based on a contextualised quantitative study of the archaeological material.

This study will achieve these aims through a combination of statistical methods and GIS techniques of modelling with a fairly traditional appraisal of the amphorae remains from a number of case studies. The primary focus of the research is Rome, as the capital of the Empire and recipient of the *Annona*[376] it is certainly the catalyst for, if not the ultimate objective of the supply chain and thus represents the final stage of the distributive process more fully than the majority of other sites[377]. Thus the bulk of the archaeological evidence for this thesis will be drawn from selected sites within the boundaries of the Aurelianic walls of Rome. To further refine this, a study area has been selected which takes in the eastern bank of the Tiber from the southernmost part of the city around *Testaccio*, as far upstream as the *Campus Martius* [Fig 1]. The majority of the sites investigated are located within this study area[378] with a few selected comparative sites

[375] This would result in the formation of a combination of cost-surface and network analyses based on the known and hypothetical ancient street layouts, the points of access to the buildings and the topography.
[376] See Chp. 2
[377] At the majority of other nodal sites there would almost certainly have been some transhipment through to other regions or cities.
[378] See Fig. 2.

located further away from the river in order to assess the applicability of the interpretations formed as a result of the data derived from the study area to the whole of the city.

This research will then provide a basis for expanding the study and a methodology which can be applied to other urban sites in order to further our understanding not just of the situation in Rome, that most exceptional of cities. It should be possible to begin to assess the level of transhipment through cities associated with the supply of the *Annona* and through this to begin to form an understanding of the specific nature of the distribution of goods within the cities of the late Empire and the changes which they underwent in Late Antiquity.

GIS modelling of spatial relationships

The rationale behind the widespread uptake of GIS in archaeological research is that in order to easily manage the burgeoning quantity of spatial data recorded through archaeological fieldwork it is desirable to marry the functionality of a database with the ease of representation afforded by graphic plans[379]. For many a dedicated GIS fulfils this criterion and enables the spatial data to be interrogated and manipulated for further analysis in order to aid interpretation. It has been suggested that the more traditional means of producing distribution maps is unsuitable for large datasets[380], however whilst the advent of user friendly GIS may make the process of producing such maps easier and allow more variables to be considered the ultimate publication of these datasets must necessarily remain that of a series of thematic maps. The central purpose of GIS software is therefore to provide a means of applying statistical processes to spatial data in order to derive interpretations on this basis[381]. Indeed, the power of modern computers should, at least in theory enable an increasing contextualisation of data as more information is added to the databases upon which the GIS is based[382]. The Archaeological Data Service GIS Guide to Good Practice outlines a number of criteria intended to ensure a minimum standard of conformity in GIS database construction and recording[383]. The full functionality of GIS software is too expansive to discuss in detail here however the principal techniques to be employed in this study are worth briefly explaining[384].

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379 See Wheatley & Gillings 2002: 3
380 ibid: 17
381 ibid: 18-19
382 See Lock 2003: 12.
383 Gillings and Wise 1999
384 See Allen, Green and Zubrow (eds) 1990; Fotheringham & Rogerson (eds) 1994; Heywood, Cornelius and Carver 1998; Lock (ed) 2000 for an introduction to the uses of GIS both generally and also in specifically archaeological applications. These volumes also provide an overview of the development of GIS use over the period in which both computing hardware and software have become available and affordable on an individual rather than institutional basis.

GIS in principal can be applied to a variety of scales of investigation though the majority of studies have utilised the software in the context of landscape investigations[385]. In such cases viewshed analysis has become almost de rigueur, though not always necessary[386]. Whilst this type of analysis is patently unsuitable for investigating the interrelationships of sites within an uncertain urban environment such as that of Late Antique Rome, the development of the methodology beyond a simple application of the basic process has influenced my approach to looking at the sites selected to provide data for this thesis. The three major lines of investigation, which I will follow in respect of the spatial element of the data, are proximity of the deposits to other major sites within the city[387], the accessibility of the deposits and a comparison of the quantified ceramic data with derived residential density within the city. The first of these methods is a fairly straightforward comparison of the location data for various broad categories of site in order to determine whether there is any correlation between the locations of the deposits and other socially or politically significant structures. The second strand of the investigation will offer a means of assessing the degree of intentionality in the location of the deposits through a cost-based analysis derived from topographical considerations[388]. This will involve use of both isotropic and anisotropic cost surfaces in order to model the different variables[389]. Whilst it is entirely legitimate to say that 'it is easy to fall into the trap of performing an analysis as if the landscape were an isotropic surface and uniformly accessible from any direction'[390], the case of a built urban environment is clearly less straightforward. If it were possible to accurately reconstruct the layout, orientation and access points of the streets and buildings comprising this urban landscape it would be entirely feasible to employ a network to model the relative access costs accounting for the differential access and the directionality of travel along the established route-ways. However, the impossibility of accurately reconstructing a plan of Rome at any given historical moment requires a level of abstraction if the analysis is not to be almost farcical in its attempt to produce a detailed analysis of evidence which in itself has a very low level of precision. This necessary abstraction manifests itself in a generalised cost surface based on the relative residential density of defined areas within the city[391] coupled with an anisotropic cost surface[392] based on the natural topography of the city upon which and into which the built environment had been inserted. The third strand of investigation is

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385 See Lock 2000a

386 Wheatley & Gillings 2000.

387 This is in itself a threefold division between known *horrea*, major imperial monuments and buildings and the known Late Antique ecclesiastical buildings.

388 Both natural factors ie. Slope, height etc. and also from the constructed topography and building density.

389 See Wheatley & Gillings 2002: 151.

390 Harris 2000: 116.

391 Here taken to correspond with the 14 Augustan administrative regions

392 Or friction surface as they are often known

interrelated to the second insomuch as it also relies on an appreciation of the residential density[393]. This is however used to attempt to show whether low-density areas are experiencing unusually high levels of deposition and vice versa. Whilst without a complete population upon which to perform this process the results can only remain very tenuous, providing this is acknowledged it offers another tool with which to test the interpretations derived through the purely quantitative evaluation of the material and also the other spatial processes discussed here.

Whilst the use of GIS as a tool for understanding spatial distributions of archaeological material has been common for a number of years now, the delay in development of a truly Object Orientated GIS package which is widely available[394] has meant that in order to effectively query the data collected one must prioritise the spatial aspect of the data over the attributes of the material recovered. This is not necessarily a drawback and the enforced viewing of data from a spatial perspective is actually quite enlightening given the very traditional, artefactual[395] approach which has previously been brought to bear on this type of material. As previously stated, the data utilised in this thesis has been recorded in a relational database containing information pertaining to the location, history, process of excavation and classification of the material in question. This database forms the basic searchable archive of the material under consideration however, for the purposes of looking at the interrelationships between the individual assemblage and the surrounding urban environment the database alone is rather limited.

As this thesis is essentially concerned with the spatial and temporal relationships between a series of ceramic assemblages and the sites from which they were recovered it is essential to employ a practical method of investigation which enables these relationships to be both thoroughly investigated and also adequately represented for publication. To this end a comprehensive plan of the study area including all the major monuments, sites and zones of habitation was created in AutoCAD using published excavation plans, the Severan *Forma Urbis Romae*, and recent synthetic maps of the ancient city[396] georeferenced to the 1:10,000 CTR map sheets for Rome. This CAD plan forms the basis of all the spatial investigation of the dataset. Whilst a GIS is an exceptionally useful tool for analysing the spatial data, it does not offer the functionality in producing an accurate plan of the study area which can be found in a dedicated CAD/CAM package. In order to enable meaningful spatial interrogation of the dataset tabulated data from the database was

[393] pp 82-85 & also Noreña 2006.
[394] See Ralston 1994 for a workable though inaccessible methodology for placing the emphasis on objects using the C++ programming language.
[395] One might almost say Art-Historical
[396] For example Lanciani 1910; Haselberger 2002.

exported to ArcView GIS 3.2[397] and located within a georeferenced framework based on the CAD plans derived from the base map data previously discussed. This combination of software and techniques allows each element to perform the function for which it was designed and whilst it is a slightly unwieldy system in terms of the need to export multiple file types across platforms the overall effect is to produce a much more accurate and ultimately aesthetically pleasing spatial interpretation and representation of the data.

Justifying the generalisation of urban building densities

A key component of the spatial analysis of the deposits studied within this thesis rests on the possible reasons for their employment for the purposes of disposing of waste material. Whilst there are obviously a number of considerations in this, clearly one of the most obvious functional considerations is the accessibility of the dump site for those wishing to use it. Whilst it is not possible to definitively argue a direct correlation between ease of access and use as a dump, the correlation between the two is indicative of the nature of the dumping process and also of the degree to which a "political" rather than convenient decision was made to use a given specific site. In order to model this an access cost surface must be generated based on existing data for the density of buildings, major thoroughfares and open spaces in the city. It has been suggested that there is a direct proportional correlation between the availability of water and residential density in the city[398]. Where calculations of this sort have been performed their validity rests on the proportions of the water supply for the purposes of supplying public basins as given by Frontinus[399]. Whilst 44% of the water supplied *Intra Urbem* was for public use, only 13% was for the public basins which appear to have been the main source of drinking water for the populace[400]. The prevalent trend within archaeological discussions of water usage in the Roman Empire has been through more obvious, monumental architectural complexes, principally baths which have always held a close relationship to the aqueducts in scholarly literature[401]. More interesting for the variability of water supply within the city[402] are the relative proportions of this supply to the public basins from each of the major aqueducts at the time of Frontinus' *Cura Aquarum* in A.D. 97[403]. Comparison has been drawn to the distribution of basins in Pompeii, where there is one on virtually every street intersection

[397] It should be noted that although ArcView 3.2 is now an outdated software package it was widely available when this project was commenced and the decision was taken not to attempt migration to the newer ArcGIS in the middle of this project.
[398] Noreña 2006: 91.
[399] See Evans 1997; *Frontinus De Aquaeductu urbis Romae*. This title however is only known from the earliest surviving manuscript which is the 12th century *Codex Casinensis*
[400] See Noreña 2006: 93 for a full discussion of the evidence and alternative supplies of drinking water.
[401] For example see Mar et al 1993; Nielsen 1990; Hodge 1992: 49; Aicher 1995: 27; Tucci 2006.
[402] Rather than attempting to reconstruct an overall quantitative assessment of the supply of water
[403] These are summarised in Appendix C.

with few residences located more than 50m from the nearest source of water[404]. Less specific information can be inferred from the supply to each of the urban regions of water by a varying number of aqueducts where a greater number implies a concomitantly greater number of public basins. The Regionary Catalogues provide some later 4th Century figures for the number of Lacus present in the city[405]. There were a total of 1,352 Lacus recorded in the *Notitia regionum urbis Romae*[406]. The reliability of the Regionaries as a quantitative source has however been questioned[407] and perhaps more internally reliable though still debatable for different reasons are the calculations of capacity which have been made for the aqueduct system[408]. From the information provided for the number of lacus and the proportion of the supply to each region provided by the aqueducts it is possible to approach an order of magnitude for the water supply to each of the regions and hence, on the assumption that more water signifies more people, the relative building density for each area. Whilst this is not a hypothesis without problems or a degree of questionability, principally there is no consideration of alternative sources of water supply although the distribution of these can be considered to be fairly uniform[409]. Despite this, the very broad trends which can be inferred through the availability of water to areas of the city can enable a simple building density plan to be constructed and hence a schematic for the relative ease or difficulty of access to the dump sites. In combination with the other analytical tools afforded by the plans, Database and GIS designed for this research project it is possible to begin to draw out some patterns from the spatial distribution of the deposits under study. There are however, a number of obvious problems with the interpretation of the data generated through this methodology which bear some discussion.

Whilst the equation between the number of Lacus and the residential density is derived from data collected in Pompeii, this seems a sensible way to assess an order of magnitude for the population. It does however account only for that population which the civic authorities believed should be supplied through such means. More significantly the use of Lacus to define residential density does not account for other sources of water such as wells, cisterns, and naturally occurring sources of water within the urban area. Though the distribution of these can by no means be described as uniform, their overall impact on the supply is likely to have been limited and overall fairly even. Of necessity the

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[404] Noreña 2006: 97

[405] Noreña 2006: 100; Nordh 1949; *Codex Vindobonensis* 162. For further discussion of the nature of the Lacus and their distribution see Taylor 2000: 46-48.

[406] Hermansen 1978: 134.

[407] Hermansen 1978: 146. Also the discrepancy between the total figure quoted as 1,352 Lacus and the total derived from the individual regions as recorded in the *Codex Vindobonensis* of 1,164.

[408] See Dodge 2000: 187. Utilising the figures calculated by Grimal (1961) as they offer capacities for the Aquae Traiana and Alexandrina.

[409] See Taylor 2000; Kleijn 2001 for a more thorough discussion of the overall organisation and development of Roman water supplies in Antiquity.

incompleteness of our knowledge of the urban fabric of the city enforces a degree of generalisation in the derivation of residential density. This disguises a number of specific issues which may be used to undermine the methodology. Primarily the diversity of urban areas and their use for multiple purposes is not addressed through this model, though in essence the level of abstraction counters the use of specific known instances to discredit the general conclusions reached. It is however desirable to use what information is available about specific areas in order to explain the patterns envisioned through the application of the generalised model. Both open spaces such as the fora and large non-public buildings such as *horrea* will have a bearing on the accessibility of certain areas of the city. Though in these particular cases and in respect of the material being examined in this study they may indicate a grater concentration of material in the less accessible areas. Obviously, if the deposits are from known *horrea* this is an important factor in interpreting the results. Such specific structures, where known, should be used to bias or nuance the overall interpretation of the density model used to generate the cost surfaces against which the recovered deposits are to be plotted.

As previously stated the residential density calculations can be based on the supply of water to the urban area. It is also clear that the number of Lacus present is alone insufficient for the purposes of forming a cost surface for the analysis of access to the assemblages and sites under consideration in this study. The methodology used to derive this particular cost surface uses the supply of water via aqueducts to the city as a means of correcting for differential size in the lacus and for the presence within the urban zone of water using structures other than those for the supply of drinking water to the urban population. The rationale for this is that water was also used for the public baths, private structures and for large monuments utilising water such as the *Meta Sudans* and *Septizodium*, these structures would restrict access within an area to a similar or greater extent than the *insulae* supplied by the Lacus.

The calculations account for the uncertainties in the source material used to provide the basic data through a level of abstraction. The first step in this process has been to calculate the percentage of supply provided by each of the aqueducts working in the late antique period to each of the Augustan regions of Rome. The Augustan regions will form the basic analytical unit for the purposes of these calculations and the subsequent cost surface for the accessibility calculations. Whilst possibly suspect, it has been necessary to make the assumption that each aqueduct distributes an equal proportion the water it carries to each of the regions it serves. This seemingly crude assumption is a necessity as there is insufficient evidence to enable an accurate reconstruction of the distribution system at a more detailed level. This can be corrected to an extent by the

inclusion of the Lacus in the equation, as the presence of a greater number of lacus within a region would indicate a greater or more diffuse distribution within that area. As previously mentioned the individual capacities of the aqueducts have been calculated with the most comprehensive used for this study[410]. There are a number of problems with calculation of the capacities of Roman aqueducts. However, for the purposes of this study it is sufficient to calculate the ratio between the various aqueducts and not the absolute capacity of each line. As such, providing the method used is consistent for each line the actual figures themselves are unimportant. A proportion of total capacity for each line is established as a percentage and then divided equally across each of the regions supplied by that line. In this manner the importance of each line to each of the Regions can be ascertained[411]. From these figures it is a simple matter to determine the total proportion of supply to each region. The urban density was then calculated based on the following formula: $^{(AqxL)}/_{A}$ where Aq is the proportion of aqueduct supply; L, the number of Lacus and A the area of the region in question as calculated from the GIS. As the values obtained are all relative to one another it is then a simple matter of applying a coefficient (*X*) in order to bring the values to a percentage with 0% being most accessible and 100% being the most densely occupied[412]. Whilst this percentage value in itself would be sufficient to provide a basis for assessing this aspect of the accessibility of the sites it was decided to reclassify the results on a scale of 1-10 in order to facilitate a more simple interaction between these values and the others in use in this study.

Defining cost-surface values

Whilst the principal form of cost surface developed for this study has been derived from the urban residential density, there are a number of other factors which must also be modelled in order to approximate the true cost of distributing the amphorae to locations around the city. Both the distance of the deposits from the points of entry and storage facilities of the city must be considered as must the elevations of the deposits relative to the level of the Tiber which would have been the primary route of ingress for these objects. The distance from the points of entry is a slightly complicated question as the precise location of many of the riverine quays and dock installations are unknown. However, it is likely that these were focussed around the Emporium area with its storage facilities. The presence nearby of *Monte Testaccio* is a testament to the use of this area for processing incoming oil amphorae in the preceding centuries and some degree of continuity, at least in the location where the amphorae were unloaded from the river barges, seems a reasonable assumption. However in order to model the uncertainty of the

410 Grimal 1961

411 See Appendix C for tabulated figures.

412 In this case the coefficient used was 10,000

landing points for the *Annona* goods, it is necessary to introduce the possibility of unloading occurring almost anywhere along the bank of the Tiber within the area circumscribed by the Aurelianic walls. To this end the distance costs have been derived from two separate surfaces. The first simply models distance from the river and is given a lesser weight in determining the overall distance cost, the second is distance from the Emporium area as defined by an irregular polygon taking in the known *horrea* and the area of the *Forum Boarium* which was known to be a place where goods were unloaded. As these distance calculations do not need to respect topographical features a simple distance layer categorised into 10m bands distant from the respective features were created. For the purposes of this calculation, those sites occurring within the area of the Emporium were also given the minimum value of 1. These bands were then assigned values between 1-10 and then multiplied, with the distance from the *Emporium* being weighted as twice as important as the distance from the river. These composite values were then re-classified to produce another set of 1-10 values for the cost of accessing each of the composite zones.

The elevation of the sites is also of key importance in determining the relative accessibility of a given dump site. Due to the limitations of the GIS, in that it is not a truly three-dimensional environment some preliminary work must be done in order to derive an elevation model from the mass point spot height data entered from the base maps. Initially, these points can simply be used, along with the contour model of the early imperial landscape to create a TIN model of the topography. This model represents the surface as a series of triangular planes joining nodes which are in essence the spot heights as defined by their three dimensional coordinates. However, as the GIS software is not capable of making 3D calculations it is necessary to interpolate a raster grid from this surface where each cell of the raster contains a height value based on the z value of the TIN at the coordinates in the centre of the cell. This grid is then re-classified into the standard 10-stage division prior to its use for assigning cost values on this basis. From this surface, cost values can be assigned to each of the deposits under consideration.

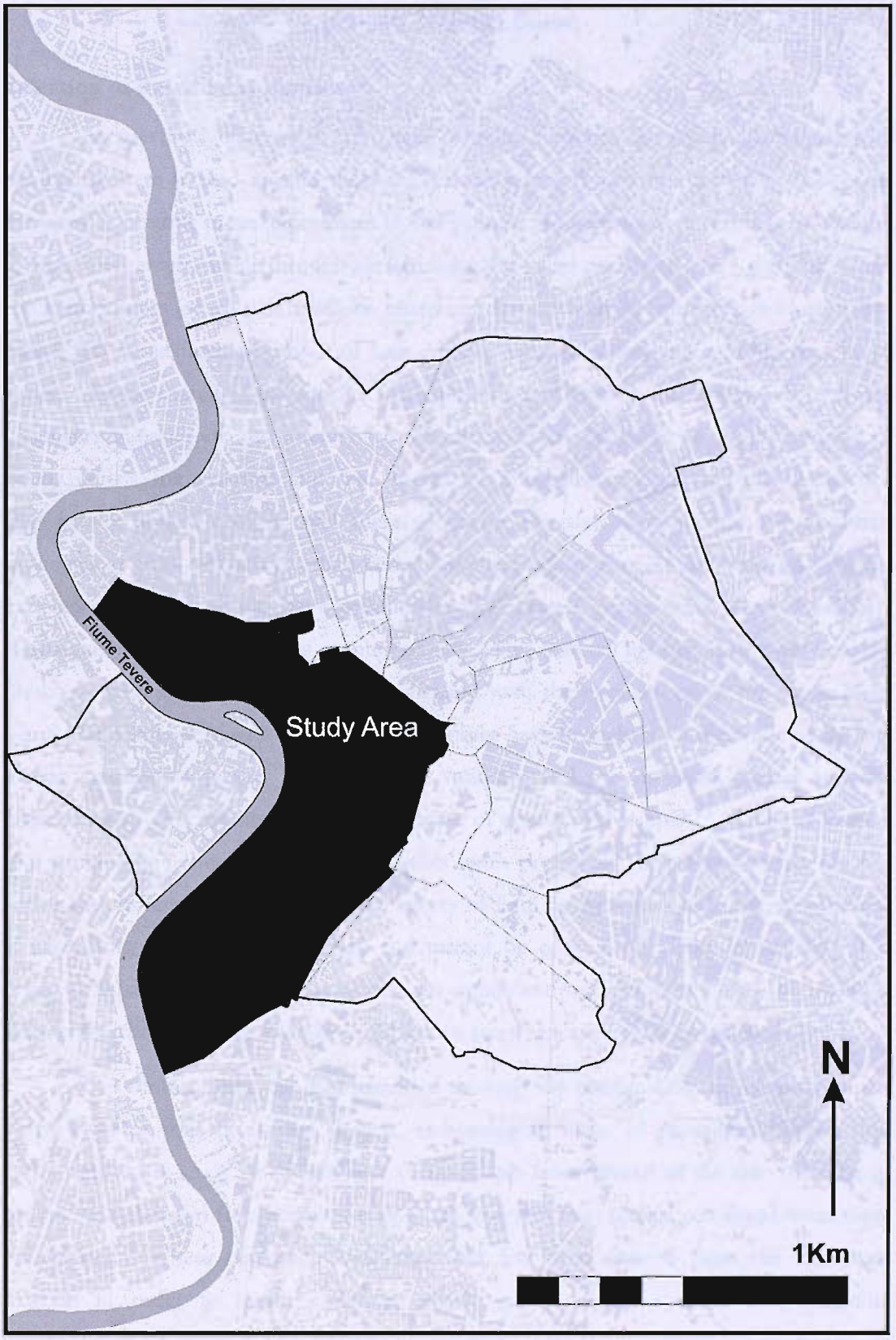

Fig. 7: Location of the study area in Rome.

Chapter 7: Data - Rome

Selection of the primary dataset

As previously discussed, this thesis aims to elucidate the mechanisms by which foodstuffs were moved around the Late Roman city and also the means by which the recovery of ceramic material pertinent to this process influences our perception of changes in the urban environment throughout late antiquity. The primary dataset, through which the methodology of this study will be tested and upon which its principal conclusions are based, will come from a number of Late Antique ceramic assemblages within the city of Rome. As the capital of the Empire and an undisputed nodal point in the web of socio-economic transactions and interactions which produced the macro-scale distribution of goods across the classical and late antique worlds, Rome represents an unmatched opportunity not only to unravel these processes but also to study the socio-political processes at work within the urban centres of the Empire through this medium. Recent excavations within the city have produced a large corpus of, as yet, under utilised Late Roman ceramic material from a number of sites. This material has begun to move into the public domain with the publications associated with the excavations of the *Crypta Balbi* being particularly pertinent[413]. These two volumes have brought both the study of the city in the transitional period between Late Antiquity and the medieval period and the importance of ceramic studies to the forefront of academic discourse[414]. This publication also provides a point of reference for other work previously carried out within the city under various auspices[415]. As a general survey of Late Antique sites in Rome, this volume is necessarily lacking in some detail and cannot be considered to be exhaustive. It is however extremely useful as a gazetteer of a significant proportion of those Late Antique sites within the city which have been subject to recent excavation or re-study.

This work utilises the data provided through the publications associated with the *Crypta Balbi* project, excavation reports, archaeological notes of partially published sites and a targeted re-study of assemblages of amphorae from several of the sites in order to provide the platform from which it is possible to revisit the material recovered from these excavations. Where necessary, additional data has been derived from the excavated material in order to create a dataset which will allow for a more fully scientific interpretation of the sites and deposits in question. This also enables a more statistically viable analysis of trends within the material across the assemblages studied. This integrationist, synthetic approach is one which has not previously been attempted with this data and will represent a significant step forward within the discipline.

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[413] The two volumes of "Roma dall'antichita al medioevo" (Arena et al. 2001; Paroli & Venditelli 2004)
[414] Particularly the second "Contesti tardoantichi e altomedioevali" (Paroli & Venditelli 2004)
[415] Tomei 2006

In choosing the assemblages for study it has been important to remain focussed. To this end a study area has been defined along the right bank of the Tiber from the Aurelianic wall in the south to a point approximately level with the modern Ponte Mazzini within which the sites to be investigated are located[416]. The extent of this area is partially conditioned by modern topographical features as these have influenced the locations and extent of archaeological investigations. However it also broadly conforms to the boundaries ascribed to several of the Augustan Regions of Rome[417]. In terms of the ancient topography of the city, the study area used for this thesis comprises of a zone within the walls between the bank of the Tiber and the *Via Triumphalis* North as far as the *Colosseum* and from there it extends from the river and follows the bottom of the valley between the *Esquiline* and the *Palatine/Capitoline* hills. This includes the majority of Regions IV: "*Templum Pacis*"; VIII: "*Forum Romanum vel Magnum*"; X: "*Palatium*"; XI: "*Circus Maximus*" & XIII: "*Aventinus*" while a swathe of region IX: "*Circus Flaminius*" running adjacent to the river is also included. There are a number of reasons why this study area was chosen as opposed to taking a random sample of sites from across the city. Principally the objective has been to focus the research on the area closest to the river but not exclusively to the dockside area of the *Emporium* as it is understood from the historical and epigraphic sources[418]. The riverside area of the city is crucial to developing an understanding of the mechanisms by which goods entered the city. It is not the case however, that the area selected represents homogenous riverine warehousing and dockyard installations. Rather, it is the variety of the urban environment within this zone which makes it particularly suitable as a test-bed for this thesis. Further to this, the topography of the ancient city and the history of archaeological investigation within Rome have ensured that this zone has been the focus of much of the scientific archaeological work during recent years. As such, this zone provides much more suitable data for this study than is available from many of the sites elsewhere in the city.

The study area is then an arbitrary but intuitive means of focussing the research to a particularly relevant area of the city for the purposes of this research. From within this study area it has been necessary to select a number of ceramic assemblages for detailed study. The decision as to which sites should be included has to a certain extent been conditioned by those which are available and have been excavated and published in sufficient detail to enable the methodology of this thesis to be employed in their study. Following an exhaustive investigation into which of the archaeological sites within the study area offered the most potential for this study, a shortlist of ten were chosen for

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[416] Fig. 7.

[417] *Suetonius: Augustus.* 30; *Cassius Dio*: 1 v.8.

[418] The extent of the Emporium is largely defined on the basis of the Horrea type buildings extant on the *Forma Urbis Marmorrea.* Most recently, Rodriguez Almeida 1981.

detailed analysis, any of which have actually produced several assemblages of material. In addition, a further two sites have been included to offer further contextual information[419]. The data from these two sites is essential in determining the background against which to assess the magnitude of the primary deposits and also degree to which the assemblages within the study area are representative of the city in general. From the core ten sites[420], three offer sufficient data to apply the methodology advocated in Chapter 5 fully, whilst the remaining sites offer varying degrees of completeness[421]. Critically there are 6 assemblages from across the study area where either weight data for the amphorae exists or where it has been possible to secure access to the material in order to perform a re-study with the aim of generating weight data for the amphora classes. The quality of the data from these sites is variable, reflecting the difference in excavation strategies and techniques, in which respect it is representative of the variations in the data available from urban sites within Rome. Obviously the ideal solution would have been to secure weight and volume data for all the sites under consideration within the study area, however this was impossible for a number of reasons. The tradition within Italian archaeology is to disregard the weights of the material in favour of counting the diagnostic sherds and estimating vessel numbers. Therefore, time constraints and the uncertain location of some of the excavated material limit the number of sites for which a full re-study is feasible.

This chapter will discuss the data from the sites selected for this thesis. The individual site summaries provide a brief background to the investigation of the deposits considered and a short overview of the data recovered. There is no attempt to provide any broad contextual information to situate the sites within the city as a whole or to directly compare data between the sites. This will be addressed in the following chapter through the methodologies previously discussed.

[419] The basilica of San Sisto Vecchio and Monte Testaccio

[420] Fig. 8.

[421] Detailed tabulated data for each of the assemblages is presented in Appendix D.

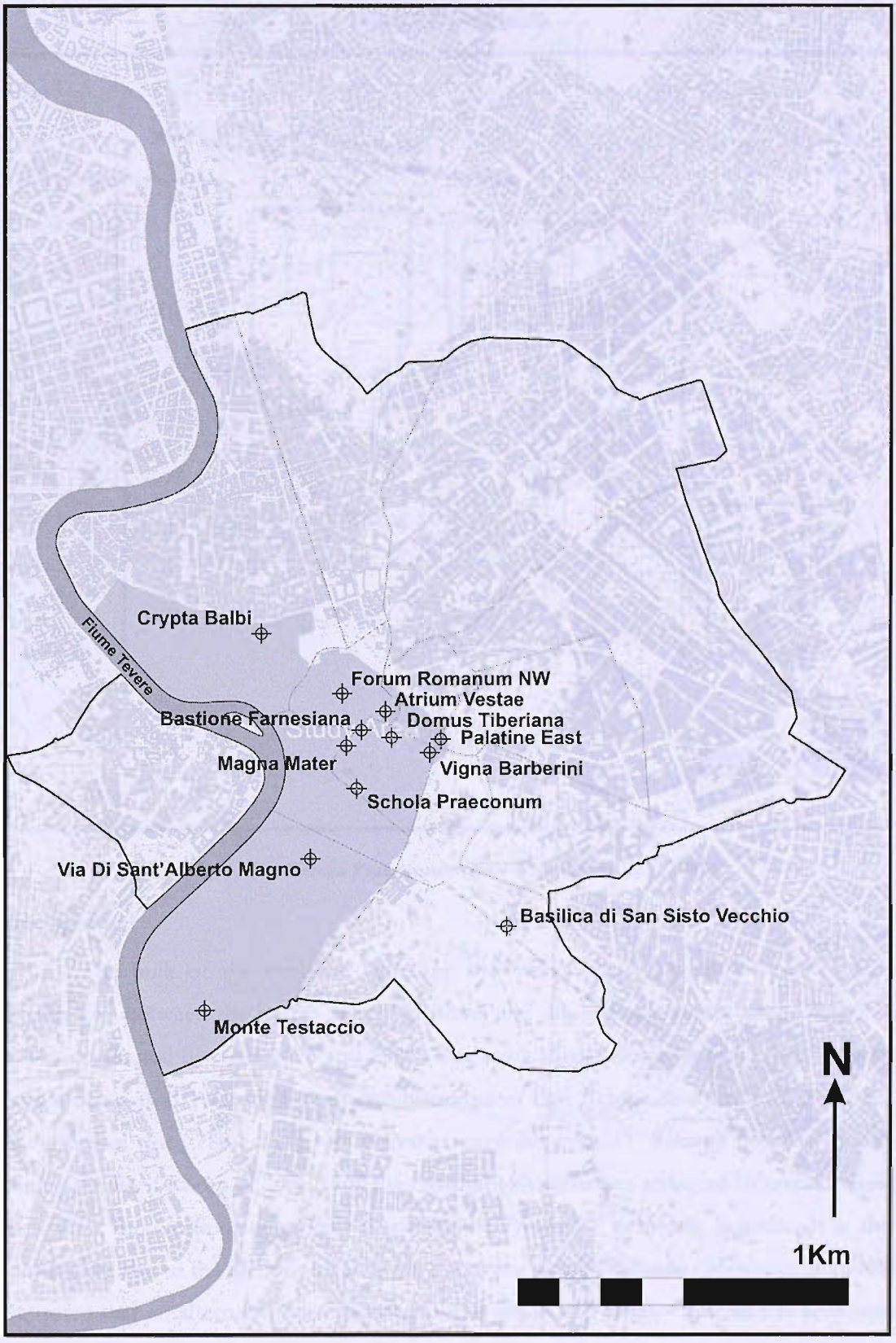

Fig. 8: Location of the 12 sites chosen for this project

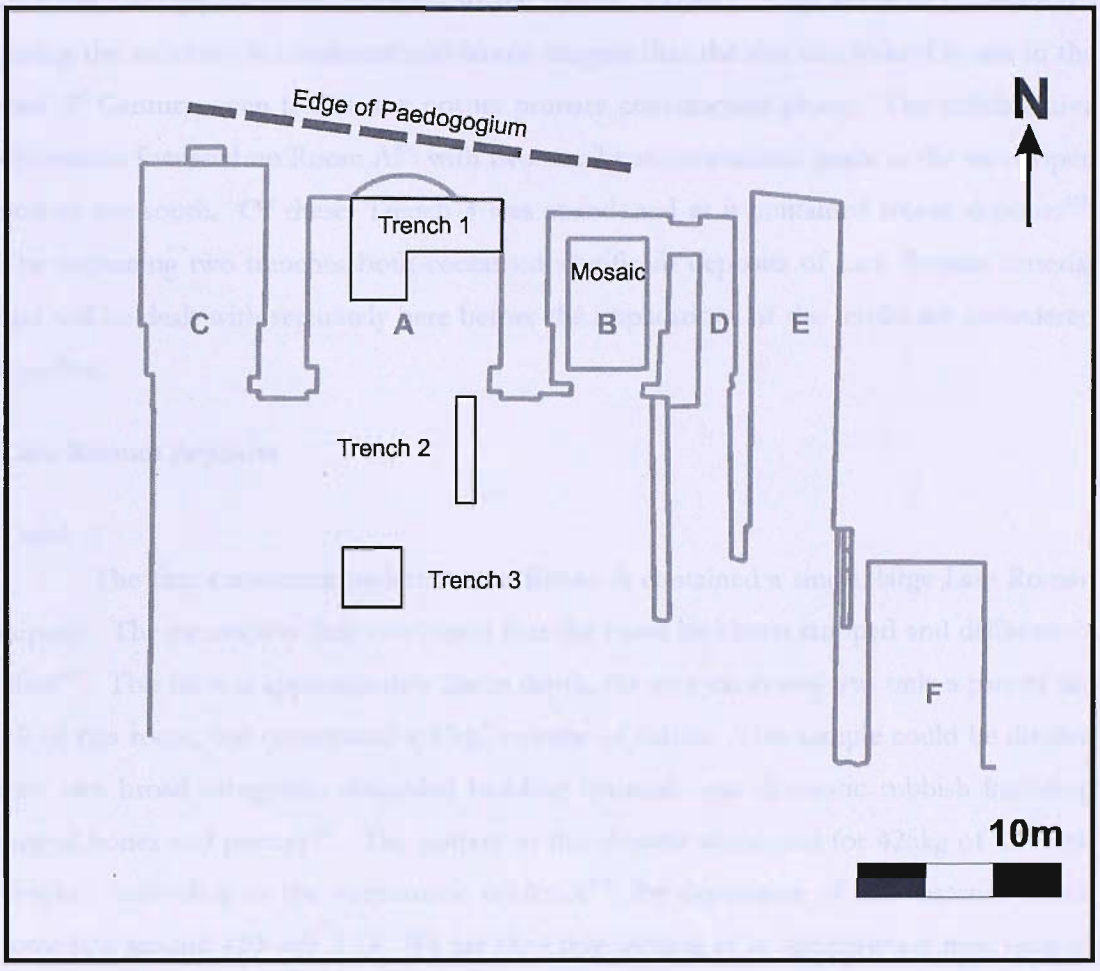

Fig. 9: The Schola Praeconum (after Whitehouse et al. 1982)

Background

The bulk of the evidence from the site comes from a series of collaborative excavations between the British School at Rome and the Soprintendenza Archeologica di Roma conducted between 1978 and 1980. The work carried out over three short seasons within this period, recovered significant quantities of Late Roman material[422]. The site has been known since 1886 when wall paintings were discovered[423] through the clearance of the upper fill of Room B[424]. In 1932 the remaining material was removed to reveal a black and white mosaic floor apparently depicting the *Praecones*[425] or public heralds. It is this which gave rise to the identification of the site as the *Schola Praeconum*. However, it should be noted that an alternative identification of the site as the *Domus Gelotiana* has also been proposed[426]. The construction of the building appears to be fairly securely dated through;

[422] Whitehouse 1979; Whitehouse et al. 1982, 1985.
[423] Marchetti 1892
[424] I here follow the plan of Whitehouse et al. in my description of the rooms and their labelling.
[425] The site name was derived from this floor soon after its discovery.
[426] LTUR II: 110

the brickwork[427] to the Severan period or slightly later, the paintings[428] to the period 220-240 and through the mosaic floor[429] to the mid 3rd Century. The available evidence for dating the structure is consistent and would suggest that the site was indeed in use in the mid 3rd Century, even if this was not its primary construction phase. The collaborative excavation focussed on Room A[430] with two small test excavations made in the more open area to the south. Of these, Trench 3 was abandoned as it contained recent deposits[431]. The remaining two trenches both contained significant deposits of Late Roman material and will be dealt with separately here before the implications of the results are considered together.

Late Roman deposits

Trench 1:

The first excavation undertaken in Room A contained a single, large Late Roman deposit. The excavation then confirmed that the room had been stripped and deliberately filled[432]. This fill was approximately 2m in depth, the area excavated was only a part of the fill of this room, but constituted a $13m^3$ volume of debris. This sample could be divided into two broad categories, discarded building materials and domestic rubbish including animal bones and pottery[433]. The pottery in this deposit accounted for 425kg of the total weight. According to the numismatic evidence[434], the deposition of this material ceased sometime around 430-440 A.D. We are therefore looking at an approximate time span of 200 years. However, as previously stated, the nature of the deposit suggests that this was one continuous process rather than a series of distinct episodes. The notion of such a deposit accumulating over 200 years is unfeasible so we must conclude that within these two centuries there is a single, relatively short period in which the building was used as a dump for waste material.

The pottery was classified both on the basis of fabric and form where this could be discerned. These were then aggregated into broad groupings on the basis of their geographical provenance. The fabrics attributed to commercial amphorae accounted for 9,950 sherds out of a total of 22,323, or 44.6% by quantity. By weight they accounted for 60% of all pottery recovered[435]. Of the amphorae recovered, North African fabrics accounted for 42% by quantity and 62% by weight. Though the exact location of the

[427] Van Deman, 1916
[428] Cagiano de Azevedo, 1947-49
[429] Blake, 1940: 96-7
[430] Located immediately to the west of the previously excavated Room B.
[431] Whitehouse et al. 1985: 163
[432] Whitehouse et al. 1982: 54
[433] The authors point out that this may be refuse from a warehouse rather than from housing.
[434] Whitehouse et al. 1982: 54
[435] Full figures are attached in Appendix D.

production sites for these amphorae was unknown at the time the article was written, they could be confidently placed within the province of Africa Proconsularis[436]. Of these African amphorae, parallels have been found in the Ostia (*Terme delle Nuotatore*) type series and from examples recovered in excavations at Carthage. Analysis of the residues left on the African sherds confirms their use for the transportation of oil.

Trench 2:

This trench and the abandoned Trench 3 were initiated in an attempt to ascertain the extent of the deposit investigated in Trench 1. This second trench was excavated to a depth of less than 1m within which were two distinct deposits[437]. The upper of these was described as 'superficial' whilst the lower was similar to the deposit excavated in Trench 1[438]. The main difference being that on the evidence of the ARS recovered[439], it was deposited 'within a generation or so' of c. 600'[440], much later than the previously considered deposit. The pottery recovered from this trench was classified in the same way as that from Trench 1. In this much smaller deposit, the fabrics attributed to transport amphorae accounted for 327 sherds from a total of 1,141, or 28.7% by quantity. By weight, the amphorae accounted for 7.9kg from a total of 15.4kg[441]. Of these amphorae remains, those attributed a North African provenance accounted for 40.7% by count and 58.2% by weight.

As a means of assessing the variations which can result from the use of different counting methods through the deposits excavated at the *Schola Praeconum*, it is useful to extrapolate the likely number of vessels which form the deposit based on the most common criteria. Based on the revised tabulated data[442] for the Trench 1 deposit and a nominal weight suggested by Keay[443] of 17 Kg for an intact Africana 1 amphora it should be possible to expand upon the statistical analyses above. The excavated sample of Trench 1 was $13m^3$ within which were 475 Kg of marble and 423 Kg of ceramic material. Of this 423 Kg of ceramic material, 157.22 Kg was defined as African amphora fabric. Using the basis of Keay's 17 Kg for a complete vessel, the material recovered would only account for 9.25 complete amphorae. However, the number of diagnostic sherds

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436 This potentially could be remedied with consultation of Kiln site surveys.
437 Whitehouse et al. 1985: 163.
438 ibid.
439 This could be open to re-interpretation based on a slightly earlier date derived by Richard Reece from the numismatic evidence. ibid. 185. However, even this revised date would put the deposit sometime in the early 6th century.
440 ibid.
441 51.3% by weight.
442 In the researching of this paper a number of statistical discrepancies were discovered in the original report. These have been corrected based on the detailed breakdowns in pottery classification and the totals, percentages and relationships re-evaluated on this basis.
443 Keay 1998a: 152; Peacock & Williams 1986

recovered is sufficient for up to 49[444] different vessels. As a result of this, there would appear to only be sufficient material (by weight) to account for 25% of the expected vessels based on the diagnostic sherds. Clearly this is a significant discrepancy and needs explaining. The first possibility is that due to the incomplete nature of the excavation[445] there is an abnormally large proportion of rim, handle and foot sherds in the material recovered. Or that for some reason the body sherds are not being deposited with the other parts of the amphorae. It is unlikely that there is a differential rate of survival between body sherds and rims, handles and feet as they are all made of the same fabric. As there is evidence for the re-use of amphora bodies as drains, in vaulting and for aggregate, this possibility is perhaps the most likely. At this stage though, it is uncertain whether these possible forms of re-use can account for the large discrepancy in the material and more work is needed. Aside from these rationalisations, the divergence between the different measures is striking and one which is to be expected, though not to a uniform or predictable degree, within all assemblages. The vastly different vessel totals, which can be reached through examination of the same assemblage of material, should illustrate why an impartial methodology for quantifying material is essential.

Interpretation

In the report[446] it is suggested that the evidence from the *Schola Praeconum* shows continued economic links between Carthage and Rome well into the 7th Century. This interpretation is largely dependent upon the material in the later deposit[447] not being residual. The problem with this interpretation is that the deposits are dated on the basis of the numismatic evidence and the ARS found within them. In the later deposit this is exacerbated by the discrepancy between the later ARS based date and that advanced by Reece on the basis of the coins[448]. An early 6th century date for at least some of the material, if not the date of deposition would be more indicative of a continuous low-level importation of these goods rather than a break of nearly 150 years as suggested by Whitehouse. The size of the later deposit also makes it less useful as a tool for understanding these processes on its own merit. However, in conjunction with the earlier deposit in Trench 1 there is great potential to explore the nature of the food supply in Rome in this period. As the date of the Trench 1 deposit is secure and consistent on the basis of the coins, ARS pottery and the amphorae themselves we can confidently state that it must have been made in the first half of the 5th Century. The quantity of material

[444] The absolute minimum, allowing for sherds of a single vessel being mistaken for other examples of the same type is 17.
[445] As previously mentioned the excavators restricted investigation of this deposit to a sample of 13 cubic metres.
[446] Whitehouse et al. 1985.
[447] Here Trench 2, though in the report this is the deposit referred to as SPII
[448] See above.

recovered from this deposit is also significant in that it represents a very real, large amount of amphora refuse. Of the deposited amphorae, North African fabric types are predominant. This is expected, but the quantities are significant in that this area was near the monumental centre of the city and some distance from the docks, which were the point of entry for these goods. The deposit cannot be seen as a continual trickle of refuse over several decades. Rather, as stated above, it is a single, coherent depositional episode. In order for this to have taken place in what had previously been a public building must have required some kind of planning decision to be taken. When this is put within the context that construction materials were also found within the deposit, it becomes feasible to suggest that this decision coincided with a re-modelling of the area. In this case there can be no doubt that someone of importance within the civil government must have been responsible for that decision.

If the report on the excavations of the *Schola Praeconum* is a comprehensive examination of the deposits excavated, it may be reasonable to ask what more can be gleaned from this data. In short, a great deal. At the time the reports were published the lack of comparative material meant that the discussion of the implications of the finds were limited to comparison with the few deposits at Ostia and Carthage which provided much of the typology for studying the amphorae. Since then, there have been several more late deposits excavated and the quantity of comparable material is vastly increased. Yet, to date no attempt has been made to synthesise these disparate sources into a single body of work dealing with the system of food supply in Rome. It is impossible to make absolutely certain judgements based on a cursory examination of a single site, but there are some suggestions which might be tentatively posited at this stage. Firstly, the existence of a large deposit of amphora sherds in this location is suggestive of a change from the pattern of the 3rd Century where huge quantities of Dressel 20 amphorae were deposited at *Monte Testaccio*. Although the earlier *Schola Praeconum* deposit is almost two centuries later, the possibility of it representing a change in the distributive mechanism for the *Annona* must not be overlooked. Secondly, it is important for our understanding of the way in which the inhabitants of Late Antique Rome thought about and used their city. It seems inconceivable that during the High Empire anyone would be allowed to use the public buildings alongside the Palatine as refuse dumps. What we may be seeing in these deposits is a very physical manifestation of the Roman populace adjusting to the changing role of their city within the Late Roman Empire.

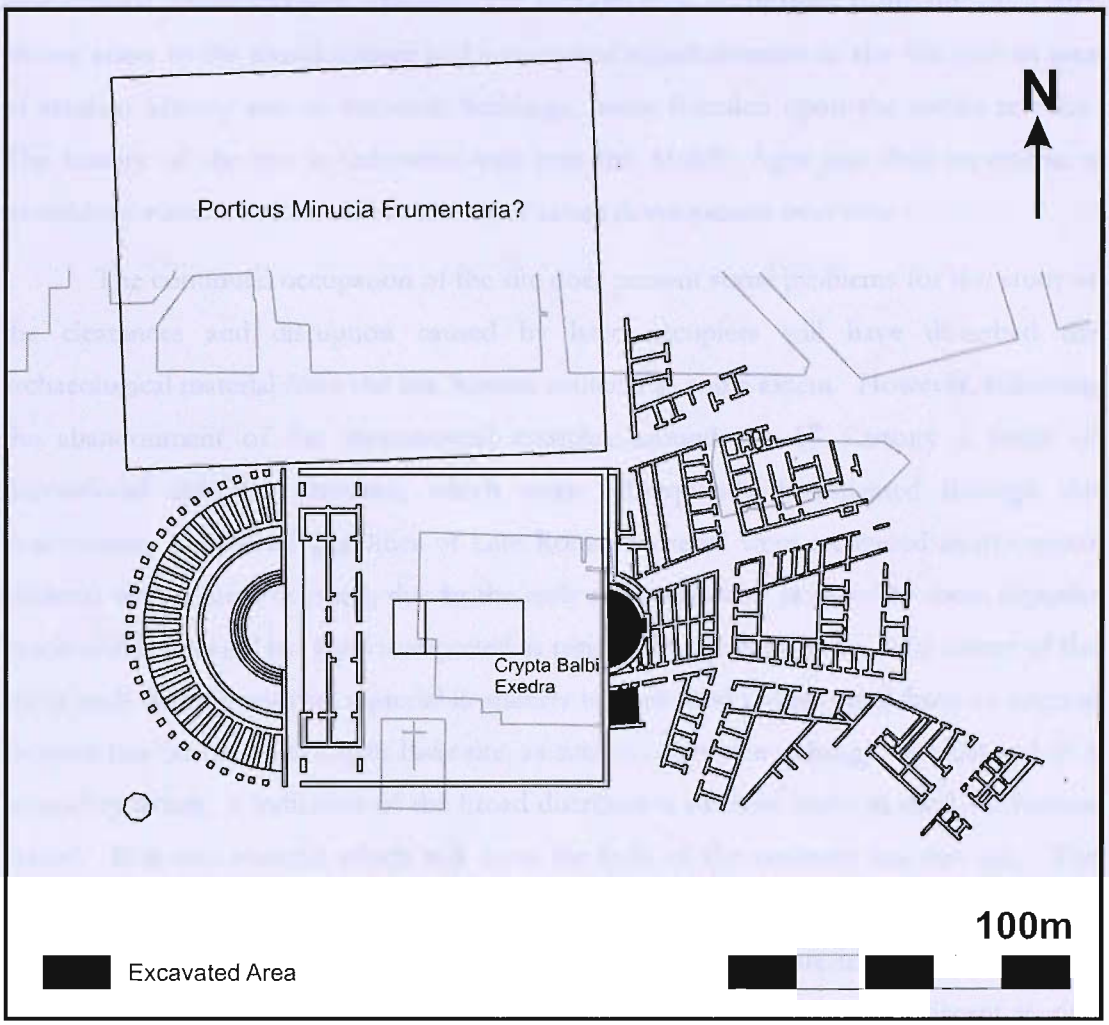

Fig. 10: The Crypta Balbi

Background

The *Crypta Balbi* Project was begun under the auspices of a law passed on the 23rd of March 1981, which made urgent provisions for the protection of the archaeological patrimony of Rome[449]. The *Crypta Balbi* project was initiated with the intent of discovering the history through all periods of an area of the city, with no particular focus on the Classical remains. As such, this project represented a significant milestone in Italian urban archaeology. The excavations, carried out in collaboration between the Soprintendenza Archeologica di Roma and the University of Siena, had significant implications for both the understanding of urban transformation within the area of the project and also for the techniques and methodologies which would be employed in the excavation of urban sites in the future. The site is located to the south of the modern Via delle Botteghe Oscure approximately mid-way between the Piazza Venezia and the Largo Argentina. The site is so called after the theatre and porticus built by L. Cornelius Balbus, a contemporary and

[449] 'proveddimenti urgenti per la protezione del patrimonio archeologico di Roma' Legge 23.3.81 n. 92. As described in Manacorda. (1982: 5).

associate of Augustus, which are partially located within the area of the excavations. This monumental public complex represents the first phase of occupation at the site. The later phases attest to the abandonment and subsequent transformation of the site into an area of artesian activity and of domestic buildings, many founded upon the earlier remains. The history of the site is unbroken well into the Middle Ages and thus represents a particularly vibrant and accessible history of urban development over time.

The continued occupation of the site does present some problems for this study as the clearances and disruption caused by later occupiers will have disturbed the archaeological material from the late Roman contexts to some extent. However, following the abandonment of the monumental complex around the 5th Century a series of depositional episodes occurred, which were subsequently investigated through the excavations. Significant quantities of Late Roman material were recovered from various contexts within these deposits, due to the early medieval dates ascribed to these deposits much of this material has been interpreted as residual by the excavators. The nature of the site is such that this residual material is unlikely to have been re-deposited from an original location too far from the *Crypta Balbi* site, as such it's presence although residual and of a secondary nature, is indicative of the broad distribution of these items in the Late Roman period. It is this material which will form the bulk of the evidence for this site. The excavations in the garden of the Conservatory of S. Caterina della Rosa[450] and the exedra of the *Crypta Balbi* itself[451] both produced quantities of Roman material though the foci of the publications are on much later periods. These two areas, although adjacent to one another are dealt with separately in the reports and so will also be here. In addition to these deposits a more significant Late Roman deposit from an insula immediately adjacent to the Crypta is in the process of excavation and study[452]. This deposit will also form a key part of the dataset from this site.

Late Roman deposits

As previously stated, the majority of the Late Roman material comes from two areas of excavation within the site of the *Crypta*. The first of these is in the garden of the Conservatory of S. Caterina della Rosa and the second in the exedra of the portico of the theatre[453]. Both these deposits contain quantities of residual Roman ceramic material and as such they provide a particularly important means of testing the methodology outlined in Chapter 6[454]. As the material present is so obviously residual and at such a temporal

[450] Volpe 1985 & Spanu & Tesei 1989
[451] Cipriano 1990
[452] By the time of the submission of this thesis excavation should have been completed though the ceramic material is still under study and hence is as yet unpublished.
[453] Fig. 10.
[454] See pp 74; 76-77

remove from its period of initial use, it cannot convincingly be interpreted as directly relating to distributive mechanisms or patterns indicative thereof. However, the normal uncertainty in dealing with residual material is mitigated somewhat as there is a clear distinction between the residual Roman remains and the much later medieval constituents of the deposits. However, both of these assemblages are compromised by the recording strategy employed and so it was necessary to secure access to the much smaller, as-yet unpublished assemblage from the area to the south east of the exedra.

The Exedra:

The total sample size for this deposit is in the region of 100,000 ceramic fragments. This therefore gives us a more than adequate statistically viable sample upon which to test the methodology. As the larger of the two excavated areas, this deposit will be the principle point of investigation for the *Crypta Balbi* site itself. The deposit in question consists of a series of stratigraphic layers; the lower of these (hereafter Layer 1) was deposited over the pavement of the exedra and is seemingly homogenous, with a volume of nearly 80 cubic metres dated to the 7th Century[455]. Laying over this was an 8th Century deposit (Layer 2) of approximately 50 cubic metres, itself partially overlain by a re-deposition (Layer 3) of material consistent with that of Layer 1 comprising approximately 20 cubic metres of material. The excavators explain this occurrence through removal and thus up-cast of material from the initial deposition in order to permit the construction of a lime kiln within the area of the exedra in the early medieval period[456]. As the surface area of the exedra is approximately 200m^2, these three layers combined would represent an average depth of deposit consistent with only 0.75m[457]. Though the depth of this deposit was not in fact uniform across the floor area, the figure arrived at previously gives perhaps a more accessible order of magnitude than the volumes given in the report. The area excavated within the exedra of the *Crypta* initially produced an incredibly small quantity c. 776 fragments[458] of Roman amphorae seemingly derived from the re-deposited up-cast Layer 3[459], though the excavation of the remaining contexts would put the total figure somewhat closer to a value of 45,000 fragments of amphorae[460]. Using the restored count, approximately 68%[461] are Late Roman African amphorae, which ostensibly is a huge preponderance within the corpus of data. The major problem we encounter with the presentation of the results is the lack of any quantitative value for the size of the individual sherds as no weight data is given. Furthermore, this lack of data pertaining to the weight

[455] Sagui 2002: 8; Sagui & Rovelli 1998: 175
[456] Sagui & Rovelli 1998: 182
[457] This figure assumes a uniform depth, which is clearly not the case; see Sagui & Rovelli 1998 Fig. 1b
[458] c. 58% of the total roman material from the deposit at that time. The total quantity of ceramic fragments at the time was 1339.
[459] Cipriano 1990
[460] The total given is 43,500
[461] Figures from Sagui 2002 disregarding un-provenanced micaceous fabric see Appendix D.

of the ceramic material creates difficulty in calculating the density of the ceramic classes within the deposit and prevents an appraisal of fragmentation through this measurement within what is an otherwise well recorded deposit it is noted that restoration of some fragments was undertaken during the post-excavation process. This partially mitigates against the effect of accidental modern breakage during excavation on the sherd counts but still does not allow the sherd sizes and degree of vessel fragmentation to be confidently inferred. However, the inclusion of an assessment of the number of vessels present could be used to provide a rough approximation of the weight of certain fabrics and the possibility of calculating the density of vessels within the deposit[462]. Although this process is not ideal, it at least allows a broad comparison to be made between sites and deposits even if at a lesser degree of precision than would be possible with a weight/density calculation.

Although only a very rough approximation, it is possible to reconstruct the weight of pottery recovered based on the minimum estimated number of vessels[463]. For example, if we allow each amphora an average weight of 15Kg to account for differences in size and the significant preponderance of *Spatheia* among the identified African amphorae, a rough calculation of their total weight can be attempted. The total (minimum) number of African amphorae is 684; this would suggest a total weight somewhere in the region of 10.25 metric tonnes distributed through a volume of 150 m^3 of deposited material. The density of Late Roman African amphorae can therefore be calculated to be approximately $70^{kg}/_{m3}$. This is clearly a very high density of material and should have significant implications for the interpretation of the depositional process in this area. Although as has previously been determined for the *Schola Praeconum*, the actual total quantity by weight may be only 25% of this reconstructed total and hence give a density within the deposit of approximately $15.75^{kg}/_{m3}$.

The Garden Excavation:

The garden excavations represent by far the larger of the two areas investigated however to date only a relatively small quantity of ceramic material has been recovered. These deposits will be utilised as a comparative assemblage to refine the interpretations and hypotheses drawn from the detailed study of the exedra. The Roman ceramic material[464] accounts for fewer than 10% of the total pottery recovered in all phases of the

[462] This is however methodologically problematic due to the subjectivity of the process and the methodological problems associated with estimating numbers of vessels as outlined in the methodology chapter.

[463] This is however a seriously tenuous calculation and only of use in assessing a very rough order of magnitude.

[464] 2234 fragments between periods O & V; 2921 including also period VI

deposit and significantly less in the final phases IV & V[465]. Of the Roman ceramics, the amphorae constitute by far the largest group[466] with c. 1420 fragments being recovered up to period V[467]. Using just the figures for the earlier periods the amphorae are by far the single largest grouping of material[468] within the deposit. Though the grouping of "African" amphorae in this instance includes Tripolitania and Mauritania one can see from the interim ceramic report[469] that the quantities for amphorae originating in Byzacena or Proconsularis are clearly the largest sub-grouping within this.

The Mithraeum Excavations

The excavations outside the exedra of the *Crypta* are the most recent archaeological interventions in the area of the *Crypta Balbi.* The deposit under consideration here is an as yet unpublished assemblage of material recovered from a small room in the insula complex located to the southeast of the exedra of the *porticus* of the Theatre of *Balbus.* The excavations in this area to the southeast of the *Crypta Balbi* have brought to light several rooms within buildings dating to the Trajanic/Hadrianic period. These buildings are part of a series of *Insulae* extending east from the *porticus* of *Balbus* which are represented on a fragment of the *Forma Urbis Marmorea*[470]. The buildings faced onto a street which was paved with basalt blocks. From the Vestibule (*Vestibolo*) at the foot of the stairs is the entrance to an *Aula*, across the street from which is a landing from which there are a set of stairs giving access to the *Mithraeum.* The *Mithraeum* was installed in a large room on the ground floor of one of the buildings in the 3rd century A.D. Originally the room of the *Mithraeum* was directly accessible from the portico of the exedra, which in the Imperial period was transformed into a latrine, from where it was also possible to rejoin the staircase leading to the upper levels of the building. Remains of the ramp have survived and also the point at which the ramp joins the upper level. The installation of the *Mithraeum* therefore prevented direct access between the portico of the exedra and the room in which it was located. In the 4th century the access between the portico and the room to the north of the *Mithraeum* was re-established for the purposes of the cult, as attested by the presence of a basin raised to be accessible between several levels; the room of the *Aula* was divided by columns of Proconnesian marble with red painted capitals whilst the central part of the room was paved in *Opus Sectile.* At the openings on to the street a pair of plastered and painted niches, one rectangular, one semicircular were constructed, the latter of which was subsequently turned into a fountain. In the mid-5th

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[465] Manacorda 1985a
[466] Volpe 1985. 155
[467] 1827 including period VI
[468] According to the figures given in the report, this equates to approximately 63.5% of the total ceramic material dating to the Roman period. Furthermore, 67% of these are believed to be of African origin.
[469] Volpe 1985. 158 - 160
[470] Carretoni et al. 1960: 106; 153; plates 10; 32; 57.

century the *Mithraeum* was demolished and together with the adjacent room transformed into a stable.

The rooms remained in use during the 6th century. Within the vestibule several infant burials within amphorae have been found, analogous to those in the adjacent exedra. In a corner of the *Aula* there are traces of a hearth presumably used for cooking, as there were discoveries of the remains of food and cooking equipment. At the beginning of the 7th century an accumulation of debris associated with the destruction of the vaults supporting the upper floors of the building filled the room to a depth of approximately 7 metres in which state it remained until the present day[471].

The material under study here is derived from a series of deposits in the area described as an *Aula*. Contexts 118-123 are abandonment layers from the *Aula* though the distinctions between the layers are an artifact of the excavation recording strategy rather than being representative of significant differences in the nature of the deposits. As distinct stratigraphic units they can be expected to represent a series of discrete depositional episodes though their similarity would indicate that these occurred within a fairly short timescale. The material available for this study is a representative sample of 30% of the total material recovered from contexts 118-123, treated as single entity due to the uniform nature of the deposits. The retention of the body sherds in this assemblage makes it one of the most suitable for research based on the methodology outlined previously. As the excavation and study of this deposit is ongoing there is therefore the opportunity for better data control than with a re-study of material which has been in storage for some time and undergone curatorial processing. This has in many cases led to the removal and destruction of material not deemed to be valuable enough for long term retention. A number of ceramic examples have been reconstructed to a greater or lesser degree; in these cases both an initial and a reconstructed sherd count will be given to accurately reflect the degree of fragmentation encountered in the recovery of the assemblage. The overall number of amphora sherds in this sample was 2,426 weighing 61.94Kg. Though not an exceptionally large assemblage it is clearly a significant quantity of waste amphorae. Of this, the African forms represent 38.6% by count and 45.5% by weight of the total, Eastern forms represent 33.9% by count and 32.2% by weight whilst Southern Italian/Sicilian types account for 23.2% by count and 18.3% by weight.

Interpretation

Though not at this stage exhaustive, the published data available from the *Crypta Balbi* excavations present a large corpus of material with which to elucidate the questions

[471] All the information for this part of the site is derived from personal communication from Dott'ssa Laura Venditelli.

under consideration in this thesis. Much has already been written about the development of the site and the activities which were carried out within its area through the various phases of its occupation and use[472]. It is thus unnecessary to reiterate the history of the site, however the particular concerns of this study have not been addressed so fully in the existing literature. The nature of the stratigraphy in the exedra clearly suggests that there were originally two primary depositional episodes in the 7th and 8th Centuries with the later construction of the lime kiln causing an up-cast of material from the 7th Century layer to be re-deposited in a secondary context over a part of the 8th Century layer. The underlying though much smaller 5th and 6th Century deposits associated with the abandonment and partial destruction of the building argue for its continued use until just prior to the formation of the first deposit. The statistically significant deposits and hence the ones which are discussed above, are the later deposits. These are dated to the 7th and 8th Centuries largely on the basis of numismatic evidence recovered during the excavations[473]. If this dating is secure, there is a significant lapse between the last period of use and the time of deposition of the amphorae within these deposits. The stratigraphic relationships within the exedra and the continued presence of the Late Roman ceramics in the 8th Century layer excludes the possibility of 7th Century coinage having contaminated an earlier deposit and confirms the residuality of the ceramic material. Residual or re-used this material is being deposited an unusually long time after its period of manufacture and primary use. The sheer quantity of material present and the likely density of amphorae within the exedra deposit are suggestive of a short, concentrated period of deposition. This could be interpreted as resulting from the consolidation of a fairly disorganised system of waste disposal within the immediate vicinity, possibly connected with early re-occupation of the *Campus Martius*. However, drawing a meaningful interpretation for the implications of this for life in the Late Empire requires a great deal of care as the deposits appear to have been made at such a great temporal remove. The small size of the 5th and 6th Century deposits at the bottom of the stratigraphic sequence argue against there being any large-scale use of the site for waste disposal prior to the 7th Century. The complete lack of any deposits earlier than the 5th century in this section of the site suggests one of two possibilities, either there was deposition within the site prior to the 5th Century but it was entirely removed prior to the remaining deposits being formed or, as is more likely, the area remained in use in its original form until the 5th Century. The really interesting question when dealing with this site does not concern the quantities of ceramic material recovered so much as the reasons why these quantities seem to have been deposited at such a great temporal remove from the manufacture of the artefacts. Whilst it is possible

[472] Manacorda 1985; Saguí 1998; 2001; 2002 etc.
[473] Saguí 2002

to conceive of some continuance of use in certain situations, the quantities involved suggest that continued use or re-use of the vessels is not a primary consideration. We must therefore be dealing with primarily re-deposited contexts. These deposits can therefore reveal some aspects of life in the area of the *Crypta Balbi* at two stages in the development of the urban landscape. Firstly and perhaps most obviously, the deposited material must have come from somewhere. A concentrated deposit of this nature is indicative of planned deposition, likely as a result of re-occupation of areas where there was previously a greater number of smaller scale deposits. This fits with the known history of the *Campus Martius*, it is not a huge leap to associate this re-deposition with a re-population of the *Campus Martius* and the associated clearances which would be necessary to provide living space. The second period about which an interpretation of the material can offer insight is the likely period of primary deposition in the 5th century. Whilst it is not possible to ascribe motives to the relative emptiness of the *Crypta*, it is possible to suggest that the deposition of ceramic debris in the surrounding area can reveal the degree to which the *Campus Martius* was used and occupied in this period. If the hypothesis that the *Crypta Balbi* was associated with the distribution of the *frumentationes* is viable then this may provide a potential reason for why until the 5th Century it was considered important to keep the *Crypta* free of debris. The evidence suggests that there was a concentrated deposition within the exedra of the *Crypta* in the 7th Century, with a further, similar deposit in the 8th Century. This is clearly not the case in the 5th or 6th Centuries as evidenced by the smaller deposits which were found stratigraphically sealed by the deposits mentioned previously as layers 1-3. The most likely explanation for this is that during the intervening period, deposits were simply building up wherever was convenient. Whether as a result of a declining population, a breakdown in civil authority or the cessation of municipal services for the removal of waste, the residents of the *Campus Martius* were not prevented from disposing of their waste in whichever areas were available.

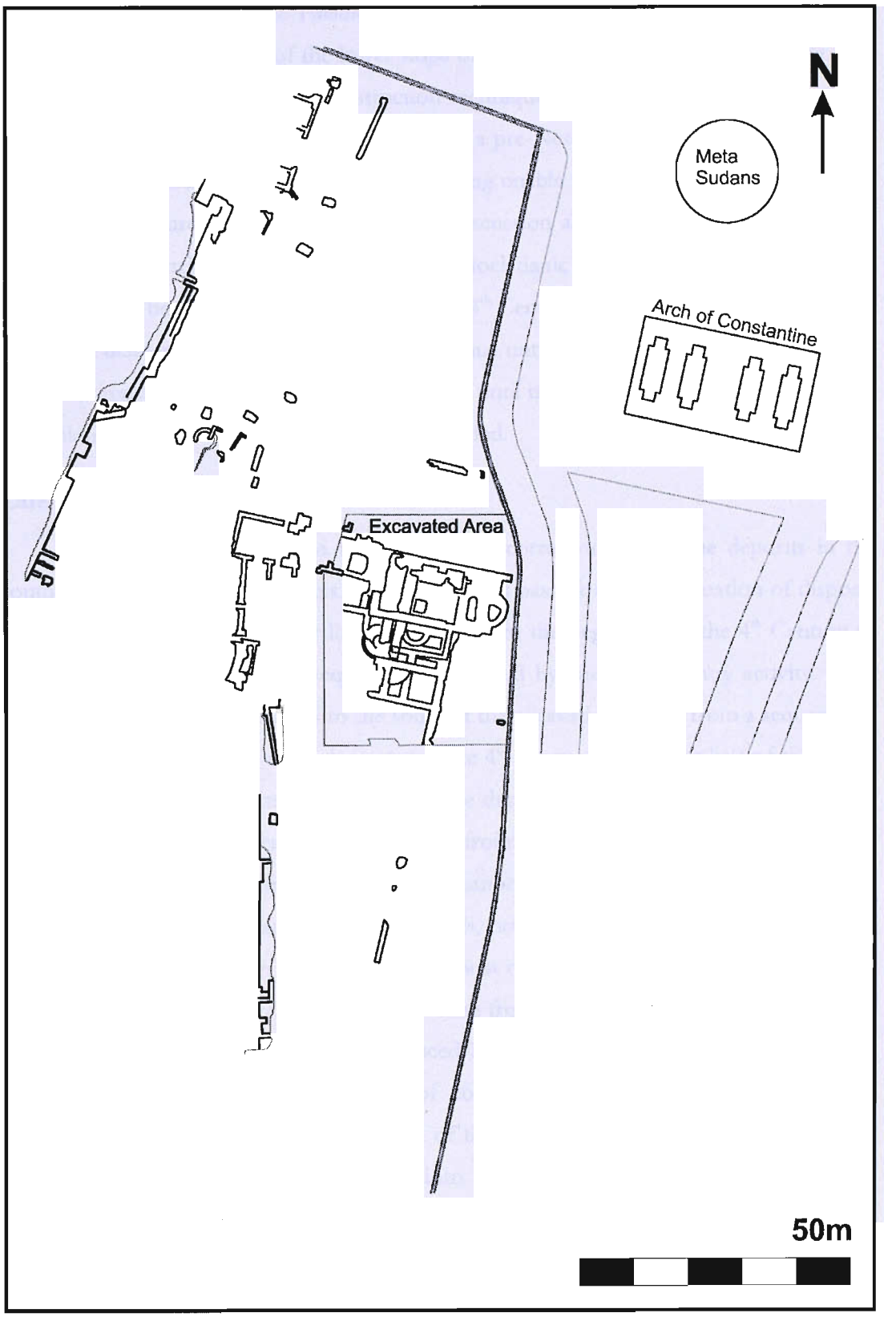

Fig. 11: Late Roman Domus on the East slope of the Palatine (after Hostetter et al. 1994)

Background

Our knowledge of this site is based largely upon the excavations carried out through a joint project between the Soprintendenza di Archeologica di Roma and the

American Academy in Rome[474]. The work was carried out between 1989 and 1991 in an area to the north east of the *Palatine* adjacent to the Arch of Constantine[475]. The area under investigation consists of the lower slope of the hill adjacent to the modern Via di S. Gregorio. On the basis of the construction techniques used, the authors of the report have dated the earliest phases of construction to a pre-Neronian phase[476]. They also posit an Antonine rebuilding though they admit to being unable as yet to determine the form of these early structures[477]. The majority of the discussion about the building is concerned with structures attributed to the Severan and Diocletianic periods. The southern rooms appear to have been abandoned before the early 4th Century A.D. and then infilled through a series of deliberate waste deposits which continue until at least the mid 5th Century. The northern area of the excavation continued in use until much later although the function of the building is debatable as little material is recorded.

Late Roman deposits

The main area studied in the finds report corresponds with the deposits in the southern sector of the site[478]. This provides a useful basis for the examination of disposal patterns within a chronologically limited period from the beginning of the 4th Century to the mid 5th Century when the sequence is truncated by late 19th Century activity. The pottery groups found in the areas to the south of the excavations come from a sequence of 9 contexts dating from the second quarter of the 4th Century to the first half of the 5th[479]. The nature of these contexts is taken to indicate that they consisted of refuse disposed in short episodes of a few decades. The material from the deposits is categorised by weight and so may present difficulties in ascertaining numbers of vessels[480]. By weight, amphorae represent by far the greatest percentage of finds, however one must account for the fact that amphorae are far larger and heavier than most other types of pottery. However, it is possible to calculate the total weight of amphorae from the deposits studied. Context A38 produced 177.63 kg of amphorae, 37 produced 70.07 and 36 produced 142.56. These are clearly large quantities when taken out of context, however they are un-informative without information relating to the volume of the contexts from which they are derived. The excavation report offers little insight into the significance of the amphorae figures short of suggesting that there is a decline in the proportion of amphorae to other pottery

[474] Hostetter, E. et al. 1994.
[475] Hostetter et al. 1994: 131
[476] This is based on the reticulate work being "framed" by tufa blocks. Lugli (1957) believes this technique of construction to be used in Rome up until the time of Nero.
[477] Hostetter et al. 1994: 139.
[478] Pena 1994: 154
[479] Pena 1994: 154
[480] The amphorae are treated slightly differently; they have percentages of rims & handles from definable geographic regions. This still leaves something to be desired as there are no absolute weights by deposit within a given area. It will be very difficult to calculate a density for the individual types at this stage.

types in the late 4th/early 5th Century and that the predominant provenance of these vessels was Tunisia. This is consistent with other sites in Rome and elsewhere[481].

A more fully published deposit is that of A105[482]. The pottery from this deposit has merited an extensive discussion and publication by monograph, which is extremely beneficial for this study. However, the manner of the recording of this data immediately appears to be problematic. The broad functional categorisation of the pottery groups omits an undefined quantity of data for unclassified and generic African amphorae. Whilst this appears to only relate to body sherds[483], the omission is significant in revealing the priorities of the author. The end result is a catalogue which is a very useful break down of the amphorae by type and by provenance. The inclusion of measures for vessel equivalence is a helpful tool for immediately gauging the relative magnitudes of the amphorae in the deposit. The most immediately significant statistic is the discrepancy between the proportion of amphorae to other ceramics by weight and by sherd count[484]. There are a number of conclusions which can be drawn from these figures. Firstly, as the weight is by far the larger measure it is reasonable to suggest that the amphorae are less fragmentary than the other coarse wares. However, the raw figures show similar numbers of sherds over the classes which are suggestive of a similar degree of fragmentation with the greater weight of amphorae probably being representative of their greater overall mass and their thicker fabric. This is borne out by the estimations of vessel numbers with amphorae accounting for fewer than 25% of the total.

Of these amphorae, we are only able to make a comparison by weight, without recourse to the check measurement of the sherd count. As expected, almost half of all provenanced types are African[485] and as at least some of the unclassified sherds are likely to be of African types, this figure may well exceed 50%. Of these, all but 11 of the estimated 51 African amphorae recovered are derived from Africa Proconsularis (modern Tunisia). What is surprising is that the estimated number of Tunisian vessels is slightly lower than the total of Italian amphorae, the majority of which come from the centre/south of the peninsula.

The implications of this pertain to the use of the site and the nature of the deposit. The low numbers of amphorae and comparatively high numbers of cookware is suggestive of a domestic deposit. This is not representative of activity which might have been associated with mass deposition or re-deposition of waste in an abandoned sector of the

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481 See *Crypta Balbi, Schola Praeconum* etc. and the *Terme del Nuotatore* at Ostia.
482 Peña. 1999.
483 Only the "sherd count" appears to be affected by this. Whilst it should have minimal impact on the density calcualations to be attempted for the data, it skews a comparative form of data by the omission of the results. This is methodologically unsound and is suggestive of bias on the part of the author.
484 27% by count and 80% by weight.
485 47.27% by weight.

city. Although the amphorae from the deposit do not account for a particularly large quantity of material the patterns within the data do reveal some interesting insights into the use of these goods on this site.

Interpretation

The ceramic material recovered at this site shows a preponderance of amphorae by weight, however this should not be seen as an indication that the site was used primarily for the disposal of amphorae. The majority of other ceramic vessels would have been much smaller and lighter than the amphorae. The data presented is at first glance somewhat less than illuminating, the proportion by weight gives only a very tenuous comparison with material from other sites particularly as we know so little of the state of preservation of the material and the sampling strategies employed. Also with the classifications employed by the author only to designate the most common forms in the report, the findings must necessarily be treated with a degree of caution. The conclusion which can be discerned from these results however is that the nature of the deposition is structured and more importantly, seems to occur in short, discrete episodes. This has an immense bearing on the work conducted in this thesis as it supports the theory that the cessation of deposition at *Monte Testaccio* does not represent the end of an ordered system of distribution for the *Annona* goods. That there are large numbers of African amphorae deposited in Late Roman contexts in this central area of the city argues for a conscious decision to deposit waste in disused areas rather than merely being the result of a household constantly and gradually depositing household rubbish in an un-used part of their property[486].

The report on the excavations of the Palatine Domus is acknowledged to be merely an interim report and not a final version. Given this, it would be unfair to expect too much of it. However, the limitations of the data presented in the report are extremely frustrating. The lack of a detailed breakdown for sherd counts by parts of vessel makes it difficult to extrapolate beyond these very limited generalisations. Furthermore, the provision of weight data is undermined by the lack of any data which might enable an appreciation of the volume of the deposits to be assessed.

[486] Were this pattern seen to be repeated across the study area it would be reasonable to suppose that the deposits were spread across the available areas and would represent a very tightly controlled pattern of waste disposal.

Atrium Vestae

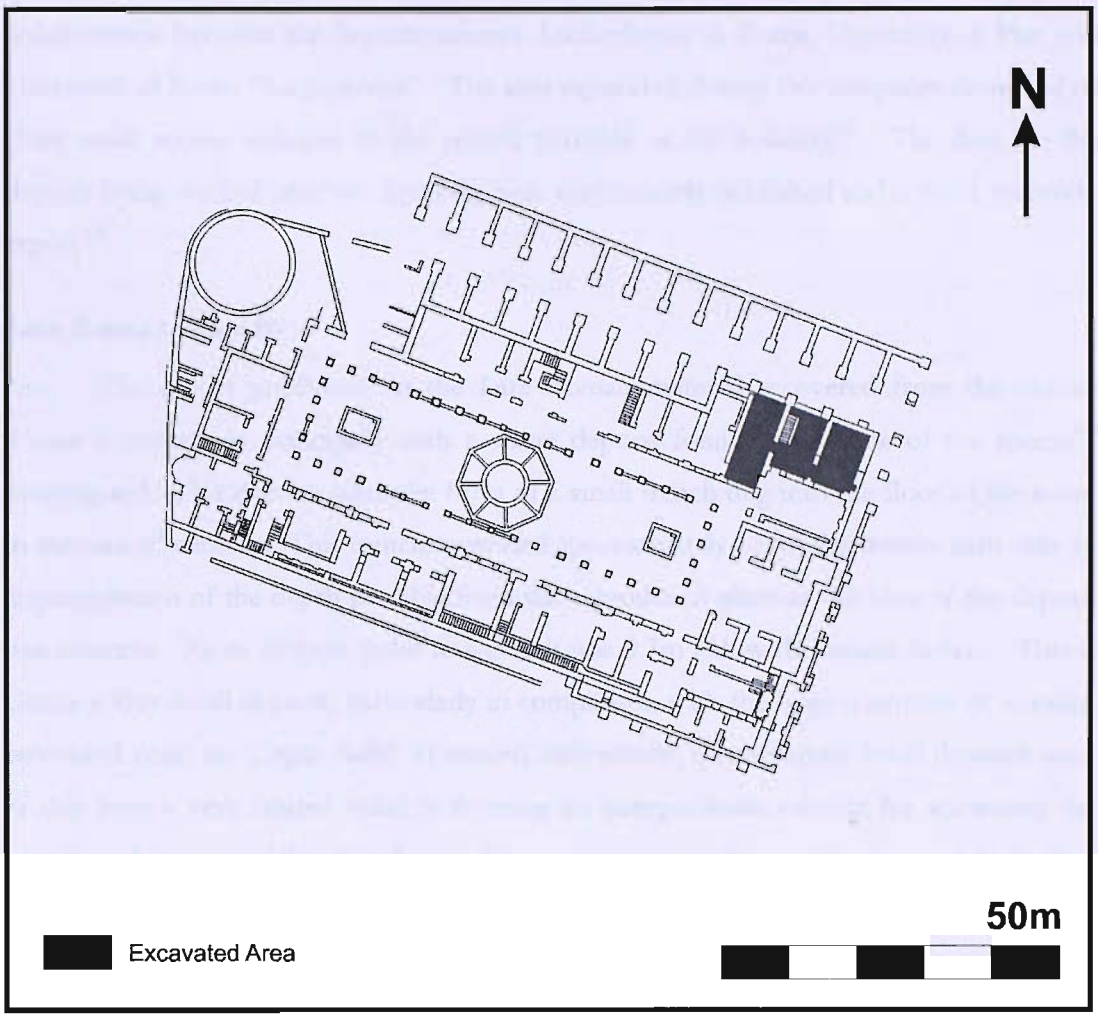

Fig. 12: The Atrium Vestae in the Forum Romanum

Background

Dating to the 2nd Century BC the *Atrium Vestae* was a feature in the forum area with re-building occurring at least as late as the Hadrianic period and with a dedication dating to A.D. 377[487]. The building is located towards the eastern end of the *Forum Romanum* adjacent to the foot of the Palatine hill[488]. As such it occupies a key location within the urban topography of the city, right at the political heart of Rome. The name for the site is derived from the ancient sources which refer to the sacred area associated with Vesta[489]. The archaeological background to the site includes evidence of occupation dating to the 7th and 6th Centuries BC[490]. The final form of the *Atrium Vestae* would appear to have been constructed in the Trajanic period[491], undergoing a subsequent modification of

[487] LTUR I: 141.
[488] See Fig. 8.
[489] Plin. *Epist.* 7.19.2; Serv. *Aen.* 7.153
[490] Scott 1988.
[491] Bloch 1947: 207-225

the west wing and additional construction to the south under Hadrian[492]. The excavations in the *Atrium Vestae* with which this research is concerned were begun in 1993 as a collaboration between the Soprintendenza Archeologica di Roma, Università di Pisa and Università di Roma "La Sapienza". The area excavated during this campaign consisted of three small rooms adjacent to the central peristyle of the building[493]. The data for the deposit being studied here was however only very recently published and is not a complete report[494].

Late Roman deposits

The report published on the Late Roman material recovered from the *Atrium Vestae* is concerned principally with a waste deposit found within one of the rooms[495] investigated. This deposit takes the form of a small trench dug into the floor of the room in the mid-4th century. This trench measured approximately 1.5 by 0.8 metres with only an approximation of the depth possible from the reproduced plans as the base of the deposit was concave. At its deepest point however it was 0.7m below the extant surface. This is clearly a very small deposit, particularly in comparison with the huge quantities of material recovered from the *Crypta Balbi*. If treated individually, quantitatively small deposits such as this have a very limited value in forming an interpretation suitable for answering the questions being asked by this thesis. However, as part of a series of assemblages they offer a different perspective and contextually useful information as a counterpoint to the larger deposits. The excavators interpreted the deposit, as resulting from an episode of banqueting due to the large quantity of faunal remains found within the trench. The ceramic data as published lists only sherd counts for the 350 fragments recovered[496]. However it was possible to acquire the weight data for the amphorae, which were recorded during the post-excavation analysis but not published. These show several interesting characteristics. Firstly the proportion of unidentified amphorae is unusually high for a context of this size[497], this can in part be ascribed to all of the unidentified sherds being from the bodies of the amphorae. Secondly, the proportion of African wares is rather lower than would normally be expected. This may in part be due to the unusually high number of unidentified sherds but as these are not even possibly of African origin the figures warrant some thought. Thirdly, there is a high degree of correlation between the proportions by sherd count and by weight, which is indicative of a fairly uniform degree of

[492] LTUR I: 141.
[493] The area marked in solid grey on Fig 12
[494] Paroli & Venditelli 2004; Filippi et al. 2004.
[495] Ambiente III by the excavator's description.
[496] Filippi et al. 2004.
[497] 62.37% by weight in this deposit, a much higher figure than seen in the other sites studied.

fragmentation between the different classes and is suggestive of an undisturbed context probably of primary material.

Interpretation

The interpretation of such a small deposit is always going to be problematic however the contextual information about the site in general can assist with this task. All the evidence points to this deposit being formed from a single short depositional episode. Furthermore, the nature of the context suggests that this was an independent act, the deposit is constrained by the small trench and as it lies below the floor level cannot unequivocally be seen to be associated with abandonment of the building or even the room. The quantity of material and the nature of the deposit suggest that it is not part of a planned system of waste disposal but rather an ad-hoc response to a single event necessitating the removal of a reasonably large quantity of material. The implications of this for the distribution of amphorae around the city are actually quite important, as the presence of amphora sherds within the deposit is suggestive that at least some amphorae were distributed to final use locations.

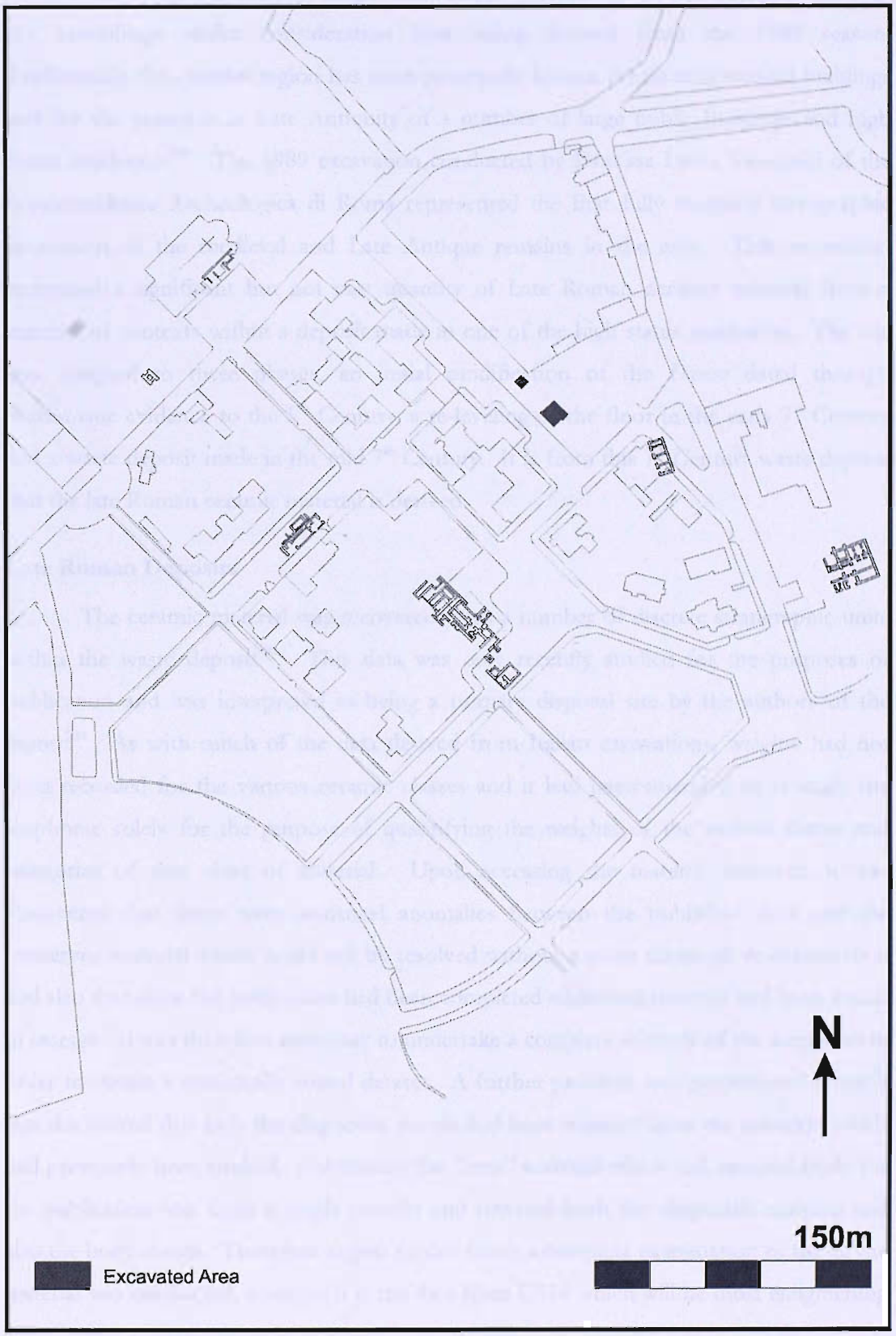

Fig. 13: Location of the excavations and Late Antique structures on the Aventine

Background

The Via di Sant'Alberto Magno excavations were carried out in the late 1980s with the assemblage under consideration here being derived from the 1989 season. Traditionally the *Aventine* region has been principally known for its ecclesiastical buildings and for the presence in Late Antiquity of a number of large public buildings and high status residences[498]. The 1989 excavation conducted by Dott'ssa Laura Venditelli of the Soprintendenza Archeologica di Roma represented the first fully recorded stratigraphic excavation of the medieval and Late Antique remains in the area. This excavation recovered a significant but not vast quantity of Late Roman ceramic material from a number of contexts within a deposit made in one of the high status residences. The site was assigned to three phases, an initial modification of the *Domus* dated through numismatic evidence to the 5th Century, a re-leveling of the floor in the early 7th Century and a waste deposit made in the mid 7th Century. It is from this 7th Century waste deposit that the late Roman ceramic material is derived.

Late Roman Deposits

The ceramic material was recovered from a number of discrete stratigraphic units within the waste deposit[499]. This data was only recently studied for the purposes of publication and was interpreted as being a primary disposal site by the authors of the report[500]. As with much of the data derived from Italian excavations, weights had not been recorded for the various ceramic classes and it had been intended to re-study the amphorae solely for the purpose of quantifying the weights of the various forms and categories of that class of material. Upon accessing the material however, it was discovered that there were statistical anomalies between the published data and the conserved material which could not be resolved without a more thorough re-examination and also that since the publication had been completed additional material had been found in storage. It was therefore necessary to undertake a complete re-study of the amphorae in order to obtain a statistically sound dataset. A further problem was encountered when it was discovered that only the diagnostic sherds had been retained from the contexts which had previously been studied. Fortunately the "new" material which had escaped study for the publication was from a single context and retained both the diagnostic material and also the body sherds. Therefore as part of this thesis a complete examination of the all the material was conducted, however it is the data from US14 which will be most enlightening

[498] Fontana et al. 2004.
[499] Phase 3 in the published report Fontana et al. 2004
[500] Fontana et al. 2004: 546

as it is this context from which the most complete assemblage of the amphora fragments was recovered[501].

The data from US 14 is significant, although not a huge quantity it is the largest of the recovered contexts both by sherd count and by weight[502]. Within this context, the proportions of amphorae by provenance are roughly what would be expected, African amphorae account for roughly 36% by weight but only 26% by count. Eastern amphorae account for a roughly similar percentage by weight[503] but a much higher sherd count[504], indicative of a greater degree of fragmentation in the Eastern vessels and also possibly representative of the much more gracile nature of the LR3 form[505]. The data is fairly consistent and at least elements of the assemblage can be dated back to the 4th Century.

Interpretation

Interpreting the significance of a deposit on the basis of a single stratigraphic context is not unproblematic, however as the broad trends are reflected in the diagnostic sherds from the other contexts it is reasonable to assume that US 14 is representative of the deposit as a whole[506]. What is more problematic for the level of interpretation required for this study is the lack of any information pertaining to the size of the deposit excavated, no quantification is given for the size of area excavated nor for the depth of the deposit. Taken independently however, there are a number of conclusions which can be drawn from the assemblage. Firstly, the number of strata present is indicative that contrary to the published interpretation this was not a single depositional episode[507]. It may well represent a series of closely related depositions but the stratigraphic separation suggests that waste was deposited on a number of occasions once some compaction had taken place. Whilst none of these deposits appear to be very large this might be an artefact of the scale of the excavation which can be seen from the plan to be quite limited. What is clear is that the overall pattern of deposition is indicative of a structured response to the removal of waste from an adjacent area and one undertaken on a regular basis.

[501] A complete breakdown of the data is available in Appendix D.
[502] Although some of this may be due to the presence of the body sherds, the weight of the diagnostic fragments alone is significantly higher than all but one of the other stratigraphic units.
[503] 33% of total
[504] 38% of total
[505] Although it should be noted that these do not represent a particularly large proportion within the Eastern types
[506] See Appendix D for figures.
[507] Fontana et al. 2004: 546

Domus Tiberiana

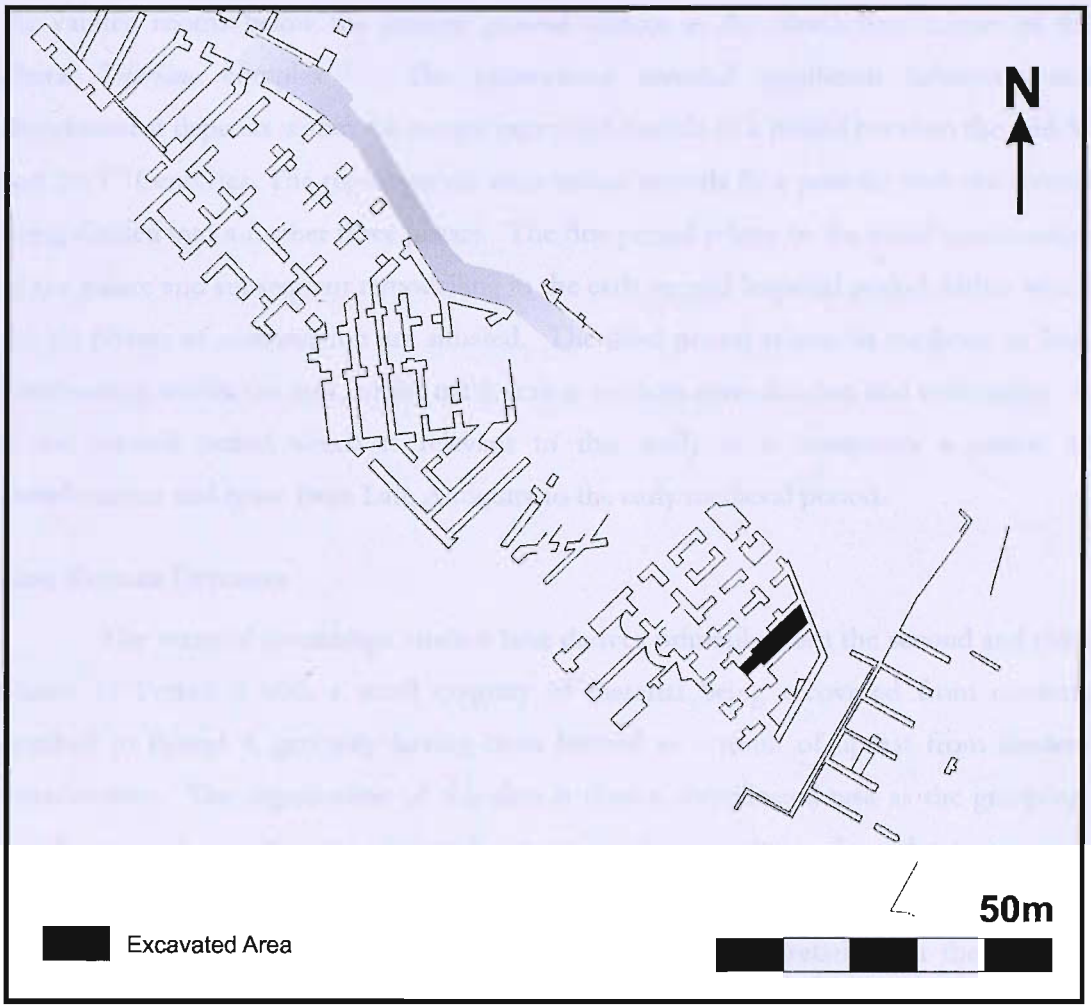

Fig. 14: Location of excavations in the Domus Tiberiana

Background

The *Domus Tiberiana* is one of the more visible sites in Rome and has been the subject of scholarly attention for at least a century. The initial usage of the term comes from Tacitus and Plutarch in the context of the events of A.D. 69[508] which confirm the location of the *Domus* between the Temple of Apollo and the *Velabrum*[509]. The main problem with studying the *Domus Tiberiana* has been the inaccessibility of the structures and substructures covered by the *Horti Farnesiani*[510]. This has led to the majority of the work carried out on the *Domus* to be concerned principally with the architectural form of the extant structures rather than detailed assessment of archaeological material recovered through excavation. However through the architectural studies a broad chronology of the development of the site has been proposed within which we may situate the archaeological material which has been utilised in this study. The six periods defined relate to the

[508] Tac. *Hist.* 1.27; Plut. *Galba* 24.7.
[509] Sute. *Otho* 6.2
[510] LTUR I: 191.

construction and development of the complex between the 1st Century A.D and the Severan period[511]. The data available for this study comes from excavations within one of the vaulted rooms below the present ground surface in the North-East corner of the *Domus Tiberiana* complex[512]. The excavations revealed significant habitation and abandonment deposits within the rooms excavated datable to a period between the mid 5th and the 7th Centuries. The report on the excavations records four periods, with the second being divided into a further three phases. The first period relates to the initial construction of the palace and subsequent remodelling in the early to mid Imperial period within which the six phases of construction are situated. The third period relates to medieval or later construction within the area, whilst the fourth is modern consolidation and restoration. It is the second period which is relevant to this study as it comprises a period of abandonment and reuse from Late Antiquity to the early medieval period.

Late Roman Deposits

The material assemblage studied here derives primarily from the second and third phases of Period 2 with a small quantity of material being recovered from contexts ascribed to Period 4, probably having been formed as a result of upcast from modern interventions. The organisation of this data is then a complicated task as the groupings which are used may bias the statistical outcomes of any analysis. In order to retain as much objectivity as is possible each strata of the excavation will be treated individually before the results are synthesised in order to provide an interpretation for the site as a whole.

Beginning with the Period 2 contexts, in Phase I US 50 contained only a very small quantity of material with just 2 sherds being identifiable as Eastern amphorae with a further 2 examples remaining unidentified. US 49 contained 5 sherds of African amphorae, 1 Eastern and one southern Italian with 12 unidentified. The final stratigraphic unit of this group, US 48 produced a much greater concentration of material. 50 sherds of African origin were identified, 41 eastern sherds, 67 southern Italian, 2 residual fragments and 33 unidentified sherds were also recorded.

Phase II consisted of only two stratigraphic units, the first, US 47 produced only 3 sherds of African material, 1 of Eastern origin, 17 from southern Italy and 7 sherds that were unidentified. US 46 produced a large quantity of African material with 59 sherds of that provenance, 27 of Eastern production, 77 of southern Italian production, 2 residual fragments and 31 unidentified sherds.

[511] LTUR II: 192-194.
[512] Munzi et al. 2004.

Phase III comprised four distinct stratigraphic units. US 44 produced only 4 sherds of African material, 4 sherds from Eastern vessels, 1 from southern Italy and 8 unidentified fragments. US 43 produced 8 African sherds, 3 Eastern sherds and 17 unidentified fragments. US 41 contained only a single African sherd along with 15 unidentified fragments. US 39 produced 20 African sherds, 19 of Eastern production, 6 from southern Italy and 12 unidentified fragments.

The final phase, Phase IV contains the largest quantity of material in its two contexts. US 29 produced 120 African sherds, 68 Eastern sherds, 35 from southern Italy, 1 residual sherd and 66 unidentified fragments. US 28 contained 93 African sherds, 74 Eastern sherds, 62 from southern Italy, 1 residual sherd and 104 unidentified fragments.

The Period 4 contexts had much less material overall, US 81 produced only a single unidentified fragment. US 69 produced 16 African sherds, 1 southern Italian sherd, 38 residual and 24 unidentified fragments.

Interpretation

Even with such a superficial level of interpretation as is possible at this time, it is clear that the differences between the proportions of material within the individual strata are such that the deposit must have accumulated as a series of episodes over a prolonged period of time[513]. Obviously the interpretation of these assemblages is hampered by the reliance on sherd count alone. However, the low quantities in the Period 4 strata support the hypothesis that they represent small quantities of material upcast by the early-modern interventions in the area. The increasing quantities of material present throughout Period 2 would suggest that the transition of this area into a space which was used for the disposal of waste was a gradual one though it may also argue that there was renewed activity in adjacent areas and a concomitant increase in the intensity of deposition in this particular space.

[513] Notwithstanding that the Period 4 contexts are a result of later disturbance, the Period 2 material is not homogenous and appears from the excavation report to have come from sealed contexts.

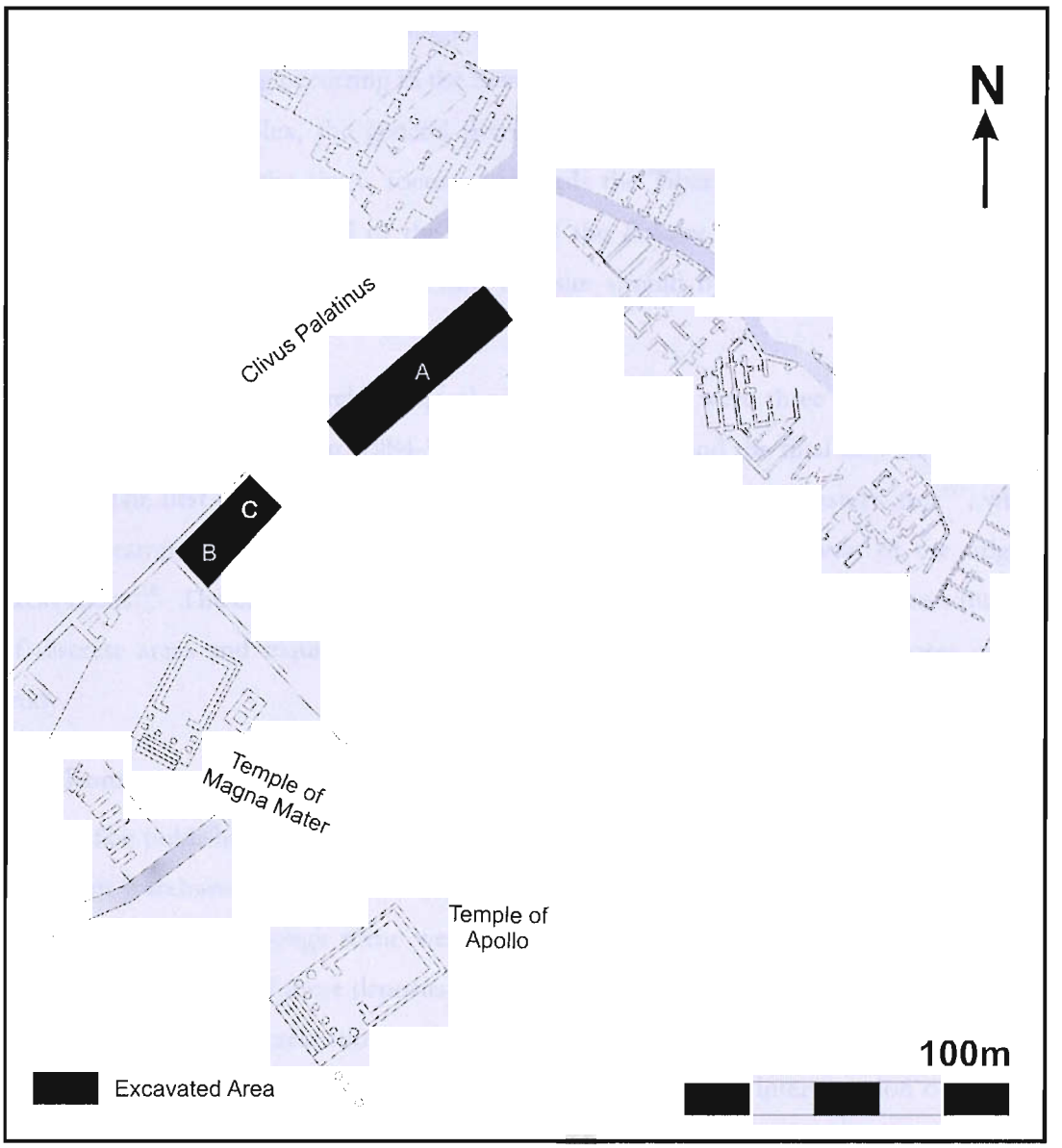

Fig 15: Location of the excavations at the Bastione Farnesiano

Background

From the early 1980s the area of the *Palatine* known as the *Bastione Farnesiano* has been the subject of a number of campaigns of archaeological excavation. This area is located to the west of the hill between the excavations of the Domitianic substructures and to the north of the area under investigation around the Temple of the *Magna Mater*. These excavations have in part been integrated with a project run by the Soprintendenza Archeologica di Roma in collaboration with the Swiss Institute in Rome, designed to amplify the understanding of this area of the *Domus Tiberiana*. This research was primarily of an architectural nature with the majority of emphasis placed on refining the phasing of

the structures in the area[514]. Sporadic yet significant remains of early imperial structures were discovered showing that the Imperial palace traditionally defined as the *Domus Tiberiana* utilised these earlier buildings for its substructures. The architectural evidence also suggests rebuilding occurring in the Severan period. As this site comprises part of the *Domus Tiberiana* complex, the general points raised for that site are also relevant here though the aspect of the site is focussed towards the Tiber rather than overlooking the *Fora*. More detailed appraisal of the nature of the *Palatine* in this period has also been presented earlier and the evidence from this site should be seen as fitting within that background[515].

In terms of actual archaeological excavations there were three distinct campaigns within this area, the first from 1984-5, the second in 1992 and the final between 1998 and 1999[516]. The first two of these campaigns were concerned with the eastern area[517], whilst the final campaign consisted of two small areas to the south and west of the original excavations[518]. The data which has been published for this site then comes from a number of discrete areas and requires some finesse in its presentation for the purposes of this study.

Late Roman deposits

The published material from the area of the *Bastione Farnesiano* was recovered from a series of 9 archaeological deposits across the site. These were largely interpreted as being abandonment layers though some were clearly associated with a re-levelling of areas of flooring. The nature of these deposits are not uniform with at least two distinct soil types being present. As the excavations were carried out in three discrete areas it seems prudent to examine the ceramic data in the same way before offering an interpretation of the data as a whole. The *Bastione Farnesiano* material is reported in a slightly more usable format than much of the ceramic data derived from sites in Rome. Whilst the sherd weights are either not published or not recorded, it is clear that the sherd counts given include numbers of body sherds. Although these are for the most part assigned to categories of unidentified amphorae, their provenance can be determined through the fabric and hence are usable to a suitable degree of precision for this study.

[514] Cicerone et al. 2004: 129
[515] pp 115-116
[516] Cicerone et al. 2004: 131-36
[517] A on Fig 15
[518] B & C on Fig 15

Area A:

The layer known as US 110 was a black, friable material into which had been cut a double grave[519]. The context produced a total of 607 amphora sherds, unfortunately no weights are recorded for this deposit. African amphorae accounted for 27.8% of the total recovered whilst eastern amphorae accounted for 9.8% and Sicilian and southern Italian types 41.4%.

US 159 was a yellow/orange layer above which was located another grave[520]. This context produced a total of 2,508 sherds of amphora fabric. African amphorae accounted for 36% of the total recovered whilst eastern amphorae accounted for 40.5% and Sicilian and southern Italian types 10.8%.

US 130 appears to be associated with a wall running east – west within this area of the excavation[521]. This context produced a total of 52 sherds of amphora fabric. African amphorae accounted for 63.5% of the total recovered whilst eastern amphorae accounted for 11.5% and Sicilian and southern Italian types 25%.

US 164 was a fill in this area[522]. This context produced a total of 2 sherds of amphora fabric, both of which were of eastern Mediterranean provenance.

US 203 was a fill layer laying over the pavement context 88[523]. This context produced a total of 10 sherds of amphora fabric. African amphorae accounted for 70% of the total recovered whilst Sicilian and southern Italian types accounted for the remaining 30%.

US 167 was a fill in this area of the site[524]. This context produced a total of 11 sherds of amphora fabric. African amphorae accounted for 54.5% of the total recovered whilst eastern amphorae accounted for 18.2%. Sicilian and southern Italian types were not represented.

Area B:

US 50 was a black, friable layer similar to US 110 though located in area B[525]. This context produced a total of 255 sherds of amphora fabric. African amphorae accounted for 54.9% of the total recovered whilst eastern amphorae accounted for 20.8% and Sicilian and southern Italian types 13.7%.

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519 Ciceroni et al. 2004: 131.
520 Ciceroni et al. 2004: 132.
521 Ciceroni et al. 2004: 132.
522 Ciceroni et al. 2004: 132.
523 Ciceroni et al. 2004: 131.
524 Ciceroni et al. 2004: 132.
525 Ciceroni et al. 2004: 134-135.

US 51 was also a black, friable layer again similar to US 110[526]. This context produced a total of 33 sherds of amphora fabric. African amphorae accounted for 27.3% of the total recovered whilst eastern amphorae accounted for 39.4% and Sicilian and southern Italian types 33.3%.

Area C:

US 87 was an abandonment layer[527]. This context produced a total of 3 sherds of amphora fabric. African amphorae accounted for 33.3% of the total recovered whilst eastern amphorae accounted for 33.3%. Sicilian and southern Italian types were not represented.

Interpretation

Many of the strata reported as containing amphora fragments in this excavation were seemingly very small. This is borne out by both the plans, where available, and by the small number of fragments recovered. There is a clear distinction between the 2,000 sherds recovered from US 159 and the other contexts which struggled to reach double figures. It is interesting to note that only a single context in the two areas excavated in the second campaign produced a significant quantity of amphora remains[528]. It is also interesting that this assemblage is, in an order of magnitude, equivalent to that of US 110 which exhibited similar soil characteristics. Though there is no direct evidence, it raises the possibility that these deposits are samples of a widespread destruction or abandonment layer. Though it is difficult to draw comparisons on the basis of this uncorrected data, the fact that the proportions of amphorae of different provenance are so discrepant would argue against any hypothesis of the layer being deposited in a single episode.

[526] Ciceroni et al. 2004: 135.
[527] Ciceroni et al. 2004: 134.
[528] US 50 with its 255 sherds

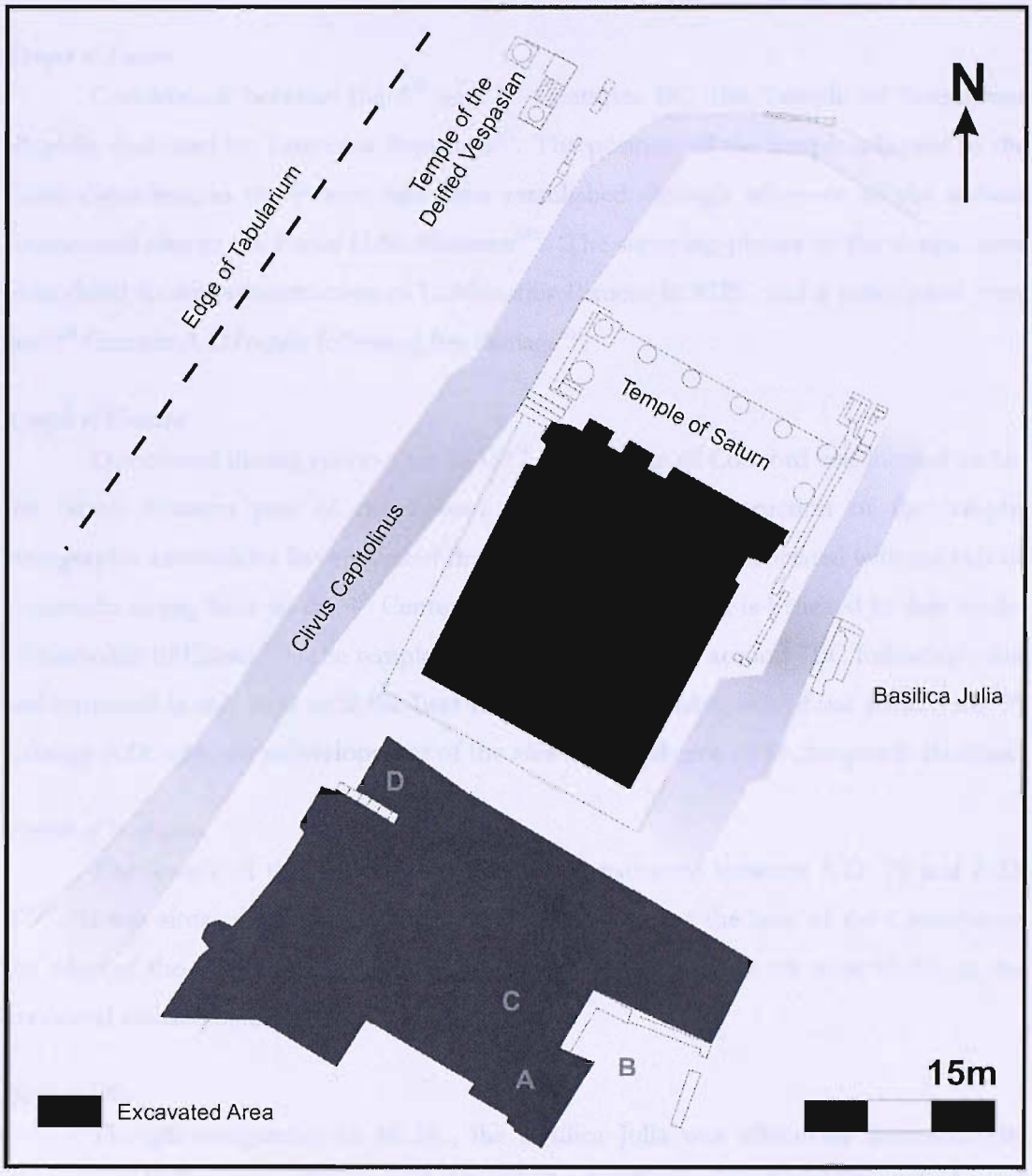


Fig. 16: Location of the excavations in the North West corner of the Forum Romanum

Background

This area of the *Forum* has been studied since the Pontificate of Pius VII in 1803[529]. The removal of the *Via del Foro Romano*, and *Via della Consolazione* by the early 1980s opened a large area around the Temples of Saturn, Concordia and Vespasian for further archaeological work to be carried out. The area behind the Temple of Saturn between the *Vicus Iugarius* and *Clivus Capitolinus* was one of the few places within the *Forum Romanum* which escaped the attentions of the earlier explorers[530]. It is only in this area that it was

[529] Maetzke 1991: 43.
[530] Maetzke 1991: 45.

possible to recover an undisturbed stratigraphic sequence formed between the 6th and 14th Centuries A.D.

Temple of Saturn

Constructed between the 6th and 5th Centuries BC, the Temple of Saturn was allegedly dedicated by Tarquinus Supurbus[531]. The position of the temple adjacent to the *Clivus Capitolinus*, in the Forum had been established through reference to the ancient sources and also to the *Forma Urbis Marmorae*[532]. The surviving phases of the temple have been dated to the reconstruction of L. Munatius Plancus in 42BC and a subsequent, very late 4th Century A.D. repair following fire damage[533].

Temple of Concord

Discovered during excavations in 1817 the Temple of Concord was located within the North Western part of the Forum. Prior to the construction of the temple, stratigraphic excavations have revealed the presence of practices associated with the cult of Concordia dating back to the 4th Century BC. The temple itself is believed to date to the Dictatorship of Caesar[534]. The temple was then reconstructed around 7BC following a fire and remained in this state until the Late Empire, finally passing out of use around the 7th Century A.D. with the redevelopment of the area for the church of SS. Sergius & Bacchus.

Temple of Vespasian

The temple of the deified Vespasian was constructed between A.D. 79 and A.D. 87[535]. It was situated adjacent to the Temple of Concord at the base of the *Capitoline* on the edge of the Forum; the remains of the front of the podium are now visible in the excavated archaeological area.

Basilica Julia

Though inaugurated in 46 BC, the Basilica Julia was effectively completed by Augustus. Following a fire around 12 BC the basilica was substantially rebuilt and dedicated in the name of Gaius & Lucius[536]. The basilica was the seat of the Centumvirale tribunal[537] and appears to have been an open space from which the proceedings of the tribunal could be appreciated by those outside the basilica[538]. Between the 6th and 8th

[531] Dion. Hal. 6.1.4.
[532] LTUR IV: 235.
[533] LTUR IV: 235.
[534] LTUR I: 317.
[535] LTUR V: 124.
[536] LTUR I: 177; Suet. Aug. 29.
[537] Quint. Inst. 12. 5-6
[538] LTUR I: 177.

Centuries A.D. the North West corner of the basilica was converted into a small church identified as *Santa Maria in Cannapara*[539].

Arch of Septimius Severus

The Arch of Septimius Severus is located adjacent to the Rostra and between this monument and access to the *Capitoline* hill. It was originally only accessible from the Augustan *Comitium* by means of stairs and has been interpreted as resembling a free-standing triumphal monument[540]. The arch was dedicated in A.D. 203 to Septimius Severus and his two sons Caracalla and Geta in commemoration of the victorious Parthian war[541]. The situation of the arch in this crowded corner of the Forum has been interpreted as being a conscious attempt to legitimise the Severan dynasty by associating the Parthian victory of A.D. 203 with the Parthian Arch of Augustus, visible diagonally opposite the Severan arch[542].

The excavations in the north west area of the Roman Forum began on the 15th December 1980 with the aim of achieving three objectives. First of these aims was to understand the topography of the valley of the forum and its relationship with the *Capitoline*. Secondly, to understand the monumental buildings in the area bounded by the *Vicus Iugarius*, *Clivus Capitolinus* and the *Tabularium* and thirdly, to understand the development of the area to the rear of the Temple of Saturn through an integrated excavation strategy[543]. This excavation was located within the interior of the podium of the temple, where there was a complete stratigraphic sequence from the Roman to modern periods. The earliest reported layers were 6th or early 7th Century A.D. and were a pair of graves with associated ceramic material. The excavation in this area was begun by imposing a 5m grid based on the alignment of the Temple of Saturn. This structure was deemed to have influenced the alignments and locations of the subsequent structures on the site[544]. An arbitrary survey origin was established at a height of 22.8m above sea level and all reported levels are relative to this point[545]. The presence of an accessible stratified sequence in the Forum area is of inestimable value for understanding the abandonment of the Imperial and Republican monuments and the habitation of the area. The podium of the Temple of Saturn contained two rooms of the Renaissance period, one of which contained a cistern giving access to rainwater supplies. A series of other rooms were also uncovered, seemingly dating to the 16th Century[546]. These rooms re-used the internal

[539] Lanciani 1891: 229; Pericoli 1879: 490.
[540] LTUR I: 103.
[541] LTUR I: 104.
[542] LTUR I: 104.
[543] Maetzke 1986:372; 376
[544] Maetzke 1991: 51-52
[545] Maetzke 1991: 52. The origin is reported only as a spot height although it is located on plans.
[546] Maetzke 1991: 60.

space of the temple podium and their excavation enabled the construction of the podium to be recorded. Evidence of restoration in the 4th Century A.D. has been recorded for the temple[547]. The use of the area for habitation had begun by the early medieval period and so one must conclude that the monumental nature of the area had ceased between the 4th and 6th Centuries.

Late Roman deposits

The deposit, which has provided the material for this study, is derived from the excavations conducted in *Ambiente D* of the area to the rear of the Temple of Saturn. This room or building was constructed after the monumental building passed out of use as it overlies a Roman floor layer. The approximate area of the *Ambiente D* was 13.6 m^2, with an approximate depth of 1.28m. This early structure continued in use into the early medieval period with minor modification including the use of a small area for a deposit of lime[548]. The ceramic material under consideration here comes from the third phase of the structure. After the use of the area as a lime deposit, in the late 6th or early 7th Century a deposit of ceramic material was made within the room. However, the presence in a later stratum of coinage dating to Justinian II would actually argue that the ceramic deposit occurred at the earlier limit of this range.

Of the ceramic material recovered from this deposit, amphorae accounted for by far the greatest quantity with 2069 sherds and a weight of 49.3Kg. Of these, African types accounted for 20.33% by count and 34.26% by weight; Eastern types represented 61.21% by count and 41.1% by weight and Southern Italian/Sicilian types 10.15% by count and 15.74% by weight. Furthermore, due to the specificity of the publication and quality of the plans it was possible to extrapolate volume for the deposit in question and hence densities for the ceramic material.

Interpretation

The Late Roman material recovered from this area fits within a wider pattern of abandonment, changing usage, and rebuilding within this part of the *Forum Romanum*. As the podium of the temple of Saturn shows signs of rebuilding in the 4th Century, we must conclude that the area was in some form still seen as a monumental focus at this point. The later creation of housing would indicate that this was no longer the case by the mid 6th Century. The nature of the deposit, its location and constituents would suggest that it is a re-deposition of earlier material or a systematisation of built up waste within the newly defined space to the rear of the Temple podium. The significance of both the creation of living spaces in this area and the presence of waste deposits within it are clearly of

[547] Maetzke 1991: 66; Pensabene 1984.
[548] Paganelli 2004: 180.

importance for understanding the changing usage of the Forum as a whole in this period. Whilst it is impossible to generalise from such a small sample, the existence of undisturbed late stratigraphy within the Forum is a major contribution to our understanding. Whilst this area is clearly no longer viewed as monumental or public space it is in reasonably close proximity to the Column of Phocas which was erected in the Forum during the Byzantine occupation of the city and hence at least a part of the forum was still considered to be a place for the display of monumental architecture whilst the peripheral areas were undergoing a significant change in use.

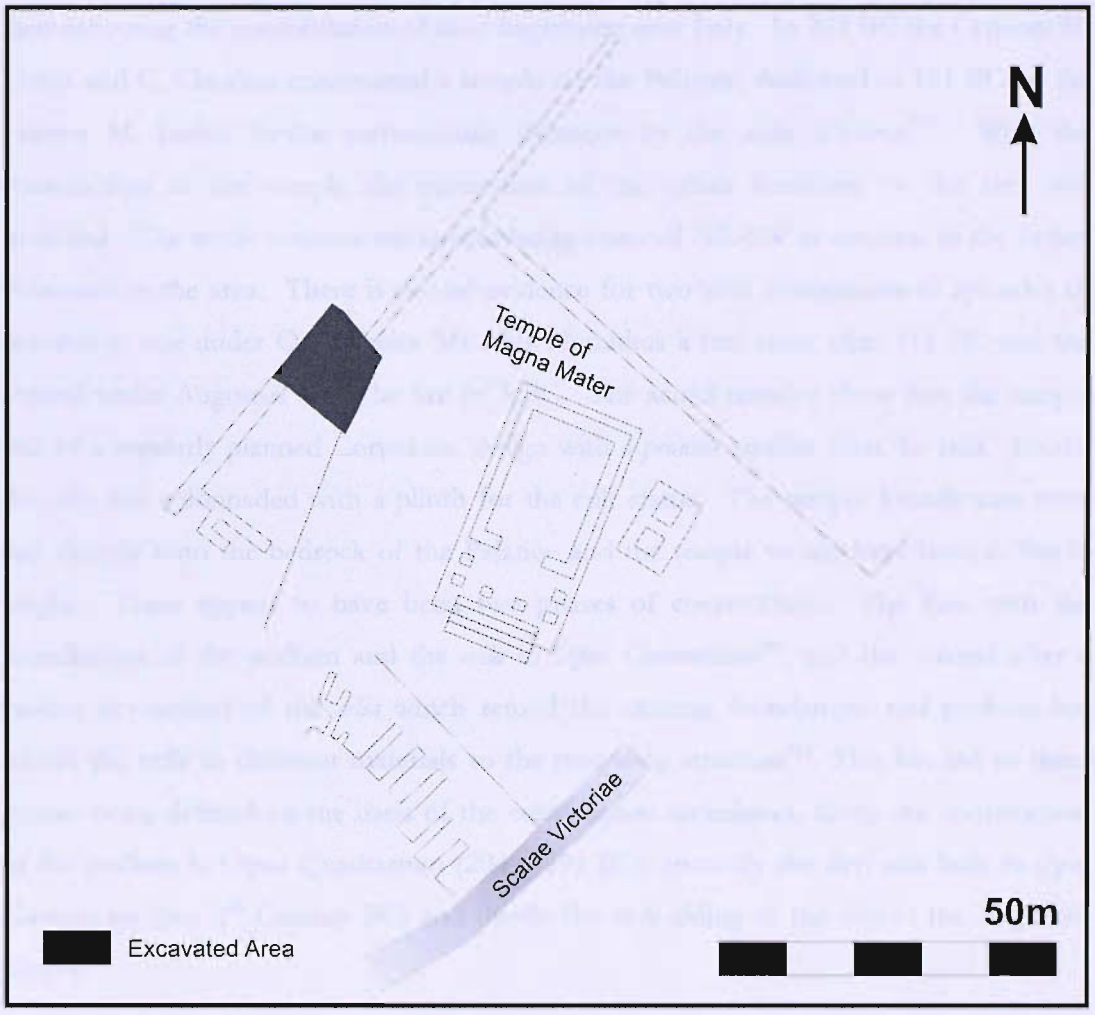


Fig. 17: Location of the excavations in the Precinct of the temple of the Magna Mater

Background

The temple of the Magna Mater is located on the south western slope of the *Palatine* hill. It was seemingly first reported through the excavations conducted by De Tournon in 1809 and 1814, and then between 1862 and 1865 Pietro Rosa conducted further excavations in the area which he interpreted as *Auguratorium*[549]. In 1872 a statue of the goddess Cybele was recovered[550] and following further excavation in the 1890s the first reconstructed plan of the temple was produced[551]. From 1977 the area of the *Magna Mater* and its surroundings were the object of a campaign of archaeological research conducted by Patrizio Pensabene of the Università di Roma "La Sapienza" in collaboration with the Soprintendenza Archeologica di Roma.

[549] Rosa 1865;1873
[550] Gatti 1911
[551] Hülsen 1895; 1926

The cult of the Cybele was introduced from Asia Minor during the last years of the Second Punic War and is a testimony to the political interest, shown by the Romans in the East following the consolidation of their hegemony over Italy. In 204 BC the Censors M. Livius and C. Claudius constructed a temple on the Palatine, dedicated in 191 BC by the Praetor M. Iunius Brutus provisionally overseen by the *aedes Victoriae*[552]. With the construction of the temple the orientation of the urban structures in the area was modified. The newly constructed temple being oriented NE-SW in contrast to the earlier structures in the area. There is textual evidence for two later restorations or episodes of rebuilding, one under Q. Caecilius Metellus Numidius a few years after 111 BC and the second under Augustus after the fire of 3 BC. The actual remains show that the temple was of a regularly planned Corinthian design with a *pronaos* smaller than the *cella*. Inside, the *cella* was colonnaded with a plinth for the cult statue. The temple foundations were laid directly onto the bedrock of the Palatine and the temple would have been c. 9m in height. There appear to have been two phases of construction. The first with the foundations of the podium and the *cella* in *Opus Caementicum*[553], and the second after a violent destruction of the *cella* which reused the existing foundations and podium but rebuilt the cella in different materials to the preceding structure[554]. This has led to three phases being defined on the basis of the construction techniques, firstly the construction of the podium in Opus Quadtartum (204 – 191 BC), secondly the first *cella* built in *Opus Caementicum* (late 2nd Century BC) and thirdly the re-building of the *cella* in the Augustan period.

Late Roman deposits

There are two published sources of Late Roman ceramic material from this site, the first being derived from the excavations conducted by Pensabene from 1977 onwards and the other from those of 1986 onwards[555]. The material is also not derived from excavation within the area of the temple itself but rather from a series of rooms to the south of the temple.

The material considered here is, like many of the sites in Rome, an incomplete dataset as the weight of the sherds was not recorded and there is no indication of whether the body sherds were retained and included within the count. A total of 676 sherds of amphora were recovered and published. Of these, African types accounted for 43.65% by count, Eastern types accounted for 14.8% and Southern Italian/Sicilian types accounted for 5.03%. This distribution, the overwhelming dominance of African amphorae and the

[552] Serv *Aen.* 7:188; Iuv. *Sat.* 3:138

[553] Largelyconsistent of Grotta Oscura tufa and Peperino with occasional pieces of Travertine

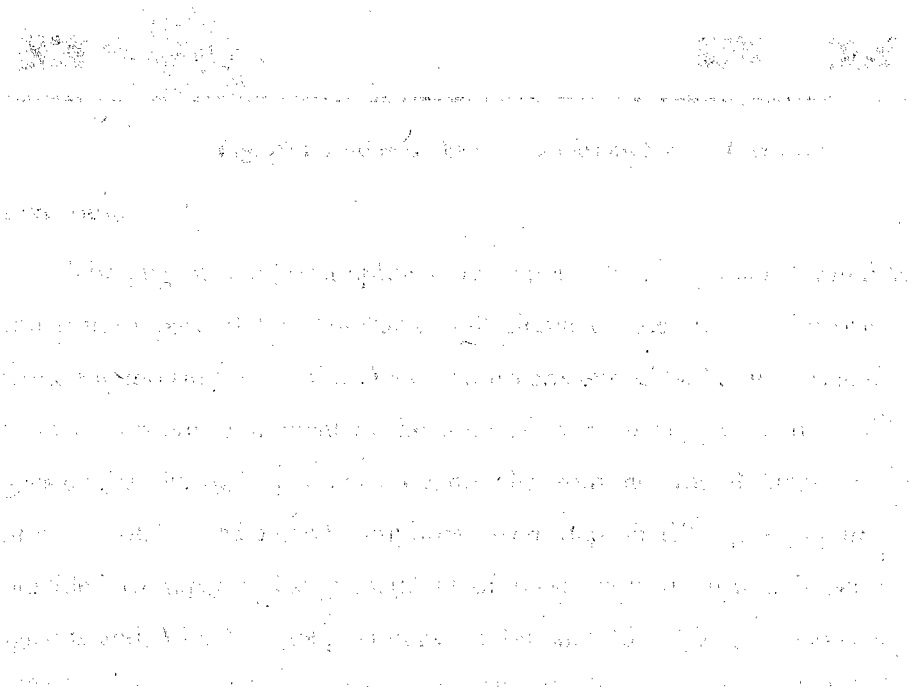
[554] This second *cella* was constructed in *Opus Caementicum* with Rosso Tufa from Fidene and also elements of *Opus Quasi Reticulatum*

[555] See Carigiani et al 1986 & De Rossi & Mandarini. 1998.

presence within the deposit of a number of earlier Spanish and Gallic amphora types, suggests that this deposit is of an earlier date than many of the others under study.

Interpretation

The fragmentary nature of the material and its publication make any definitive interpretation difficult. However the presence of an ostensibly contemporaneous Late Roman deposit would argue for the continued use of the open space around the temple as late as the 5th Century. The trends within the deposit bear out the trends apparent thus far in other Late Roman deposits and furthermore argue for the penetration of this material throughout the city. The presence of the material adjacent to the cult area also argues against the deposits derived from within the Imperial palace being exceptional and may in conjunction suggest a much more diffuse distribution pattern for the amphorae than has previously been suggested.



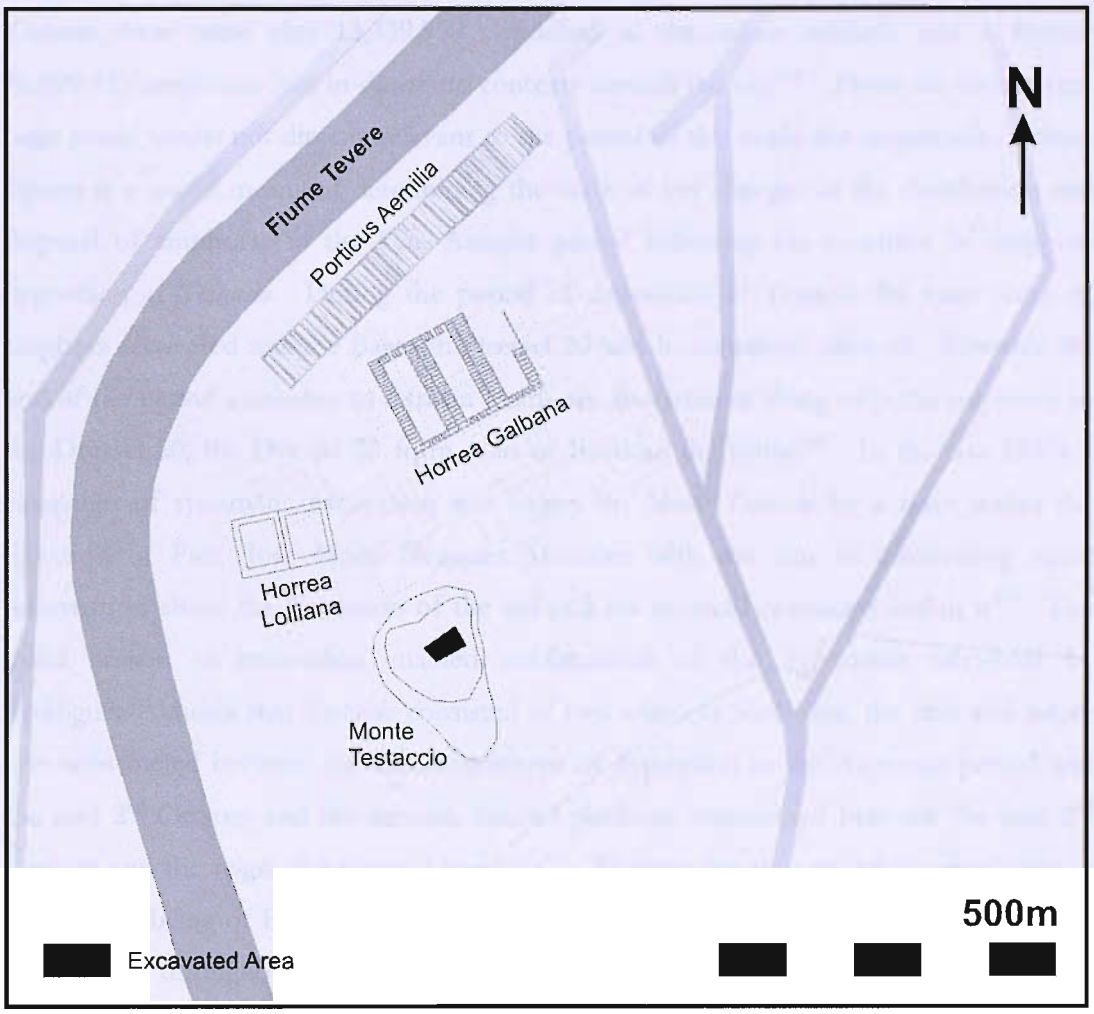


Fig. 18: Location of the excavations on Monte Testaccio

Background

The huge mound of amphorae, known as *Monte Testaccio* is located adjacent to the southernmost part of the Aurelianic wall circuit of the city, to the rear of the known riverine warehousing along the Tiber. Approximately 22,000m^2 in area and over 35m high it is an impressive monument to the scale of overseas supply of the city[556]. It has been suggested that during its period of use, broadly from the time of Augustus until the mid 3rd century, a total of 53,359,800 amphorae were deposited[557]. This figure can be further subdivided to suggest that 35,420,000 of these were deposited between the reign of Augustus and A.D. 146, 460,000 between 146 and 154, 9,200,000 between 155 and 200, 3,680,000 between 200 and 216, and 4,600,000 between 217 and 255[558]. Whilst it is difficult to compare directly between the figures presented, as the temporal periods are not of equal length, there appears to be a fairly even distribution of numbers deposited across

[556] Rodriguez-Almeida 1984: 109
[557] Rodriguez-Almeida 1984: 118. this figure is inconsistent with the breakdown which follows.
[558] Rodriguez-Almeida 1984: 118.

the lifespan of the dump. Rodriguez Almeida has suggested that for the period between Augustus and Gallienus, c. 270 years, in addition to the 53,359,800 amphorae deposited at *Testaccio* there were also 13,339,950 deposited at the urban markets and a further 20,009,925 amphorae lost in domestic contexts around the city[559]. These are clearly very large totals, whilst not directly relevant to the period of this study the magnitude of these figures is a useful means of determining the scale of any changes in the distribution and disposal of amphorae in the Late Antique period following the cessation of amphora deposition at *Testaccio.* During the period of deposition at *Testaccio* the main form of amphora recovered was the Baetican Dressel 20 which, contained olive oil. Towards the end of the period a number of African forms are also present along with the successor to the Dressel 20, the Dressel 23 form, also of Baetican derivation[560]. In the late 1980s a campaign of systematic excavation was begun on *Monte Testaccio* by a team under the direction of Prof. José María Blázquez Martínez with the aim of discovering more information about the formation of the hill and the material contained within it[561]. The initial season of excavation enabled confirmation of the hypothesis advanced by Rodríguez-Almeida that *Testaccio* consisted of two adjacent platforms, the first and larger one constructed between the commencement of deposition in the Augustan period and the mid 2nd Century and the second, smaller platform constructed between the mid 2nd Century and the reign of Severus Alexander[562]. Despite the majority of the amphorae in the deposit being of Baetican origin, there are significant quantities of African amphorae also present throughout the areas of the hill accessed by excavation and these have been studied in their own right[563]. The presence of African oil amphorae has been used to suggest that *Testaccio* was used exclusively as a dump for oil amphorae rather than for those containing other products[564]. If correct, this hypothesis could be used to argue for a systematic and controlled deposition of the containers of goods associated with the provisioning of the basic needs of the population of Rome at a point prior to the inclusion of oil in the *Annona* itself.

Excavations have permitted the recovery of amphorae corresponding with two concrete periods, the mid 2nd Century and the first third of the 3rd Century A.D. The Spanish excavation campaign has determined that 80-85% of the *Testaccio* amphorae are Baetican with the remaining 15-20% split between other geographical areas. The majority of which are African "oil" amphorae[565]. The 1989 excavation produced 83.1% Baetican

559 Rodriguez-Almeida 1984: 119.
560 Rodriguez-Almeida 1984: 161-170.
561 Blázquez et al. 1994: 18.
562 Blázquez & Remesal 1999: 11.
563 Revilla 1999.
564 Revilla 1999: 75-76.
565 Revilla 1999: 75.

and 16.8% African amphorae. More detailed examination suggests that the 2nd Century African amphorae are predominantly Tunisian (63.23% to 36.77% Tripolitanian) whilst the 3rd Century African amphorae are predominantly Tripolitanian (95.45% to 4.45% Tunisian)[566].

Late Roman Deposits

Monte Testaccio is unusual amongst the group of deposits included in this research in that it is not strictly a Late Antique site. Deposition on the hill had ceased by the mid 3rd Century and it is this change in the practice of disposal for the amphorae containing oil coming into the city which leads to the question of what the nature of those deposition practices were in the subsequent years. *Monte Testaccio* is often thought of as being entirely comprised of Baetican Dressel 20 amphorae. Whilst they are vastly predominant, there are also a significant number of African amphorae present. Deposition at this site was therefore not likely to have been a result of regionalism based on the provenance of the oil and its containers. Nor was it likely to be resultant from the location of offices or warehousing belonging to or operating under the auspices of merchants dealing with particular suppliers. The change in depositional strategy after the mid 3rd Century is therefore something which reflects more than simply a sourcing of products from alternative sources and is more likely to have resulted from some change in the priorities of the authorities in Rome.

Interpretation

The interpretation of *Monte Testaccio* is necessarily a highly functional one. *Testaccio* existed for the purpose of the disposal of used oil amphorae in close proximity to the main point of entry and storage of goods within the city, the Emporium. It is quite reasonable to suggest that the pattern of deposition is reflective of a centralized distribution strategy for the oil which was imported in the amphorae. Purely functional considerations would argue against the distribution of full amphorae around the city which would then be returned to the *Emporium* area for disposal.

[566] Revilla 1999: 88.

San Sisto Vecchio

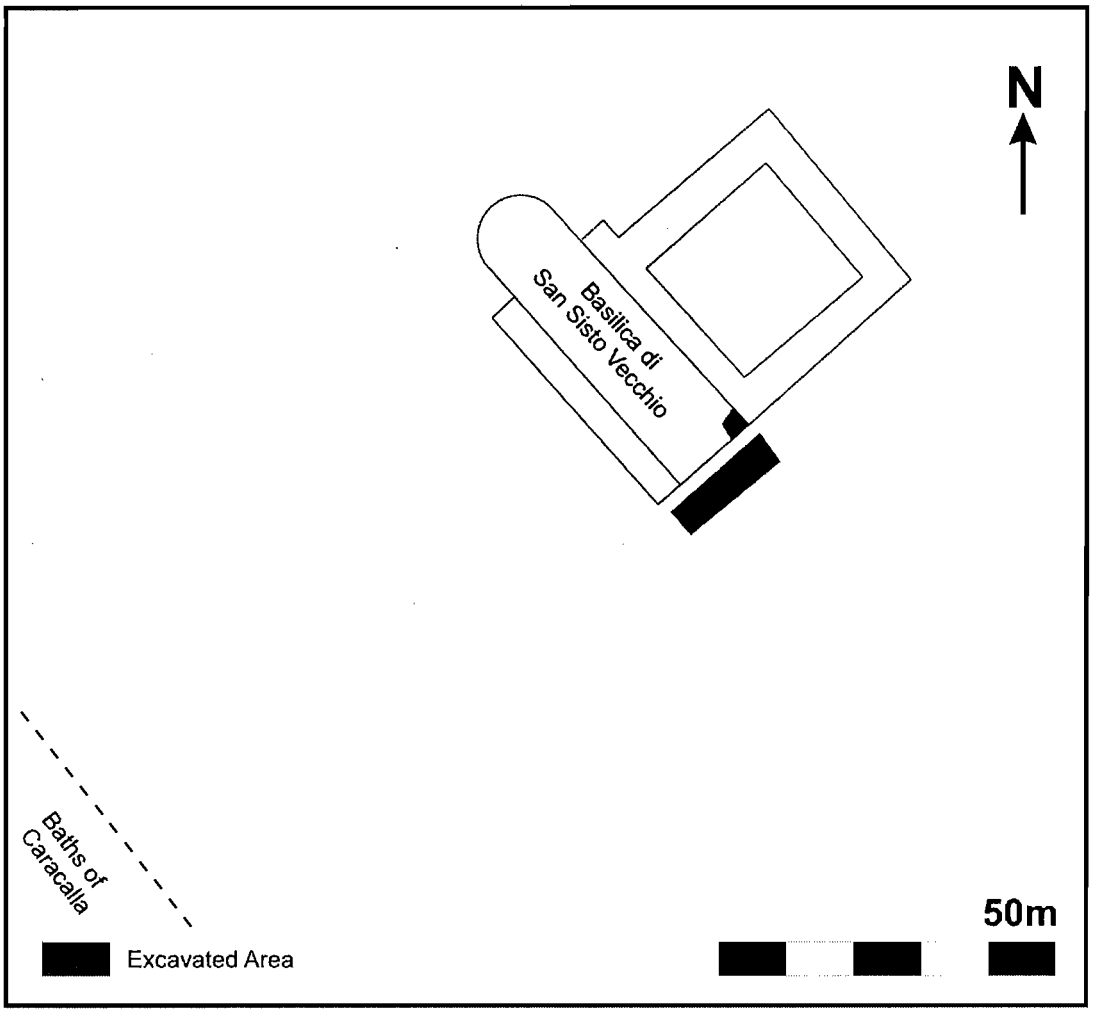


Fig. 19: Approximate location of the excavations at the Basilica di San Sisto Vecchio.

Background

The Basilica of San Sisto Vecchio has been identified as the *Basilica Crescentiana*, mentioned in the *Liber Pontificalis* and consecrated between A.D. 399 and 401[567]. This structure precedes the later church of San Sisto Vecchio in Rome. Following the construction of the basilical structure on this site, a rising water table led to the necessity of also raising the ground level to compensate for this. Amongst the aggregate used for this purpose were a large number of sherds of pottery[568]. The amphorae consisted of less than a thousand, often small fragments as a result of on-site filtering and were largely derived from the later fills[569]. Due to the stratigraphy of the site, only the fragments deposited during and immediately subsequent to the construction of the basilica were

[567] Schuring 1986: 158; Geertman & Annis 2004.
[568] ibid.
[569] Schuring 1984: 147.

deemed to be significant[570]. The published study of the amphorae from this site was something of a test case for a holistic study of pottery technology[571].

Late Roman deposits

The late Roman ceramic material was derived from the foundation of the north east corner of the atrium of the basilica and also from two trenches excavated to its east side[572]. The quantified material presented here is not exhaustive and represents a dataset filtered by the author of the report on the basis of that material which she considered useful in determining type and form[573]. Due to the nature of the report, there is also very little additional contextual information relating to the deposits and the material in its published form appears to have been studied very much in isolation.

Interpretation

A number of the amphora fragments were found adjacent to a pit used for lime slaking and have been interpreted as being part of the paraphernalia of construction of this feature[574]. Most fragments were however recovered from levelling layers packed with earth as a foundation for the construction of the basilica[575].

[570] ibid.
[571] Schuring 1984: 147-51.
[572] Schuring 1984: 176.
[573] Schuring 1984.
[574] Schuring 1984: 176.
[575] Schuring 1984: 176.

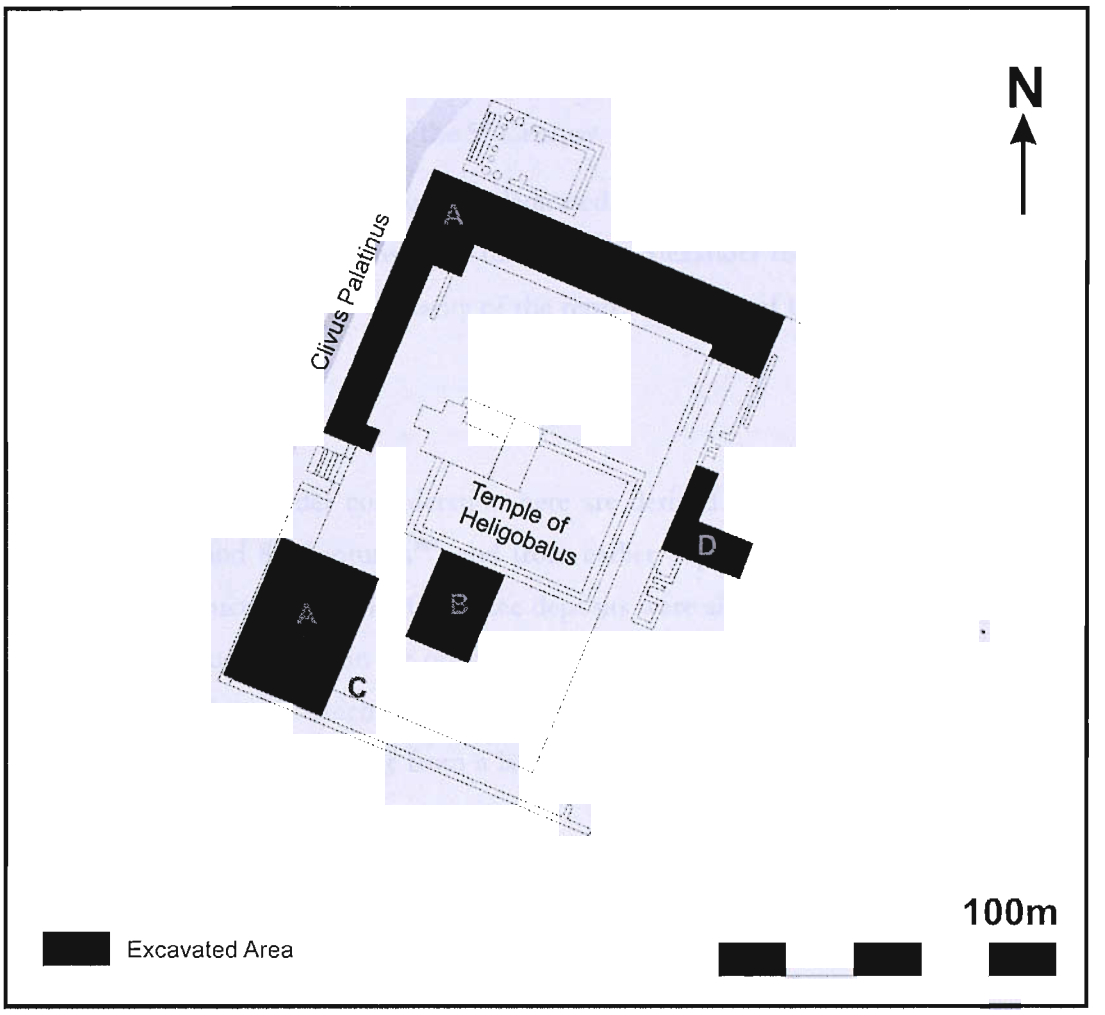


Fig. 20: Location of the excavations in the Vigna Barberini

Background

This site is located to the east of the *Palatine* within the precinct of the temple of *Heligobalus* and is in close proximity to the *Colosseum* and temple of Venus and Rome. The temple complex was a Severan foundation over an area previously part of the Flavian palace and can be seen as part of the remodelling of this flank of the *Palatine* under the Severan dynasty. The area of the *Vigna Barberini* has been under investigation by the École Française de Rome since 1985[576]. These investigations concentrated on areas around the periphery of the temple precinct and two larger open areas within the precinct to the south of the church of S. Sebastiano. These larger areas revealed traces of a large Julio-Claudian domus which was destroyed in the mid to late 1st Century A.D. Subsequent to this a large Flavian structure consisting of a semi-circular feature was constructed in the area at which time the terracing of the hill was substantially enlarged[577]. Towards the end of the 2nd

[576] Virlouvet et al 1993.
[577] Virlouvet et al 1993: 137-8.

Century these structures began to degrade and the upper level of the structure became unusable. Subsequent rebuilding under the Severans substantially extended the terraced area on this flank of the hill and led to the creation of the temple complex, which overlies the earlier palatial structures. This was in turn disused and subject to removal of spolia for use elsewhere by the early years of the 5th Century.

The Temple of Heligobalus was dedicated to a divinity transferred to Rome from Emessa in A.D. 221[578]. It seems likely that Severus Alexander transformed the temple of Jupiter Ultor due to the close similarity of the representations of the two temples on coins of the period[579].

Late Roman deposits

The deposits under consideration here are derived from the stratigraphy formed between the 5th and 8th Centuries[580], and from earlier deposits overlying the Flavian and Julio-Claudian structures[581]. The first three deposits were all recovered within Sector A of the excavations, located within the open area of the Temple precinct and are of earlier date than the fourth deposit which comes from the structures along the eastern flank of the hill. All of these deposits suffer from a lack of weight data though they did record body sherds within the published data.

The first deposit under study is the earliest of the deposits on the site, being linked to the remodelling of the hill after the Julio-Claudian period. Of the Amphorae recovered, only 4.15% were of African origin with the greatest numbers being Italian with a few Dressel 20s also present.

The middle two deposits should perhaps be discussed together as they are really a subdivision of a single phase as defined during the excavations. This phase belongs to the Severan remodelling of the area in the mid 3rd Century. Phase 5A produced a total of 2,100 amphora sherds, African amphorae account for 27.62% of these with Eastern amphorae accounting for only 2.05% and no sign of the late Roman South Italian forms such as the Keay LII or CBII. Spanish amphorae however account for 15.52% of the recovered sherds. Phase 5B produced a total of 2,336 sherds, African types account for 36.82% of these, eastern types accounting for less than 5% and again no record for any Keay LII or CBIIs. Spanish types again are reasonably common as they account for 13.87% of the published material.

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578 LTUR III: 10.
579 Bigot 1911.
580 Villedieu 2004: 62.
581 7278 ovelies the Julio-Claudian structures whilst 5A &B area associated with the construction of the temple... 5B may be slightly later. The real late material is recorded in Paroli & Venditelli 2004.

The final deposit to be studied is due to abandonment or destruction in the Late Antique period and consists of 901 recorded amphora sherds[582]. Of these, 34.9% by count were of African origin, 15.3% were of Eastern origin and 20.8% were from Southern Italy or Sicily. Of the remainder, 4.8% have been defined as residual with the remaining sherds being unidentifiable. Within this residual group Baetican Dressel 20s are the most common form attested.

Interpretation

The ceramic evidence from this site would seem to support the architectural dating evidence and the proportions of material from the deposits are what one would expect given their dates. The utility of this is that the *Vigna Barberini* is one of few sites where it is possible to see the change between the importation of goods from other parts of the Mediterranean and the subsequent dominance of African products. What is interesting about the earlier deposits is that Baetican oil amphorae are well represented despite the persistent notion that all these amphorae were disposed of at *Monte Testaccio*. The presence of another destruction/abandonment deposit on the *Palatine* in the Late Antique period raises serious questions about changes in the usage of urban space within this period.

[582] Contra Villedieu 2004: 78-79. The published table has a discrepancy between the total given and the actual total for the sum of all figures.

Chapter 8: Interpreting the Rome data

Towards a synthesis of the Rome data

Given that the nature of the data available means that direct comparison between sites is difficult if not impossible in all cases, it has been necessary to find some way of using the material recovered to inform our understanding of the patterns of distribution and nature of the Late Antique townscape. The work which I have undertaken has lessened the impact which some of the initial problems in the published data would have caused this study. However it has been impossible to attain a completely satisfactory dataset. The principal problem remaining in the dataset relates to the quality of the recorded data pertaining to the context within which the ceramic material was recovered. With little information recorded about the area or depth of the excavations the ideal calculations of density for the pottery are impossible and a modified methodology must be employed in order to synthesise the data and draw interpretation from it. Whilst a number of patterns can be discerned from just a cursory examination of the raw data it is still necessary to find a means of conflating the figures for the individual sites and also providing a means to statistically support the interpretation advanced on this basis. Although to date there has not been sufficient data to carry this out a number of studies have used a revised density calculation based on surface area[583]. Whilst this is far from ideal it can allow for a more reasoned appreciation of the orders of magnitude concerned. Providing that this method is used carefully and critically it is a perfectly feasible analytical tool, if not one which would be employed if the dataset were ideal. In the meantime a number of very general themes can be discerned from the data collected.

Patterns and anomalies

As can clearly be seen from the tabulated data there is a wide range in the total quantities of material recovered both in terms of weight and sherd count[584]. This is difficult to reconcile without some appreciation of the volume of the excavations and a comparison between these absolute figures is unenlightening. Slightly more interesting is the relative proportion of the various provenances within the deposits, particularly in terms of the material classified here as residual. The generally low level is suggestive of the material assemblage as a whole being a signifier of behaviour in the Late Empire (c. 4th – 6th centuries) however the increased quantity in the Palatine East group is suggestive of a re-deposition of earlier material.

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[583]Most notably this is used in surface collection surveys to varying degrees eg. Schofield 1991; Keay et al. 2005.

[584] See Appendix D.

The more interesting level of interpretation is achieved through understanding the contexts of these deposits. At the *Schola Praeconum* and *Domus Tiberiana* we are looking at large quantities of material being deposited in former public buildings in the centre of the city. Indeed, these two sites are on opposite sides of the Palatine and so would probably be the last places one would expect to find an accumulation of rubbish in a city functioning in the same way it had been doing for the preceding centuries. The deposit located adjacent to the *Crypta Balbi*, the *Via di Sant'Alberto Magno* and the Palatine East assemblages are all from formerly domestic contexts. Certainly in the case of the Palatine East and *Via di Sant'Alberto Magno* these reveal civic attitudes towards areas which had previously been the sites of high status housing. Although the *Via di Sant'Alberto Magno* deposit is relatively small it is significant that it occurs in what had been considered a very desirable residential area in antiquity. Of all these deposits, the one which conforms least to the overall pattern of major deposits is the assemblage from the *Atrium Vestae*. It represents a very short, small-scale depositional episode which possibly reveals more about every-day attitudes to waste disposal in this period than many of the other sites. The overarching pattern of these deposits appears to suggest that there was some form of control over waste deposition in the city. Most are short lived, homogenous deposits of large quantities of material in areas which, due to their prior function must have required an official decision to sanction their use for this purpose. The deposit in the *Atrium Vestae* appears to be the complete opposite of this, a small ad-hoc deposition which the excavators interpreted as being a result of single episode of feasting.

Reconstructing the Late Antique townscape

One of the key developments which can be made through this work is enhancing our understanding of the nature of late antique townscapes. This work, whilst focusing on ostensibly economic data and providing important evidence of economic practices is also key to redefining our understanding of late antique urban populations and the ways in which they were using the fabric of the city. Whilst a fundamental reassessment of late antique urbanism is beyond the scope of this particular research, the results presented here hint that the notion of a significant decline in population may be groundless. Both the quantities of material involved in the majority of the deposits studied here and the locations, nature and chronology of deposition argue for a vibrant urban community continuing well beyond the end of the Empire in the West and into the medieval period. The work undertaken as part of this thesis has collated the individual plans existing for these sites into an integrated CAD plan of the city, taking account of other work on mapping Rome[585]. The location of churches I Late Antiquity has received some attention

[585] E.g. Haselberger 2002.

in recent scholarship and can be said to be a dominant part of the discussion of Late Antique urban landscapes[586]. This research intends to push the interpretation of urban spaces in Late Antiquity beyond a discussion of ecclesiastical foundations and to begin to understand the totality of the topography of the cities of the Empire. This combined with the ceramic material discussed in the course of this research, will demonstrate that an archaeologically based approach to such data can offer a new perspective on this particular urban centre in late antiquity.

Space and society

Use of space within the built environment is a critical issue in this study. The relationships between built structures and their use within a social system is well established[587]. However, it is important to understand that it is the whole of the built environment which constrains, reflects and is shaped by these cultural activities. The use of one particular architecturally defined space is related to the use of other spaces around it, both within a given structure and in the wider urban landscape[588]. The built environment is therefore a means of encoding and demonstrating the socio-cultural values of the builders and disseminating and reinforcing these values in the community as a whole[589]. This study however, is concerned not with the creation of structures and the social structures which this reflects but with the abandonment, re-use and adaptation of buildings in the Late Antique period and the subsequent implications of this for social practice. Of primary concern is the degree to which the deposition of waste material within urban structures indicates a fundamental shift in the way in which these spaces were being used and the attitudes of the population to these waste products. Ethnographical examples of ceramic waste deposition show that in at least some cases there is no real distinction made between the interior and exterior spaces of habitable areas in respect of places suitable for deposition[590]. This is also borne out in the different attitudes to waste between the Mesakin and Moro in the Nuba hills of Sudan[591]. This acceptance of waste in the habitation by the Mesakin goes as far as their eating in the central compound of their dwellings which are also the areas where most of their waste is deposited[592]. However, this apparent acceptance of refuse within the central living space is not entirely accurate as the Mesakin are deemed to have a more developed fear of pollution, they merely feel that the internal decoration of their compounds serves to symbolically cleanse the space[593]. This

[586] See Lavan 2003; Gauthier 1999.
[587] Rapoport 1990: 11
[588] See Rapoport 1990: 12.
[589] Sanders 1990: 45.
[590] Hodder, 1982: 147.
[591] Hodder 1982: 154.
[592] Hodder 1982: 161.
[593] Hodder 1982: 182.

has also been discussed in relation to processes leading to the formation of the archaeological record[594]. Some archaeological approaches to space in Late Antiquity have been concerned with structuring space around "activity areas" and the use of textual sources as a proxy for ethnographical evidence[595]. Whilst this may ostensibly seem to be a profitable means of addressing issues of the use of space in antiquity, it is site specific and acts to decontextualise the sites under study from their surroundings.

Interpreting the GIS

Interpreting the data stored and interrogated through the GIS is in some respects a much simpler process in comparison to what the task would have been without the use of this software. It offers a readily understandable, graphical medium for presenting spatial data and the results of statistical processes and location based comparisons undertaken on that data. Whilst this is the case, the results displayed in this manner are not conclusive and must be interpreted in the same way as all archaeological data. These spatial distributions of the available data are perhaps the most obvious and immediately apparent examples of the utility of the GIS for investigating data with a spatial dimension. Elements of the data studied for this thesis are no exception and a very cursory inspection of the cartographic presentation afforded by the GIS is instructive, at the very least posing further questions to be answered through more detailed investigation of the sites concerned. One of the key uses of the GIS and CAD in this study has been to compare the locations of the ceramic deposition sites studied with other categories of archaeological sites known within the city in the relevant period. This has taken the form of a series of point theme overlays whereby the distance between these different site types can be assessed along with the frequency of their distribution. Principally this has involved plotting the locations of the early 4th and 5th Century ecclesiastical sites, the Imperial Roman monuments and Imperial pagan temples. Each of these themes will be returned to individually and in more detail later in this chapter. However firstly it is important to understand that through the proximity of waste deposition sites to these monuments and other architectural types, it is possible to form an interpretation of the motives behind the disposal of these products, the location of said deposits and the nature of the authority behind such decisions.

In addition to this investigation of the sites of deposition based on the locations of other defined structures, is a discussion of the location of the deposits based on slightly less well defined areas within the city. One of the principal criteria used to determine the access cost calculations for the deposits has been the distance at which they are situated

[594] Hodder1982a: 65.
[595] Lavan 2003: 184-185.

from the *Emporium* area. Of necessity this zone has a somewhat ill defined edge[596] however it and other areas such as the *Fora* and *Palatine* played an important role in shaping the urban landscape and any interference or introduction of new functions to these areas should be seen as significant in the development of that urban environment. In a similar vein, where the layout of the intra-urban Late Antique road network is known, this has been plotted and used as a tool for understanding the distribution of the deposition sites, not merely from the point of view whereby the roads facilitate access to a dump site but also as a way of comparing the locations of deposition in relation to the roads with the location of other forms of architectural foundation to those same roads. Any similarities or discrepancies will again prove instructive both in the understanding of those areas within the city which remain in use but also the way in which the positioning of the deposits under consideration can be seen as a conscious administrative or political decision and to what extent we may be seeing opportunistic deposition with little or no fixed planning.

The other most obvious spatial characteristics of the data feed into the calculation of access costs as outlined above[597]. They also however bear some discussion in an empirical manner as point data in their own right. The distribution of the sites in relation to the river, the warehouse area of the *Emporium* and each other is critical to understanding the mechanisms by which the goods, which had previously been the contents of the ceramic materials recovered through excavation, moved into and around the city.

The spatial characteristics of this dataset are vitally important to forming a holistic view of the available information; one which moves beyond the detailed but necessarily limited theses reliant on data from sites in isolation. Whilst the interpretation of the data to be presented here must be seen as pertinent to the data available at the time of publication it is of course the case that this may be modified by future discoveries or a reinterpretation of the existing data. Whilst it would be supremely arrogant to suggest that the overall interpretation to be presented here is a final or conclusive assessment of the nature of the urban landscape and the impact of Late Antique waste deposits upon that landscape, it is the method by which these interpretations are drawn and the demonstration of an interpretative methodology by which we might begin to seriously interrogate quantitative data in order to address these questions which, in addition to the interpretation of the data collected here is the key contribution of this work.

The first problem encountered when attempting this synthetic study of the amphorae from excavated deposits in Rome was finding a method whereby the recorded

[596] The definition of this zone for the purposes of the GIS is discussed in Chp. 7; p 89.
[597] pp 82-86.

data from various deposits could be directly compared. The variety of methodologies employed on site, not to mention the disparate times at which the excavations were undertaken resulted in not only a fragmentary archaeological record but also one where consistency in recording was only at best applicable within a given site. The divergent goals of the excavators coupled with the availability, or lack, of suitable typologies for describing the finds left many potential sites sorely lacking in providing a suitable quantitative basis for undertaking this work. In order to effectively utilise the data it has therefore been necessary to modify the methodology to be employed. Where possible, densities have been calculated which enable detailed analyses of those sites to be performed. Comparisons of these densities across key sites can reveal details of possible patterns in the dataset, which can then be further elaborated through the integration of data from the less complete assemblages. These other data can still provide an important means of comparison with the core data and the patterns within the assemblages can be related to those from sites where density can be calculated in order to extend the relevance and implications of the interpretation derived from these data across a wider area.

Whilst it is not possible to entirely dissociate the quantitative assessment of the material from the spatial element of the interpretation of the changing urban environment of Late Antique Rome it is possible to undertake a great deal of interpretation purely on the basis of the locations of the sites relating to the supply and distribution of the basic foodstuffs which formed part of the *Annona*. Whilst this may seem contrary to the assertions made earlier in this work, it is a corollary of the nature of the evidence that the ceramic material cannot be solely relied upon for our evidence and that there is in fact a great deal of evidence to be drawn from the architectural and epigraphic evidence associated with the buildings through which these goods passed. The nature of the development of Rome over the past two millennia and the archaeological and antiquarian investigations into the material history of the city have conspired to ensure that there are significant gaps in the archaeological record for particular areas which will most likely never be filled. However, where unscientific excavation or unrestrained redevelopment of the city have compromised the possibility of recovering ceramic material or other artefactual evidence, there are in several instances other forms of evidence to which we may turn. Principally for this study, this has involved the collation of various sources of evidence for those buildings which we can with some degree of probability associate with the movement of the *Annona* goods into the city. The surveys of Lanciani, and the excavations undertaken in the city to recover the "glories of Imperial Rome" offer a window, albeit a restricted one, through which we may undertake to explain the nature of the city in antiquity. In addition to these early scholarly investigations into the ancient urban fabric, we are particularly privileged in the specific case of Rome to have several

fragments of the *Forma Urbis Marmorae* executed under the rule of Septimius Severus. When complete, these offer a schematic plan of the whole city. The particular advantage of this most ancient of maps being its representation of the features of the city albeit with some apparent bias towards those deemed most important by its governors. In the case of Rome, the continued and regular supply of foodstuffs to support the population were always of concern to the ruling elite and those buildings concerned with its storage and distribution were unlikely to have been omitted from the *Forma Urbis*. It is through this that the locations of the structures of the *Emporium* can be extrapolated and the significance of the extent of the warehousing in this district is not to be underestimated. Whilst the ports of Claudius and Trajan at Portus are amply provided with *horrea* the journey time upriver from the coast would have prohibited these being used as storage for the immediate needs of the city[598]. The *horrea* of Rome are not only numerous, their capacity is significant even if one believes the upper population estimates of a million inhabitants in the High Empire, but they are located within a focussed area. The area where *horrea* are found within the city is not consistent across the whole period of the occupation of the city as part of the Roman Empire, indeed the late Republican levels on the Palatine show evidence of *horrea*. What is clear however is that by the time the city begins to accept a sort of formal structured plan, the vast majority of the storage installations are located on the lower reaches of the Tiber, in the area known as the *Emporium*, to the south of the *Aventine* hill. Whilst this may not have been the sole focus of the import activity there is strong evidence to suggest that it was the focus of oil imports, at least until the late 3rd Century[599]. Though *Monte Testaccio* is included in the sites selected for this study, it has been made clear that it really represents an earlier period of use and a different attitude to the use of urban space may well have been in prevalence. What this enormous refuse site does show is that the scale of oil imports to the city was vast. The sheer scale of the hill is an enduring testament to the key role that olive oil played in the lives of the people of the ancient Mediterranean. It is also the key comparative site for Early Imperial disposal practices and hence invaluable in assessing the nature of the depositional process in Late Antiquity. Most Romanists with even a passing knowledge of ceramics are aware that something quite strange happens in the mid 3rd Century. Suddenly and almost without warning the previously varied ceramic record is flooded by a range of cheap African imports and ARS dominates the ceramic record to an unprecedented degree. The same effect is observed in the remains of the amphorae in use as well. Whereas *Monte Testaccio* is composed almost entirely of Baetican Dressel 20

[598] See Keay et al. 2005 for the most recent work to be carried out in defining the horrea of Portus through geophysical and topographical survey. Also see Witcher 2005 for an appreciation of the relationship between Rome and the Suburbium.
[599] See De Caprariis 1999.

amphorae, attesting the importance of the Guadalquivir in supplying the oil requirements of the city, any deposit of later material is likely to produce a series of amphorae within which North African forms are dominant. Whatever the motivation for the change, from the late third century onwards *Monte Testaccio* remains unused. Despite the references to a "Piccolo Testaccio" no obvious successor to *Monte Testaccio* exists within the city. It is only through the discovery of significant quantities of Late Roman amphorae in Late Antique waste deposits that we can begin to understand the changing nature of the depositional process, the use of urban spaces in Late Antiquity and through this material the nature of the supply of these staple goods within the city. We must turn to these other, less obvious sources for direct evidence of the containers within which the oil, by this time part of the *Annona*, was brought into the city. This thesis has set out a methodology for the study of the remains of these containers and has discussed the assemblages and the sites from which they are derived. The following sections will continue to discuss the ways in which this data can be combined and interrogated holistically and contextually in order to further our knowledge of the distribution of these goods and the changing use of space within the Late Antique city.

Using quantified data: the idealistic approach

As previously discussed[600], given an ideal data-set it would be possible to compare the quantified data directly between sites by means of a calculation of the density of the finds within each deposit. As this has not been possible for all of the sites studied here due to incomplete records being made or maintained for some of the sites, an alternative means of using the data has been employed. However, there are three sites within the centre of the study area from which it has been possible to recover all of the data necessary to calculate densities. Whilst such a small sample cannot be used to make generalisations about the overall character of the total sample of sites from Rome, it is important to explore the potential of the methodology advocated in this thesis. The three deposits which will be used for this purpose are the SP1 deposit from the *Schola Praeconum*, the deposit from the *Atrium Vestae* and the deposit from *Ambiente D* of the excavations in the North West corner of the *Forum Romanum*. Interestingly, the only other site for which this type of analysis would have been possible is the recent Spanish excavation on *Monte Testaccio*. The *Testaccio* data however, would not be particularly enlightening; due to the nature of the site artificially high densities of material would be unavoidable and would provide little comparative information for interpreting the remaining three. To this end, the evaluation of the ideal methodology has been restricted to the three sites mentioned previously.

[600] See Methodology Chp. 6.

Detailed discussion of the individual sites can be found in the previous chapter[601]. As the material has already been discussed in relation to each site, this discussion will focus on the comparisons between the material from these sites and the possible implications of the patterns elucidated. The total density of African amphorae from the *Forum* is $1.04^{Kg}/_{m}^{3}$, the *Schola Praeconum* is $12.09\ ^{Kg}/_{m}^{3}$, and the *Atrium Vestae* $1.07\ ^{Kg}/_{m}^{3}$. In order to give an idea of the order of magnitude of the density for African amphorae within these deposits, the excavations on *Monte Testaccio* produced densities in the region of $64.29\ ^{Kg}/_{m}^{3}$ from a reasonably representative stratum of the excavation. Obviously *Testaccio* is not a particularly enlightening comparison, as the hill is almost entirely constituted from amphora fragments. It does however give an idea of the relative scarcity of amphorae in the deposits elsewhere. Considering that African amphorae are also far less well represented on *Monte Testaccio* in comparison to the Baetican oil amphorae and indeed in comparison to the proportions of African amphorae in other Late Antique deposits, this discrepancy is itself revealing. The total amphora density for the stratum in question is actually $307.14\ ^{Kg}/_{m}^{3}$. The totals for the *Forum*, *Schola Praeconum* and *Atrium Vestae* are $2.84^{Kg}/_{m}^{3}$, $19.5^{Kg}/_{m}^{3}$ and $10.62^{Kg}/_{m}^{3}$ respectively. This vast difference is not necessarily significant but it serves to reinforce the question as to what is happening in regard to amphora disposal after the cessation of deposition at *Monte Testaccio*.

Within the three sites available to test this methodology there is also a marked variation in the total density of amphora remains. The *Schola Praeconum* deposit contains nearly twice as much amphora material as the *Atrium Vestae*, which itself contains over three times the material from the *Forum*. What is particularly surprising about this is that the *Atrium Vestae* material is derived from such a small area of excavation. Continuing to compare the densities of Eastern types one can see that the *Schola Praeconum* produced 5.12 $^{Kg}/_{m}^{3}$ with the *Atrium Vestae* producing $2.86\ ^{Kg}/_{m}^{3}$ and the *Forum* $2.16\ ^{Kg}/_{m}^{3}$. Although these values are much closer together in absolute terms, it is also striking to note that the *Atrium Vestae* and the *Forum* are again, in this instance much more uniform than the *Schola Praeconum* which is around double the density of the other two sites. Densities of amphorae definitely provenanced to other regions are negligible though the high density of unidentified sherds from the *Schola Praeconum* may, at least in part, be attributable to unclassified Southern Italian forms. The close correlation between the densities of the *Atrium Vestae* deposit and the *Ambiente D* from the *Forum* is suggestive of a potential norm for the background level of amphora waste expected on a given site. The close correlation between the figures for these two sites, also borne out by the Southern Italian amphorae[602], is in some respects surprising when considering the nature of the two deposits. Whereas

[601] Chp. 7.
[602] See figures in Appendix D

Ambiente D has been interpreted as a deposit accruing as a consequence of disuse, the deposit in the *Atrium Vestae* has been seen as an intentional deposition of waste after a single episode of feasting[603]. There are two plausible explanations for this. Firstly, it is possible that rather than a single feasting episode, the deposit in the *Atrium Vestae* is actually a limited quantity of waste accumulated over a short time as a result of normal patterns of consumption. The problem with this being that it does not appear to tally with the faunal evidence from the deposit. The second hypothesis is that both deposits are representative of normal consumption practices, however the *Atrium Vestae* deposit is formed as a result of excess consumption of oil, wine etc. and therefore displays the same characteristics as the *Forum* deposit, albeit on a much reduced scale. The importance of this should not be underestimated, the absolute quantities in question are vastly discrepant, approximately 10Kg of amphorae from the *Atrium Vestae* and 50Kg from *Ambiente D*. Whilst the number of unidentified fragments may cause some concern, the African and Eastern amphora types are sufficiently well known to allow a broad geographical grouping to be made on the basis of fabric alone and as such it is possible to state with a high degree of certainty that none of the remaining unidentified sherds belong to either of these groups. The similarity in densities for these key regional groupings is much more enlightening than previous comparisons of percentages. It must be stressed that data from two sites do not make a pattern and this is particularly apparent when considering the data from the *Schola Praeconum*. That the density of African amphorae at the *Schola Praeconum* is significant is beyond doubt, the meaning of this high density is however less clear. If the *Forum* and *Atrium Vestae* are representative of a "normal" level of deposition then we can see the *Schola Praeconum* as representing an intense depositional process and perhaps the deliberate filling of the area with waste material as opposed to a gradual accumulation of debris in a disused area.

As previously stated, it is difficult to justify any wide reaching interpretation on the basis of only three sites. However, the discussion of these sites should have shown how a knowledge of the density of amphora remains within these deposits enables them to be directly compared with one another. Whilst any interpretation of this data must be tempered by knowledge of the context of each deposit, this type of data offers an important means of looking at broad patterns of disposal and consequently also of consumption. The significance of the *Schola Praeconum* deposit is that in comparison with the other two deposits for which densities have been calculated, it strongly suggests a structured, intentional deposition of this material within the area of the building. The idea that increased density can be equated to intentionality in the depositional process is interesting and potentially a very useful interpretative tool. Whilst some caution must be

[603] See p 110.

maintained, this is certainly an area which would be worth further study as more data becomes available.

Core sites

As previously discussed[604], this thesis is based on the evidence from 6 core case studies with additional data drawn in from a further 6 sites and also from *Monte Testaccio* which, although falling outside the time period of this study is a useful comparative to the later data. One of the key issues in understanding the archaeology of Late Imperial Rome is the apparent lack of a replacement for *Monte Testaccio* after the 3rd Century. The relationship between this structured disposal site for amphorae and the subsequent prevalence of dispersed, less discriminatory deposits in Late Antiquity is not well understood. Furthermore despite strong evidence for the continued import of vast quantities of grain, oil and wine into Rome in this period, the absence of a large disposal site similar to *Testaccio* has left scholars either doubting the continued import of large quantities of ceramic containers, or looking for an as yet undiscovered "Late Antique Testaccio". In contrast to this I would argue that the high concentration of Dressel 20 amphorae at *Monte Testaccio* is reflective of a high degree of centralisation in the control and distribution of the oil supply of the city. Whilst there is no reason to suppose that following the addition of oil to the *Annona*, there would be any lessening of the centralised control over supply, it appears that there may well have been a more dispersed pattern of distribution.

Whilst the remaining core sites do not offer quite the same quality of data as the three previously discussed, the recording of weight and inclusion of body sherds in the quantified data is crucial in rendering these assemblages more suitable for study and evaluation than many of the other published sites within the city. The *Via di San'Alberto Magno*, *Crypta Balbi* and *Domus Tiberiana* excavations all produced a quantity of useful data which required some re-study but essentially provide sufficient information for the assemblages to be studied in their own right. The major problem with these sites, and the reason that they cannot be fully exploited is that no record of the volumes excavated was kept, nor has it been possible to reconstruct this from the extant plans or section drawings[605]. The particular details of these sites have already been discussed, along with an appraisal of the material assemblages recovered from them. Their wider significance can however only be assessed in relation to each other and to the sites previously discussed. The first thing to be noted about this group of sites is that they all have produced material from a number of different excavated contexts. In the case of the *Domus Tiberiana* and the

[604] See Chp. 7 on site selection.

[605] In the Case of the Room to the South East of the Crypta, no data at all had been published and plans were exceedingly difficult to come by.

Via di Sant'Alberto Magno these are successive strata overlaying one another within a fairly restricted area, the *Crypta Balbi* provides a number of contexts from three discrete areas within the wider area of the *Crypta Balbi* and an adjacent *insula*. The *Crypta Balbi* offers particular challenges in forming an interpretation as both published and newly studied data has been incorporated. The individual deposits have already been discussed, however it now remains to explore the potential for these assemblages to reveal not only the different histories and significance of the various areas within and around the old theatre of *Balbus* but also their relationship to the wider urban environment in Late Antique Rome. Of principal significance is the deposition of a number of layers of refuse both within the *cryptoporticus* of the Theatre and also the adjacent *insulae* from the 4th Century onwards. Despite the remodelling of part of the *insula* for use as a Mithraeum, use of the area as a stable in the 5th Century is attested and there is some evidence of occupation into the 6th Century, the collapse of the building and accumulation of debris in the 7th Century is contemporaneous with the deposits formed in the exedra of the *Crypta*. Whilst it is difficult to quantitatively compare the amphora assemblages from the various areas within the *Crypta Balbi* due to differences in recording strategies and the inaccessibility of the material from the earlier excavations for re-study, some clear trends are present. The difficulty lies in that the Exedra deposit is so much larger than any of the other deposits studied[606] that incorporating it into a holistic interpretation on a quantitative basis is difficult at best. This exceptional nature is however significant if we relate this deposit to the *Schola Praeconum*. Whilst the area of the Exedra is large, at around 80m^3 of material, it is not sufficiently much larger than the excavated area of the *Schola Praeconum* to explain the vastly increased quantity of amphora sherds recovered solely on the basis of it being an excavation of a larger area. It is plausible, though unfortunately unverifiable to suggest that this also is an intentional deposition in the vein of the SP1 deposit, writ large. Indeed, the material derived from the *insula* is much more of the order of magnitude recovered from the SP1 deposit. Despite there only being approximately 30% of the material from the assemblage actually available for study the quantity is already within the range of the *Forum* deposit. The size of the deposit in the room adjacent to the *Crypta Balbi* would appear to be no larger than the excavated area of the SP1 deposit. Although not a particularly statistical comparison, the rough equation of these sites is possible and may be suggestive of a patterning of deposition which will become clearer as more data from this project is fed into the interpretation. If this is indeed the case it may be possible to suggest that the quantities of waste amphorae deposited at these locations are a result of structured and intentional deposition practices. The *Domus Tiberiana* excavation would appear to be slightly less well appointed than the *Schola Praeconum*, in fact producing fewer sherds of

[606] With the obvious exception of Monte Testaccio

amphora fabric than the *Ambiente D* assemblage. Though it is quite difficult to assess the total size of the excavations which produced this material it is feasible to suggest from the plans that they were certainly not significantly smaller than the area excavated for the SP1 deposit. This would then suggest that the deposit is not a significant deposition of waste material, though it may well have been intentionally formed in a single episode. Rather the character of the deposit and its relationship to the other deposits previously discussed is indicative of the sort of ordinary deposition postulated for the *Atrium Vestae* and *Ambiente D*. The data from the *Via di Sant'Alberto Magno* is somewhat more contentious. Due to the common process of study, no weights were initially recorded and by the time the material was restudied as part of this thesis, only the body sherds from one stratigraphic unit were remaining. The absolute quantified figures for the deposit are therefore very low in comparison to the other sites studied and unfortunately without knowing the exact dimensions of that individual archaeological context it is impossible to assess the significance of this material beyond the site itself. What is clear however, is that the assemblage comprises part of a deposit made within what had hitherto been a high status dwelling within a very prestigious area of the city. It is unlikely to have been utilised as a waste deposit lightly if there were persons of consequence still living there and so is indicative of the general trend, seen throughout the evidence so far discussed, for the abandonment and re-use of open and formerly private spaces for the purposes of waste disposal. One may presume that this was undertaken for the purposes of keeping other, more important areas free from accumulated debris and is a theme to which we will return later.

Secondary sites

In addition to the core sites studied as part of this project, a further half dozen sites have been selected, mostly within the study area but also including one site outside the area in order to provide a greater depth of comparative material. The quality of the data from the majority of these remaining sites is lower than from the core sites due to the necessity of relying solely on published data. Due to the conventions of these publications no weight data was recorded and for a great many of the sites sherd counts were probably not included in the totals. The one notable exception is *Monte Testaccio* for which both weight and volume information is available, the site remaining as a peripheral site to this study due to its principal usage being prior to the period with which this study is concerned. The majority of these sites are also from the *Palatine*, though from differing contexts and different flanks of the hill.

The *Bastione Farnesino* is located a short distance away from the *Domus Tiberiana* excavations, in the same part of the palace complex though overlooking the western slope

of the *Palatine*. With only a total of 3,500 sherds from an excavated area slightly larger than many of the other deposits previously discussed, this site would seem to fit into the emerging pattern of small scale deposits in disused buildings. Whilst this assemblage is composed of material from a number of stratigraphic units, the vast majority of the material is derived from a single stratum deemed to be an abandonment layer by the excavators. Although comprising a larger area it is slightly surprising that this quantity is almost three times that of the *Domus Tiberiana* excavations. Whilst impossible to directly compare the quantified data it may be significant that the *Bastione Farnesino* also contained a number of inhumation burials around the same time as many of the ceramic deposits were being formed. This may signify that the whole area to the west of the *Domus Tiberiana* was falling into disrepair and disuse whilst the northern flank, overlooking the *Forum Romanum* and the *Via Nova* from whence the excavated material from the *Domus Tiberiana* was derived, remained structurally intact. It may have been considered important to retain the character of this area as a backdrop for the *Forum* and Basilica of *Maxentius* in order to retain the connection of the political focus of the city with the authority of its antiquity unchanging at least in appearance.

The Palatine East excavations are located a short distance from the *Colosseum* near the end of the *Sacra Via*. The assemblage under consideration is derived from the excavation of a Late Roman domus and due to its location is a key site for understanding the development of this area of the city in Late Antiquity. The problems associated with the publication of the site and deposit have already been discussed[607]. The information available from the site suggests a series of short depositional episodes, despite the lack of body sherds as part of the counts their weight is known and suggests a heavy preponderance of African types. As the total weight is greater than the *Schola Praeconum* and the excavated area almost certainly no larger than that of the SP1 it is quite reasonable to suggest that this site exhibits the characteristics of an intentional, structured deposition. The site also bears many other topographical similarities to the *Schola Praeconum*, which will be discussed in more detail when we turn to the analysis of the topographical data through the GIS.

The Temple of the *Magna Mater* occupies an important location on the south-western slope of the Palatine and is also an important part of the fabric of the city, being one of the oldest temple foundations. The temple precinct, the Temple of Victory and the *Clivus Victoriae* represent an important public space in Republican and Imperial Rome. The presence of this deposit adjacent to the temple precinct and the high incidence of residual material are suggestive of a clearance deposit from an adjacent area. Furthermore

[607] pp 105-108.

the low count of material would suggest that whilst the clearance may have been part of some directed strategy for the area, the deposition of material in the area was conditioned more by the need to remove an accumulation of debris in an adjacent area than by a decision to form a deposit in a vacant building. The principal problem with attempting to use the quantitative data in comparison with that from other sites is that there is no indication within the publication as to whether it includes body sherds or if it is merely the diagnostic pieces. The scale of the assemblage may therefore be substantially reduced from the actual quantity of excavated material. Given these constraints it is difficult to see this assemblage as being anything other than an ad-hoc necessity. The undifferentiated nature of the deposit and the high proportion of residual material contained within it, argue for it being the re-deposition of material from one or more nearby accumulations.

Located to the east of the Palatine, overlooking the site of the Palatine East excavations and the valley of the *Colosseum*, the *Vigna Barberini* contains the area of the 3rd century temple of *Heligobalus* and its surrounding precinct. The clear distinction between the three phases of deposition within the recovered assemblage demonstrates that in the first two instances the recovered material can be seen as levelling material or fill for new construction within the area. Only the last phase of deposition can be interpreted as a waste deposit. This latest deposit consisted of few sherds, less than a thousand, and due to the slightly uncertain overall size of the deposit, comparison with the other sites studied is difficult. The location of the Late Antique deposit is not particularly conclusive though in relation to the other sites and the surrounding topography of the city it may be of more interest.

The early Christian basilica adjacent to the church of San Sisto Vecchio lies outside the study area and was included in the study to provide a counterpoint and some comparison to try to address any question of their being a particular patterning within the results peculiar to the zone chosen for detailed analysis. The majority of the material recovered is derived from levelling deposits made prior to the construction of the basilica in the late 4th or early 5th centuries. The data is also slightly skewed as the author of the report tended to select specimens which would lend themselves to the analytical methods developed through the project. One has to assume that the sample taken is representative of the population of the deposit as a whole but with no indication of what proportion of the total quantity of material it represents quantification is impossible. Whilst the nature of the deposit is seemingly straightforward its implications for this study are less obvious. The use of amphorae as filling for foundations or as a means of lightening concrete

vaulting is well attested[608]. We should not be surprised to find disused amphorae used in foundation deposits, particularly in a damp area, as there are precedents for such techniques in harbour installations across the Roman world[609]. What is interesting is that very few of the other sites show signs of deposition for this purpose.

Monte Testaccio has appeared throughout this discussion of the sites studied for this thesis as a comparison to the data derived from excavation of Late Antique and Early Medieval deposits of amphorae. The process which led to the formation of this huge deposit of waste amphorae had no obvious reason to suddenly cease in the late 3rd Century and has led to the question, already raised[610], of what happens to all of the oil amphorae in the succeeding period. *Monte Testaccio* is a unique site and as such comparative quantification is unenlightening[611]. The excavations on *Monte Testaccio* have revealed that the density of amphorae there was fifteen times greater even than the *Schola Praeconum*, which has by far the highest density of any of the sites investigated in detail for this thesis. The true significance of *Testaccio* is twofold. Firstly it reminds us of how small the quantities of amphorae yet recovered through excavation of the Late Antique layers really are and encourages us to seek explanation for their presence. Secondly, it acts as a monument to the unique nature of Rome for in no other city, not even in Constantinople is such a dump expected or even sought.

Accessibility as a determinant of deposit location

So far in this discussion of the results of the project we have kept to the strictly quantitative aspect of the ceramic data. However, the understanding of this data within the context of the late antique city as a whole is of crucial importance to furthering the interpretation of the process of deposition and beginning to make sense of the distributive processes preceding it. The methodologies employed in the construction of a GIS framework within which to interrogate this data has already been discussed[612]. It is my intention here to expound upon the results of this project and thereby further enhance the emerging interpretation of the data in relation to the key issues of the distribution of staples within the city in the Late Antique period and the significance of the locations of these deposits for our understanding of the way in which the urban landscape was being populated and used. The principal factor in determining the location of the sites is their accessibility. As has previously been discussed, this is a combination of several factors.

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608 The circus of Maxentius on the Via Appia outside of Rome is a particularly visible example of the use of empty amphorae in poured concrete.
609 Notably the large amphora wall at Myos Hormos.
610 See de Caprariis 1999: 227-231.
611 Despite references to a "piccolo Testaccio" of later date nearby no archaeological investigation has to this date been carried out.
612 pp 79-82; 141-145.

Firstly, the degree to which a given area has been built upon or may otherwise have access through it restricted by man-made or natural obstacles to movement. Secondly, the distance at which the deposit is located from the potential entry points into the city of the wharves and docks along the Tiber and also the distance from the major storage facilities in the *Emporium* area. Thirdly, the accessibility of the site is dependent upon its elevation above the level of the river. Though these three considerations are fairly straightforward, an appreciation of the degree to which the deposit sites studied in this thesis may have been affected by or even dependent upon these factors will be extremely important in determining the interpretation of their significance. In order to retain as much transparency as possible in the reckoning of these relative accessibility calculations and to provide for later reinterpretation in light of any new evidence, each facet of this process will be dealt with separately before the integrated results are discussed.

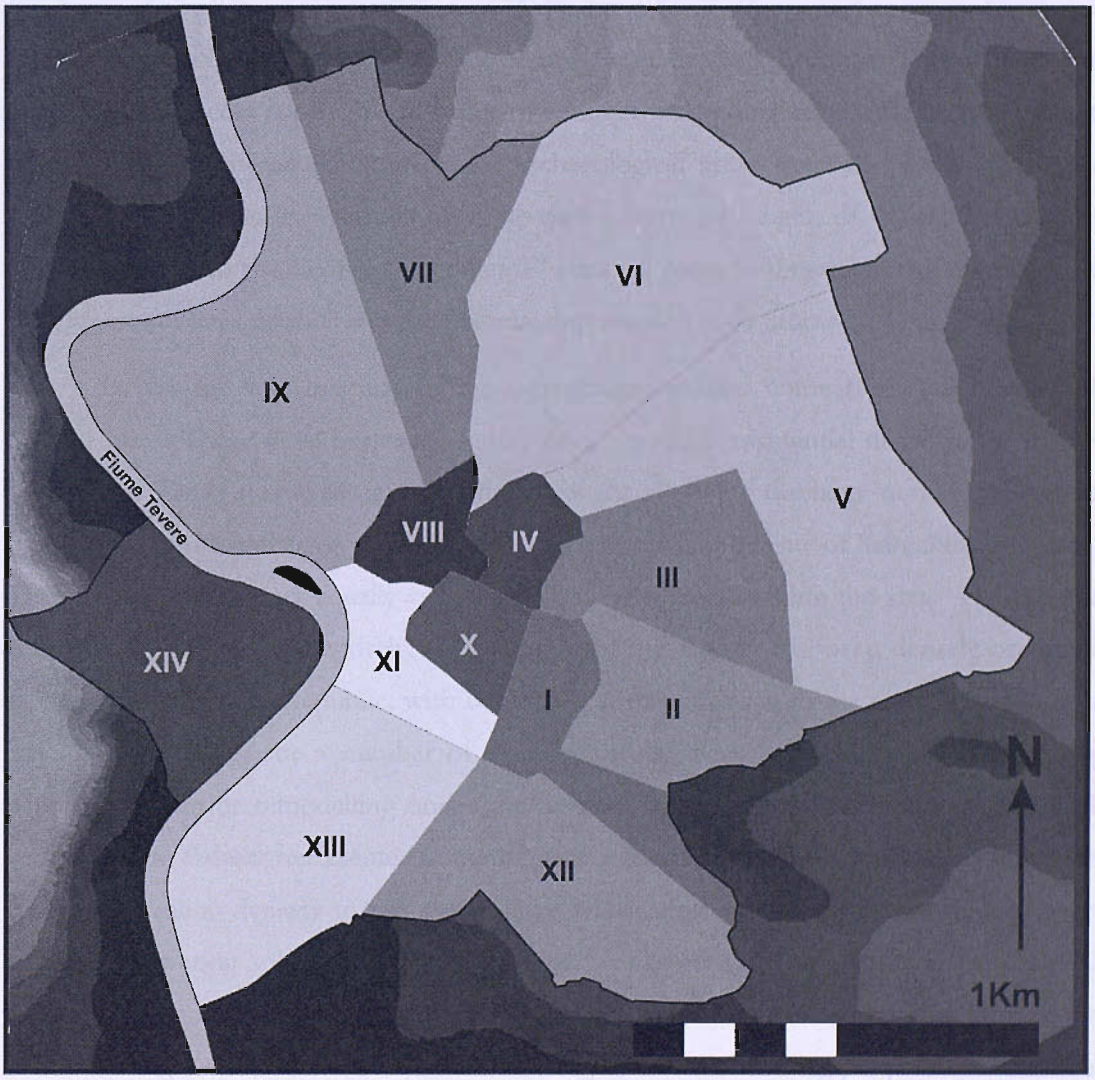


Fig. 21: Residential densities in each of the 14 Augustan Regions of Rome

The most immediate conclusion which may be observed from the residential density map is that none of the sites investigated lie within the least densely occupied area, that of the *Circus Maximus* and *Forum Boarium*, *Regio XI*. Whilst this may be due to the lack of recovery within this area of late antique material, it may also be due to the continued importance of these areas in the life of the city in Late Antiquity. As the *Forum Boarium* had been an important commercial area in earlier times and there is no direct evidence to suggest that this function ceased in the Late Empire this is understandable for this part of the Region. The importance of the stadium or hippodrome to the political life of Late Antique urban centres has also been stressed[613] and may account for the lack of deposition within the immediate area of the *Circus Maximus*[614]. Whilst it is important to re-iterate the old maxim that absence of evidence is not evidence of absence, there are convincing explanations for the lack of deposits in these areas. It should be noted also at this stage that the high incidence of deposits in the central areas of the city is for the most part congruent with the modern archaeological area of the *Forum* and *Palatine*. This produces an environment where greater access is possible in order to conduct archaeological research. However, it should be remembered that the central archaeological areas have also been subject to extensive antiquarian excavations over the past century or longer, of which the primary concern was often to uncover the "pristine" classical form of the architectural remains at the expense of later periods and the material deposited at such times.

By far the vast majority of the assemblages studied come from the *Forum* and *Palatine* areas. These were both assessed to have very high residential densities[615]. In the case of the *Forum* this is more a situation brought about by the large number of public buildings, temples and open public spaces than a significant density of habitable structures. They would however act equally well to constrain movement within the area. The *Palatine* is a different proposition entirely. The summit of the *Palatine* had been densely occupied from at least the early Republic, with habitation stretching back to the earliest days of the city and had undergone a number of changes through the Imperial period culminating with the last major remodelling under the Severan dynasty in the later part of the third century. The *Palatine* represented something of a contradiction as it presented the public face of the ruling dynasty to the city at large whilst attempting to preserve their privacy within its towering substructures and terraces[616]. The location of a number of deposits within the area of the *Palatine* is in some ways quite surprising. Particularly notable about the assemblages under consideration in this study is that whilst being peripheral to the true

[613] Cameron 1976

[614] LTUR I: 272-277 for description of the circus and its immediate surroundings.

[615] 10 & 8 respectively.

[616] See Mar 2005 for a discussion of the changing architectural form of the Imperial Palaces on the *Palatine* and their relationship to the city.

centre of the hill, they are not restricted to the lower slopes and in some cases have clearly been inserted into sections of the Imperial palace complex.

The *Aventine* is the second most accessible region in the city and from this perspective it is unsurprising to find two of the assemblages within this area. The remaining assemblages from the *Campus Martius* and the region known as *Piscina Publica* are equally unremarkable in terms of the residential density of their surroundings. Given the uncertainty surrounding the question of how far recovery of archaeological material or the lack thereof has influenced the locations of the assemblages studied here it is difficult to draw too many conclusions from the numbers of sites in any given region. However, what is clear from the data recovered is that the five-fold increase in residential density in the *Palatine* region as compared to the *Aventine* was not a bar to the use of sites within this region as dumps for amphora and other waste. Indeed, this may be of the greatest significance when interpreting the results.

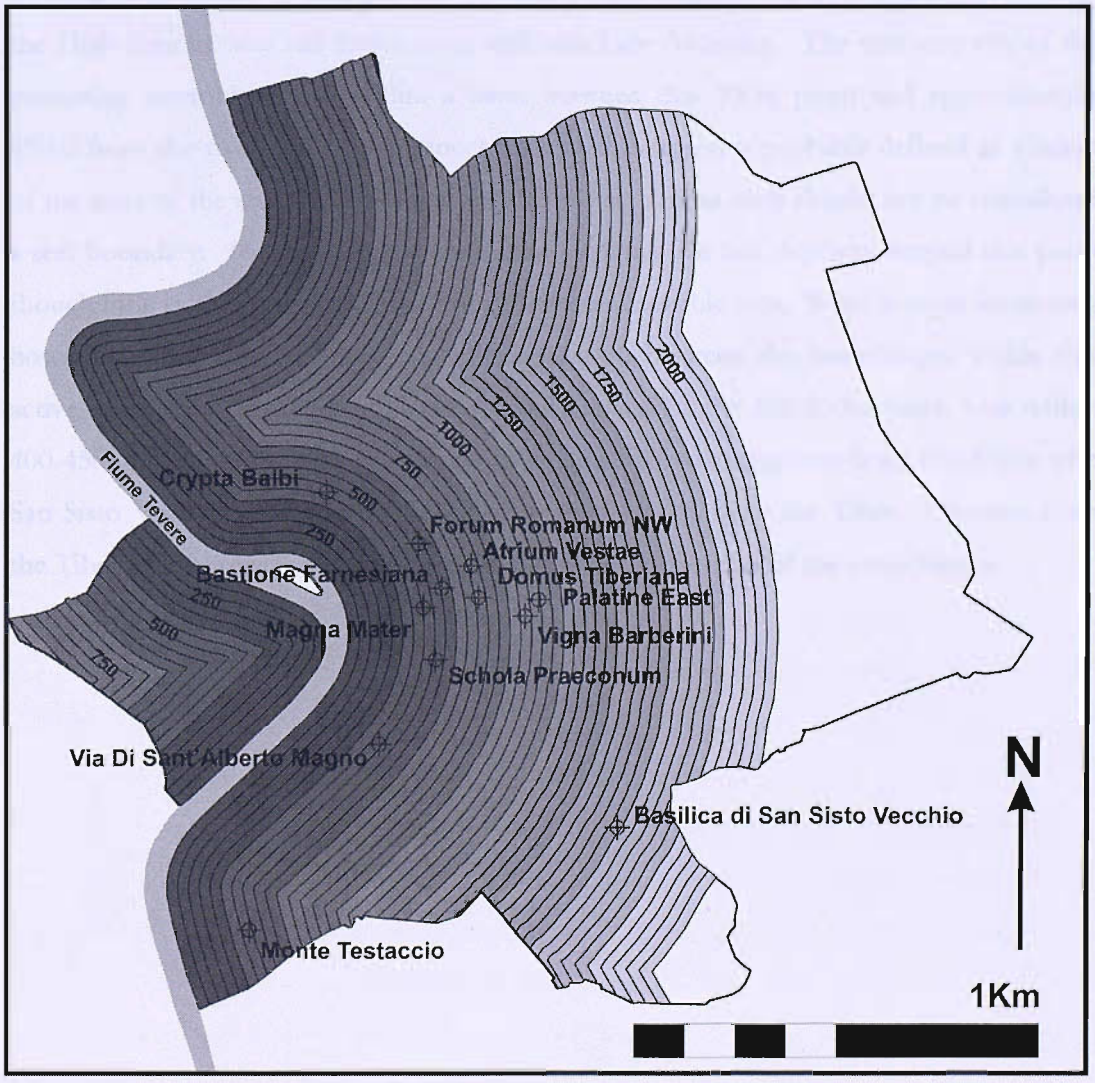


Fig. 22: Distance of sites investigated from the Tiber.

In dealing with the distances of the assemblages from the Tiber and *Emporium* it has become apparent that a number of trends exist within the data. Firstly and perhaps most surprisingly, none of the assemblages lie closer than 300m from the edge of the river. This does not appear to be related to the edge of the Tiber floodplain though the elevation of the sites above the level of the river is something which will be discussed in more detail later. Whilst it may be easy to critique this conclusion on the basis of the unknown potential of the zone closer to the river for producing sites with late antique ceramic material, it should be noted that in those sites which have been excavated along the riverside, amphorae are recovered as abandoned in commercial structures[617]. Whilst it may not offer a complete explanation, I would suggest that at least for the part of the river from *Testaccio* in the south as far upriver as the *Forum Boarium* and *Insula* the lack of material found within this riverside zone is a result of the commercial nature of the properties within it. Future research may confirm or disprove this, however it is a useful working hypothesis. If tenable, this position would suggest that the commercial zone of the High Empire was still functioning well into Late Antiquity. The vast majority of the remaining assemblages fall within a band between this 300m point and approximately 850m from the river. The furthermost limit of this region is probably defined as a result of the edge of the study area defined for the project and as such should not be considered a real boundary. Indeed, there is continued evidence for late deposits beyond this point though little in the way of published or otherwise accessible data. What is more interesting however, is the lack of any spatial differentiation between the assemblages within this active zone. Six of the assemblages studied are within the 300-350m band, four within 400-450m, one at 450-500m, two at 60-650m and the remaining sites from 650-850m with San Sisto Vecchio as an outlier at approximately 1500m from the Tiber. Distance from the Tiber is not however the only consideration in the location of the assemblages.

[617] eg. Mocchegiani Carpano & Meneghini 1985; 1987. The Lungotevere Testaccio excavations which recovered an unknown quantity of amphorae in the storerooms along the Tiber. An attempt was made to access this material for the purposes of this research however it was impossible to find anyone who could actually remember where it had been consigned.

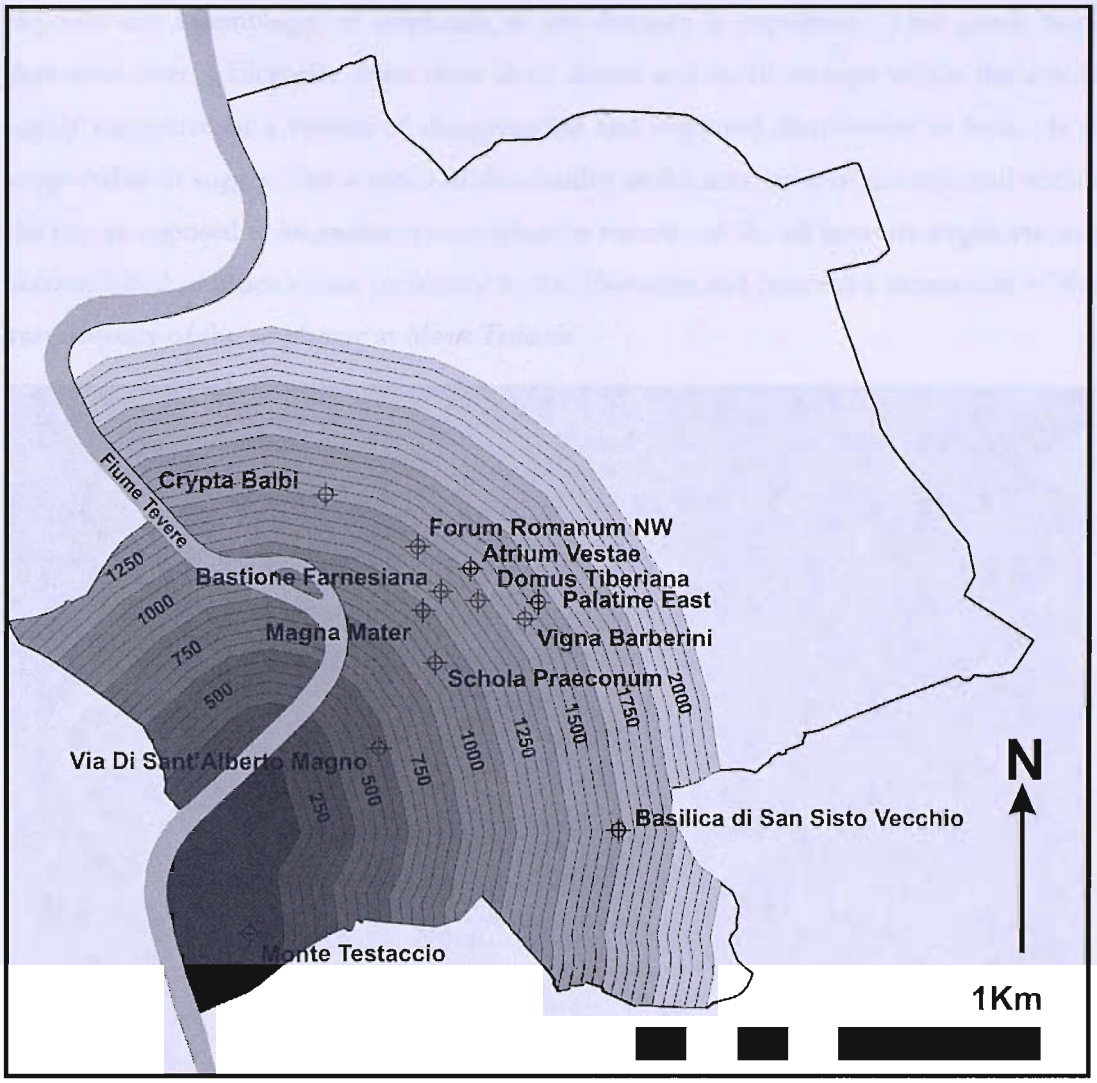


Fig. 23: Distance of sites investigated from the Emporium.

In addition to this it was decided to appraise the distance of the deposits from the *Emporium* area which was defined by the extant remains of *horrea* and dock installations, along with the representations of such structures from the *Forma Urbis Marmorae* and archaeological plans of the city. The northern limit of the area defined was congruent with the line of known late antique streets in the area. Apart from the exception of *Monte Testaccio*, none of the assemblages are located within this area. The majority of the deposits are in fact located over a kilometre from the *Emporium* with all bar three of the assemblages falling within the 1000-1500m range. Again it is likely that the limits of the study area condition the upper limit of this range. The lower limit follows no discernable topographical line and as such may be significant in furthering the interpretation of this data. The lack of data from within the *Emporium* area is a clear indicator of a shift in practice from the late 3rd century when deposition ceased on *Monte Testaccio*. It is interesting however that there should be such a great distance between this zone and the majority of the assemblages. Whilst not conclusively suggesting anything other than that there is a lack of evidence for deposition closer to the *Emporium* area, the presence of

deposits and assemblages of amphorae at this distance is important. That goods were deposited over a kilometre from their likely access and initial storage within the city is highly suggestive of a system of disaggregated and dispersed distribution in bulk. It is supportable to suggest that a series of distributive nodes may have been employed within the city as opposed to an earlier system whereby transfer of the oil from its amphorae was accomplished in much closer proximity to the *Emporium* and hence the deposition of the vast majority of the amphorae at *Monte Testaccio*.

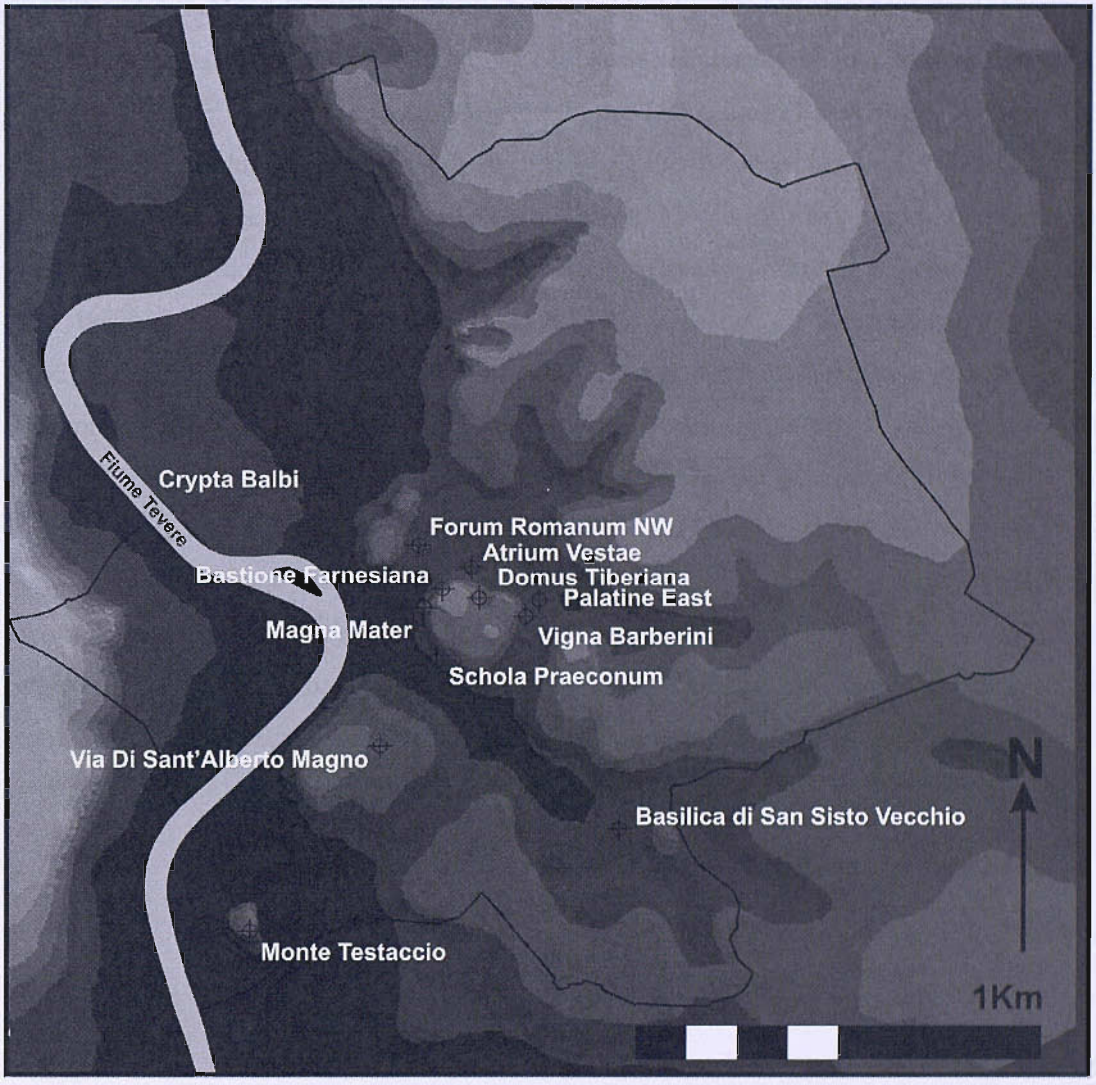


Fig. 24: Locations of sites investigated against the topographic background of the city.

So far we have been discussing the sites from which the ceramic assemblages under consideration have been derived as points upon a laminar surface. In reality the urban topography of Rome was conditioned by the relief of its hills and watersheds, these would also have played their part in determining the locations at which it was deemed sensible or practicable to dispose of the waste amphorae which came to form the assemblages under consideration here. The elevations of the deposits are reasonably well spread across the available range. Five sites lie between the mean level of the river at 15m and 20m above Mean Sea Level, *Monte Testaccio* should probably also be included within this group though the upper layers would obviously technically be at a higher elevation. Only the Palatine East lies between 20-30m and the *Via di Sant'Alberto Magno* between 30-40m. The remaining three sites were all over 40m above Mean Sea Level. Whilst again comparisons between the numbers at any given elevation may not be particularly enlightening due to the impossibility of assessing how many additional deposits there may have been or may remain to be discovered, the presence of deposits both on the floodplain and atop the hills suggests that elevation may not have been a decisive factor in determining the location of the deposits. If one includes all the other sites identified as being of relevance to the Late Antique *Annona* the mean elevation of the sites is approximately 24m above Mean Sea Level, all of the sites bar the three sites on top of the *Palatine* fall within one standard-deviation of this mean. Whilst these statistics may be incomplete and based on a reasonably small dataset, the lack of any possibility for there to be significant outliers due to the natural topography of the city would only serve to strengthen the compact nature of the figures.

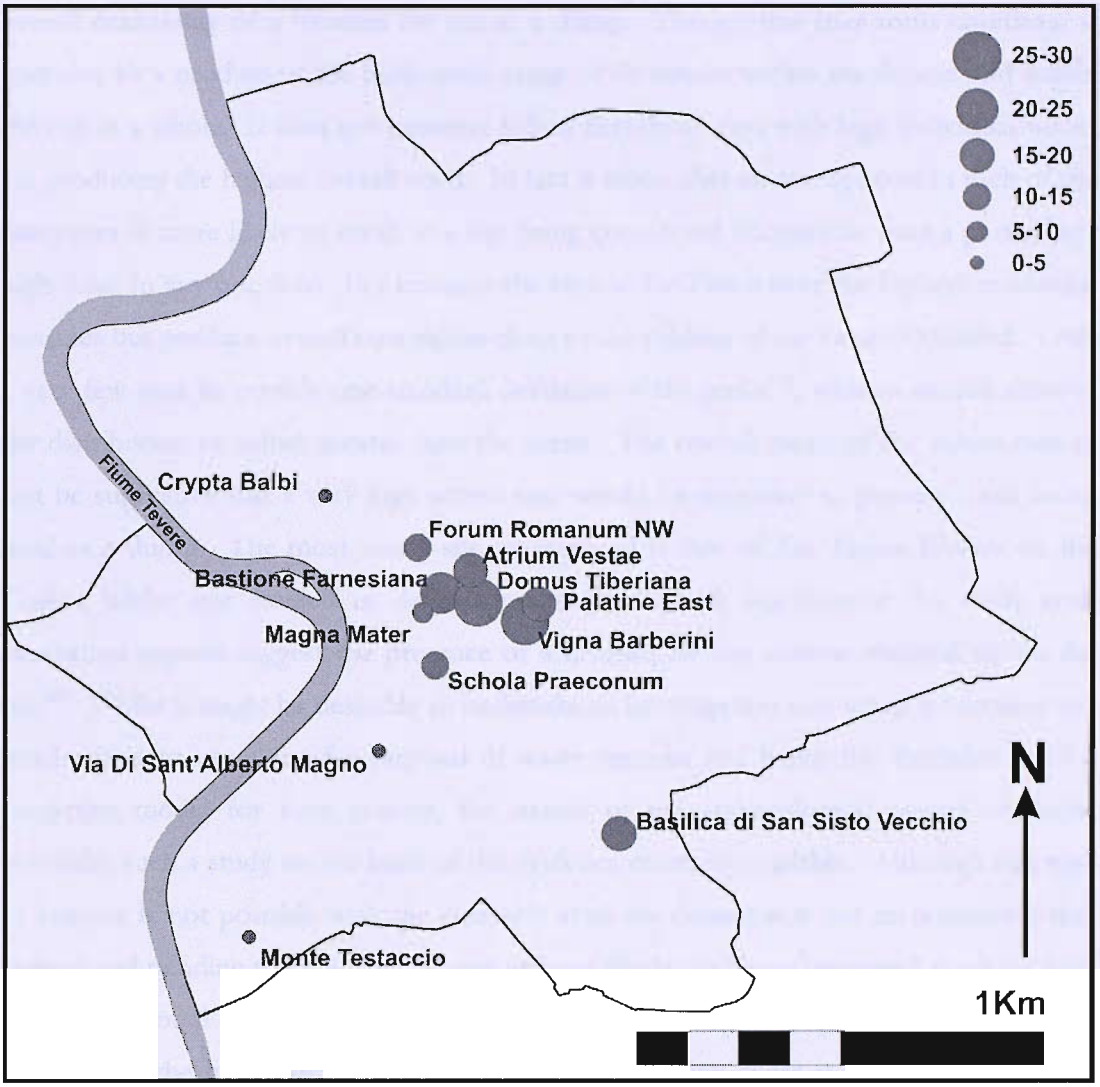


Fig. 25: Total access costs of sites investigated.

As previously stated, the intention of this GIS based interrogation of the data was to produce a unified means of assessing the access cost of the sites at which the deposits of amphorae had accumulated. The individual and aggregated costs for access to each site can be seen tabulated below[618]. Whilst the individual costs are informative and enhance our understanding of the urban environment and its impact upon the accessibility of the sites studied here, they are only the first stage in understanding the processes behind the selection of these sites for the disposal of waste. The total access costs are in many ways more than the sum of their parts. The variance between the different cost surfaces is indicative of the relative importance of each specific factor in determining accessibility whereas the composite cost reflects the overall ease of access to a particular site, accounting for the cumulative effect of these determinants. Interestingly, despite the equal weight given to the three factors investigated it is those sites located within areas of high residential density and at a great distance from the Tiber and *Emporium* which appear to have the highest cost-values. The elevation of the sites appears to have little impact on the

[618] Table 1.

overall desirability of a location for use as a dump. Though this may seem significant it may also be a product of the fairly small range of elevations within the dataset and within the city as a whole. It does not however follow that those sites with high individual values are producing the highest overall costs. In fact it seems that an average cost in each of the categories is more likely to result in a site being considered undesirable than a particularly high value in any one field. For instance the sites in the *Forum* have the highest residential densities but produce overall cost values close to the median of the values exhibited. Only a very few sites lie outside one standard deviation of the mean[619], with an overall skew to the distribution of values greater than the mean. The overall range of the values may in fact be suggestive that a very high access cost would be necessary to prevent a site being used as a dump. The most costly site investigated is that of *San Stefano Rotondo* on the *Caelian*, whilst not studied in detail for this thesis as it lies outside the study area, excavation reports suggest the presence of a quantity of late antique material within the site[620]. Whilst it might be desirable to undertake an investigation into when it becomes too much effort to use a site for disposal of waste material and hence the formulation of a predictive model for such activity, the nature of the archaeological record of Rome precludes such a study on the basis of the evidence currently available. Although this type of analysis is not possible with the currently available dataset it is not inconceivable that current and pending work within the city will enable this to be incorporated at a later date. Thus, this would aid the development of a modelling tool which has wider implications and despite the limitations of the dataset in this direction there is much which can be drawn from the data presented here, even from those sites where a less than ideal dataset was available.

[619] Those with very low access costs include the *Horrea Lollina*, *Lungotevere Testaccio* and *Porticus Aemilia* which explains or at the very least reflects the choice of these sites for storage and transhipment facilities. Those with very high access costs seem to be biased towards sites outside the study area and with the notable exceptions of the *Domus Tiberiana* and *Bastione Farnesino* this can almost certainly be ascribed to their distance from the river and the *Emporium*.

[620] Martin 2004.

Site_Name	Region	Res. Cost	Dist. Cost	Elev. Cost	Total Cost
Schola Praeconum	X: Palatium	8.000	4.333	3.000	10.40
Crypta Balbi	VIIII: Circus Flaminius	4.000	5.333	2.000	4.27
Palatine East	X: Palatium	8.000	6.333	3.000	15.20
Horrea Lolliana	XIII: Aventinus	2.000	1.000	2.000	0.40
Horrea Petroniana	XIII: Aventinus	2.000	1.333	4.000	1.07
Horrea Galbana	XIII: Aventinus	2.000	1.333	2.000	0.53
Horrea Agippiana	VIII: Forum Romanum vel Magnum	10.000	5.000	3.000	15.00
Columna Minucia	XI: Circus Maximus	1.000	3.000	2.000	0.60
Meta Sudans	IV: Tempulum Pacis	9.000	2.333	3.000	6.30
Porticus Minucia	VIIII: Circus Flaminius	4.000	5.667	2.000	4.53
Statio Annonae	XI: Circus Maximus	1.000	3.000	2.000	0.60
Monte Testaccio	XIII: Aventinus	2.000	1.333	2.000	0.53
Magna Mater	X: Palatium	8.000	4.000	3.000	9.60
Porticus Aemilia	XIII: Aventinus	2.000	1.000	2.000	0.40
Lungotevere Testaccio	XIII: Aventinus	2.000	1.000	2.000	0.40
San Sisto Vecchio	I: Porta Capena	7.000	8.000	3.000	16.80
Atrium Vestae	VIII: Forum Romanum vel Magnum	10.000	6.000	3.000	18.00
Santa Susanna	VI: Alta Semita	3.000	9.667	7.000	20.30
San Clemente	III: Isis et Serapis	6.000	9.333	4.000	22.40
San Stefano Rotondo	II: Caelimontium	6.000	8.667	6.000	31.20
Vigna Barberini	X: Palatium	8.000	6.000	6.000	28.80
San Marco	VIIII: Circus Flaminius	4.000	6.333	2.000	5.07
San Pasquale	XIV: Transtiberim	9.000	2.667	2.000	4.80
San Lorenzo in Damaso	VIIII: Circus Flaminius	4.000	6.000	3.000	7.20
Bastione Farnesina	X: Palatium	8.000	5.000	6.000	24.00
Foro Romano NO	VIII: Forum Romanum vel Magnum	10.000	5.000	3.000	15.00
Via SantAlberto Magno	XIII: Aventinus	2.000	2.667	6.000	3.20
Domus Tiberiana	X: Palatium	8.000	6.000	6.000	28.80

Table 1: Access cost breakdown by site

The quantified data has already been discussed in some detail; the relationship between the quantities of ceramics recovered from the various sites and the cost of accessing them has revealed some interesting patterns or rather the lack thereof. The greater quantity of sites for which there are either weight or sherd count data show very little if any patterning and their use as an interpretative tool in this way is somewhat dubious as there is no way of assessing whether greater or lesser quantities of material are recovered as a result of the lack of deposition in the first place or due to the dimensions of the site. Again the use of artefact densities provides a correction to this problem by removing the possibility of variation due to deposit sizes. Despite this there is no obvious correlation between the density of deposition and the access costs of the sites. Removing *Monte Testaccio* from the dataset makes this more apparent. Its very high density and low

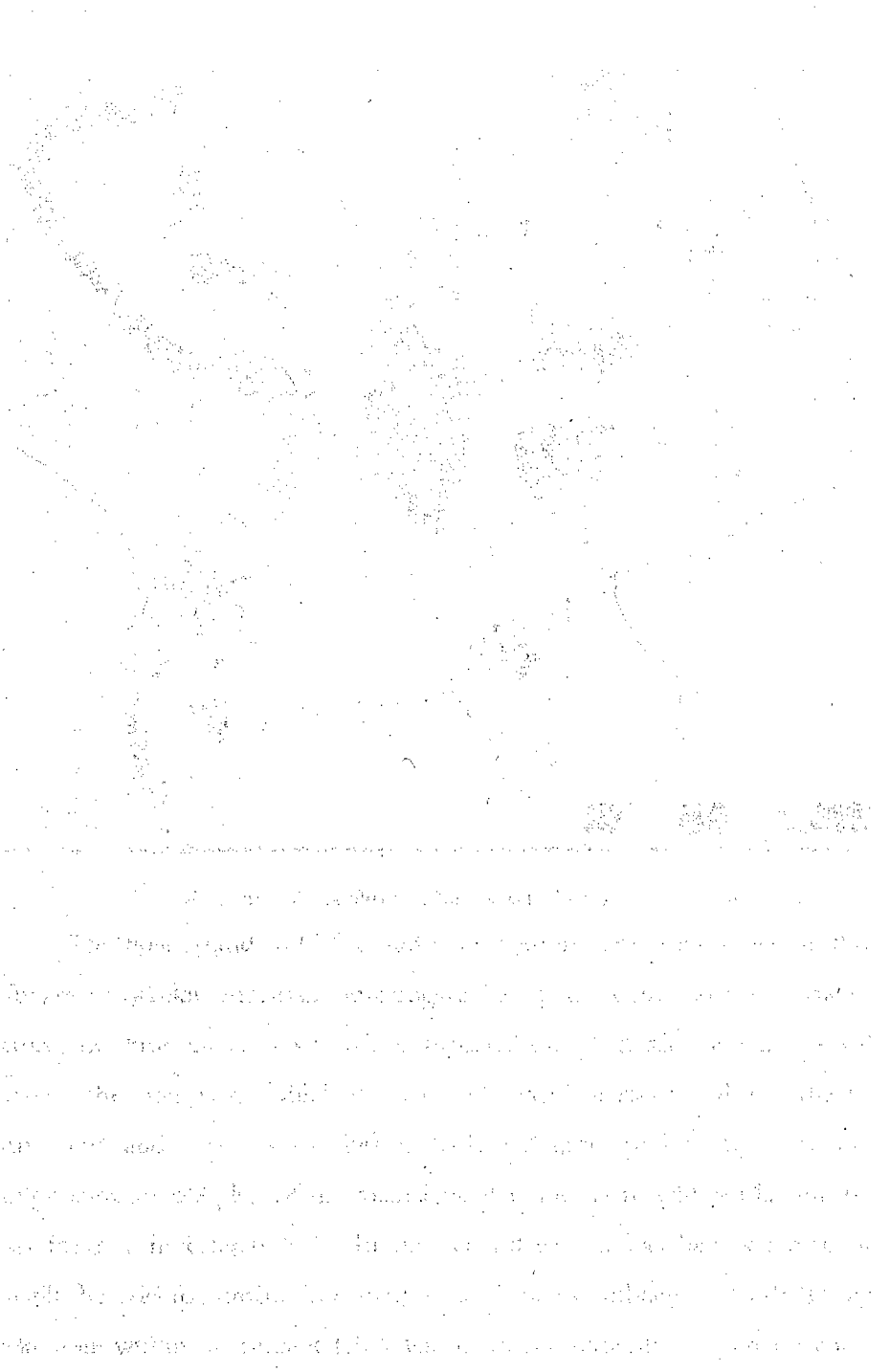
costs are a symptom of the very specific purpose for which the *Testaccio* site was used and are atypical of the dataset as a whole and therefore skew the data from such a small sample into an apparently inversely proportional relationship between these variables. Despite the small size of the sample it is possible to state that no relationship exists, the *Schola Praeconum* displays the lowest of the costs but highest amphora density. The lowest density is found at the *Foro Romano NO* excavation, which displays a high access cost yet not so high as that of the *Atrium Vestae* where the density is broadly in the middle of the range. The overall impression is therefore that the density or quantity of material present on a given site is not contingent upon the cost of accessing the deposit. This is a trend which is not immediately apparent from the more simplistic datasets where no density calculation has been possible.

Site	Sum Of Weight	Sum Of Sherd count	Sum Of Density	Cost
Bastione Farnesina	0	3517	0	24
Casa dei Vestali	9.989	341	10.62	18
Crypta Balbi	61.937	46023	0	4.27
Domus Tiberiana	80.094	1293	0	28.8
Foro Romano N-O	49.304	2069	2.84	15
Magna Mater	0	715	0	9.6
Monte Testaccio	19547	0	307.143	0.53
Palatine East	411.3	2377	0	15.2
San Sisto Vecchio	0	369	0	16.8
Schola Praeconum	261.82	10277	19.5	10.4
Via SantAlberto Magno	47.481	496	0	3.2
Vigna Barberini	0	5580	0	28.8

Table 2: Costs against ceramic quantification for the sites studied in detail

It would therefore appear that accessibility, as a determinant of the location of the deposits is more important than the quantity of material requiring deposition. The fact that greater absolute quantities are found in some sites with lower access costs does not preclude reasonably large quantities being deposited in sites with higher costs. In the cases of the *Crypta Balbi* and *Monte Testaccio* the degree of space within the site is more likely to have influenced the quantity of the material deposited there than any difficulty in moving large quantities of material around the city as there is no evidence that the deposition was carried out within a short timeframe. In the case of *Monte Testaccio* there is conclusive evidence that the deposition was extended over a period of centuries. The fact that high cost sites are used at all is somewhat surprising and the issue of deposition in the *fora* and on the *Palatine* is one of the most obvious yet least well-apprehended aspects of the urban transformations occurring in Late Antiquity. High cost sites are used for the deposition of quantities of ceramic and other waste in Late Antiquity and a number of them have been discussed in this thesis, whilst the lack of evidence for deposition on other sites of this nature is not nearly sufficient to explain the presence of waste in the high cost sites studied, as an anomaly in the dataset. Whilst some patterning can therefore be discerned

on the basis of the access cost calculations it would appear that there are other, perhaps more important factors also involved in the dedication of a site for use as a waste deposit.



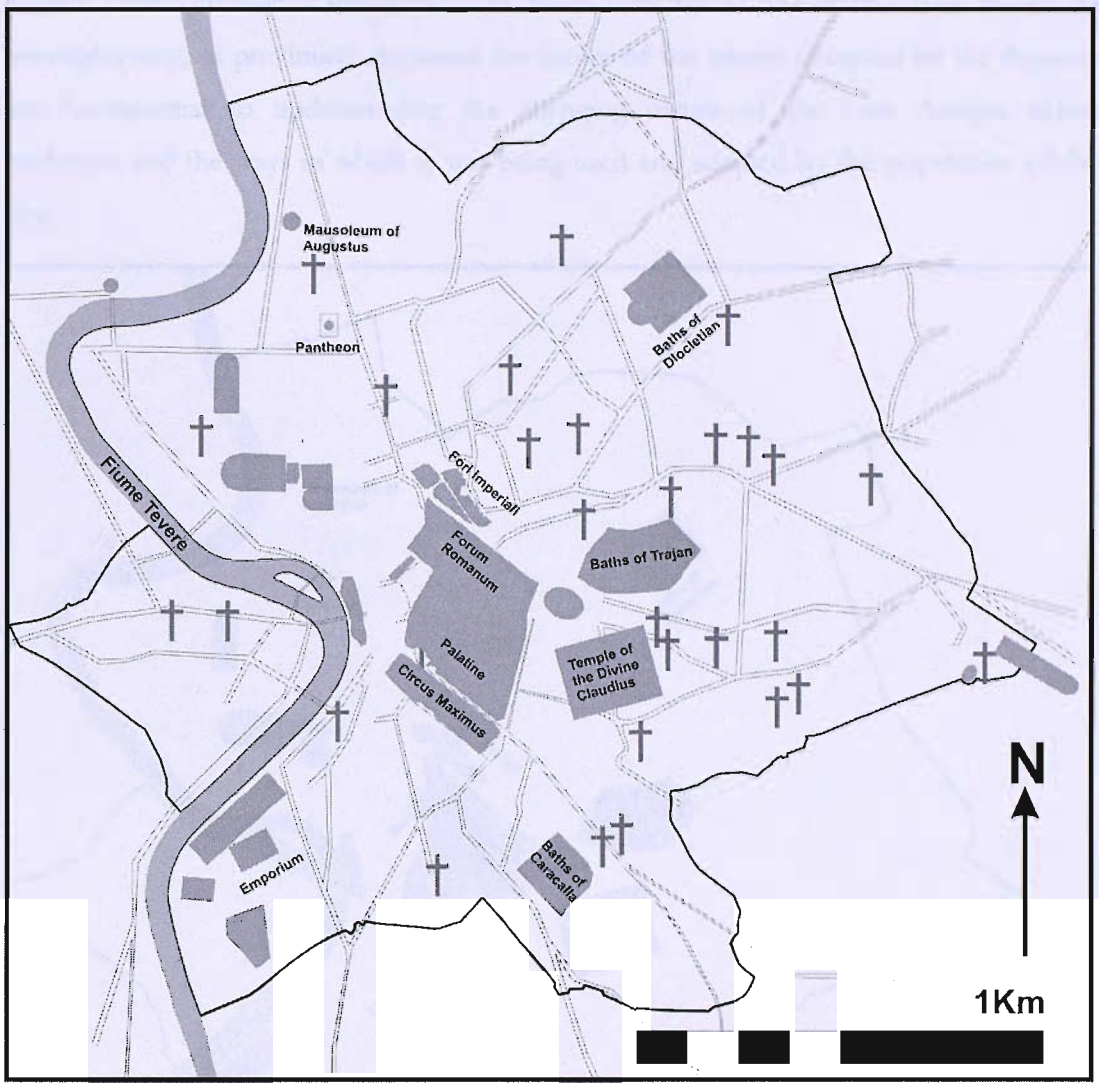


Fig. 26: Archaeological background to the Late Antique city.

The final strand of GIS based investigation once again relies on the ability of the software to quickly and easily interrogate the spatial data and assign proximity between features of different classes. In this instance the proximity of features will be assessed between the sites from which the assemblages were recovered and the roads, Imperial monuments and Ecclesiastical sites of the Late Antique period. In the first case, a tenuous though supportable plan of the main Late Antique thoroughfares has been provided as a basis for this investigation[621]. In the second case it has been deemed unnecessary to consult the GIS for further information as all the assemblages with the exception of *Monte Testaccio* lie within or immediately adjacent to monumental Imperial architecture or high status public or private buildings. The widespread presence of monumental architecture within the city and particularly within the study area defined for this research would leave little possibility for any interpretation beyond that all the deposits studied in detail are

[621] Guidobaldi 2001: 48.

within close proximity to some form of monumental architecture or are within enclosed private areas. Whilst a simplistic GIS based analysis of the spatial data would be unenlightening, as previously discussed the nature of the spaces occupied by the deposits are fundamental to understanding the changing nature of the Late Antique urban landscape and the ways in which it was being used and adapted by the population of the city.

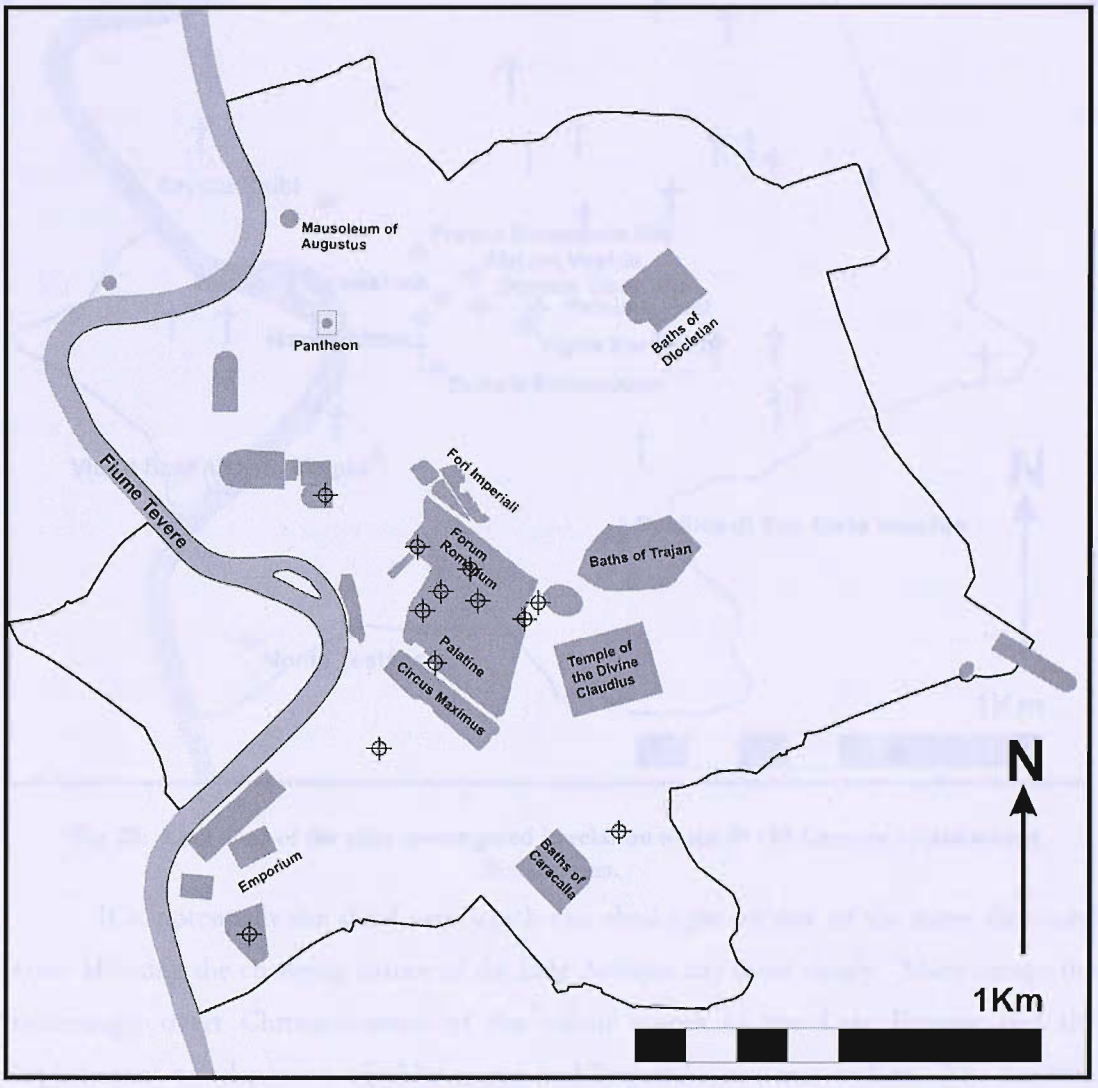


Fig. 27: Locations of the sites investigated in relation to the monumental background of the city.

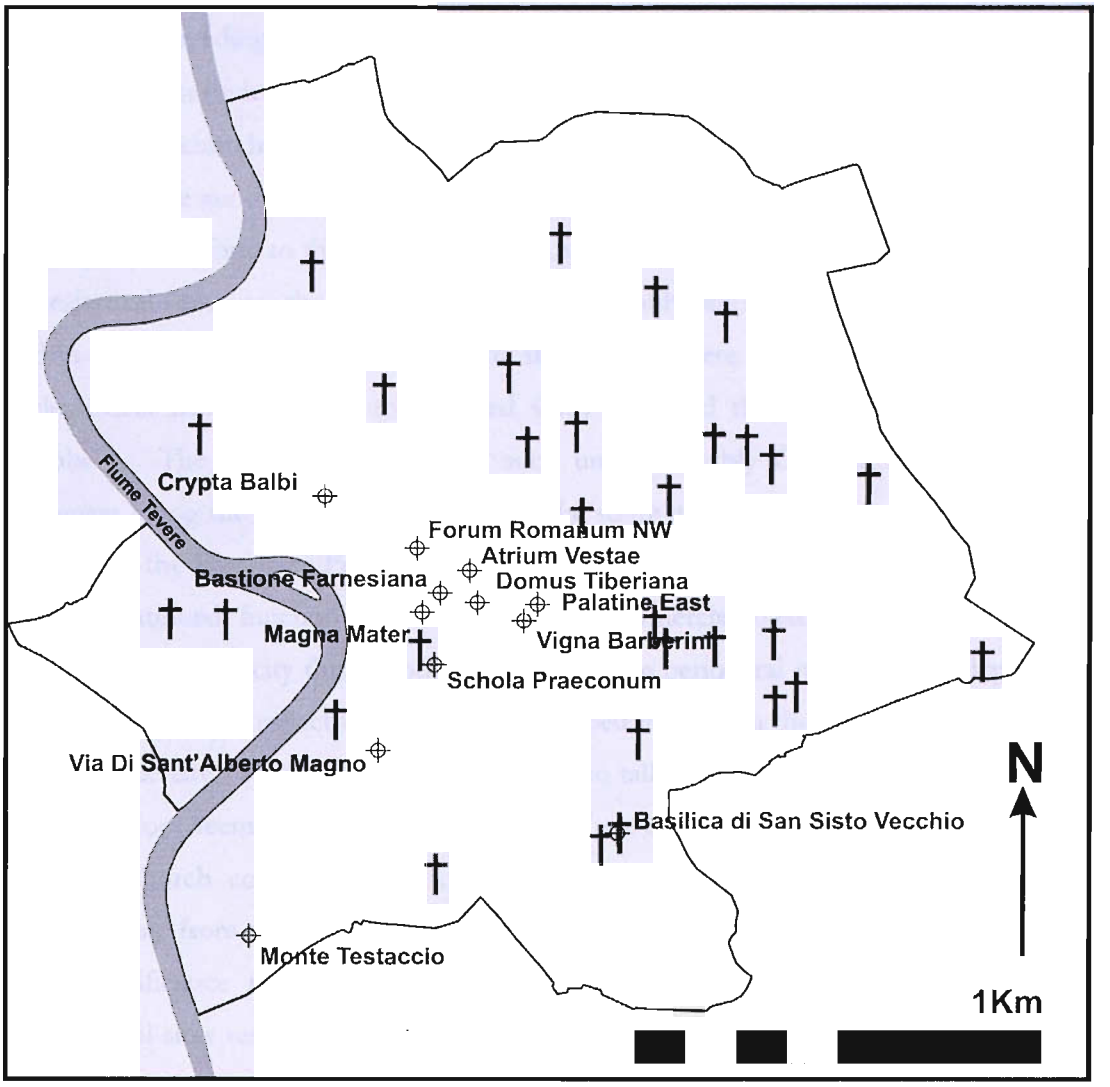


Fig. 28: Locations of the sites investigated in relation to the 4th/5th Century ecclesiastical foundations.

It is potentially the third case which can shed light on one of the most discussed issues affecting the changing nature of the Late Antique city most clearly. Many accept the increasingly overt Christianisation of the urban spaces of the Late Empire and the displacement or adaptation of older pagan and Imperial structures as fact. The location and circumstances of waste deposition in this key period in the transition of the urban landscape in relation to the distribution of the early Christian sites may elucidate this process or conversely demonstrate that the "process" of Christianisation was rather more haphazard. The key feature of this strand of the investigation is not to assess the distance of any of the deposits from the ecclesiastical sites but rather the distance of the ecclesiastical sites from the deposits. This may seem a merely semantic distinction but is in fact crucial to overcoming the bias inherent in the incomplete archaeological record. It is also interesting to note the differences between the distances of the actual ceramic assemblages studied and the other Late Antique sites associated with the process of moving foodstuffs into the city. In the first instance, the minimum distance between an

assemblage and the nearest ecclesiastical site is 91.23m within the study area. Although the basilica preceding the church of *San Sisto Vecchio* is located over one of the deposits, the next nearest ecclesiastical site to this assemblage is just over 100m. Indeed, only six 4th or 5th Century churches lie within 100m of the deposits studied and within the actual study area itself there are only four. When one considers all of the sites identified as pertaining to the supply of food to the city in the Late Antique period these figures increase to eleven ecclesiastical sites over the city as a whole, however only one additional ecclesiastical site is within 100m of any of the sites within the study area. There are in fact only five recorded ecclesiastical sites lay within the defined study area and these are located towards its periphery. The complete absence of such unquestionably Christian sites within the *Emporium*, along the Tiber, in the *Forum* and the southern *Campus Martius* is intriguing. In the case of the *Emporium*, *Forum Boarium* and *Forum Romanum* this may well be attributable to the continued function of these areas as commercial districts and the centre of government for the city throughout this period. The peripheral nature of the deposits to these areas may also reflect the importance ascribed to them in the ordered running of the Late Antique city. Whilst it may not be correct to talk of a progressive Christianisation of the city it does seem plausible that if these areas are operating as the secular centre of the city, the Church constructs its enduring monuments in the predominantly residential districts away from the Forum and the Tiber. Whilst it would be very easy to draw too much significance from the fact, it is interesting to note that the locations of the ecclesiastical sites respect the locations of the deposits or vice versa. It seems reasonable to suppose that as an active and influential landlord, the Church would be able to ensure that waste was kept clear from their property and perhaps in some cases deposited in disused buildings nearby. It has been suggested that following the breakdown of Roman government in the West the Church undertook many of the functions of the state in respect of the feeding of the poor[622]. Some of the deposits may well represent the beginnings of this process with deposits made in proximity to, but not immediately adjacent to ecclesiastical sites. The location of deposits in areas with no apparent affinity to the Church does however present a further problem to interpretation of the significance of the locations chosen for deposition.

[622] As discussed by Purcell 1999.

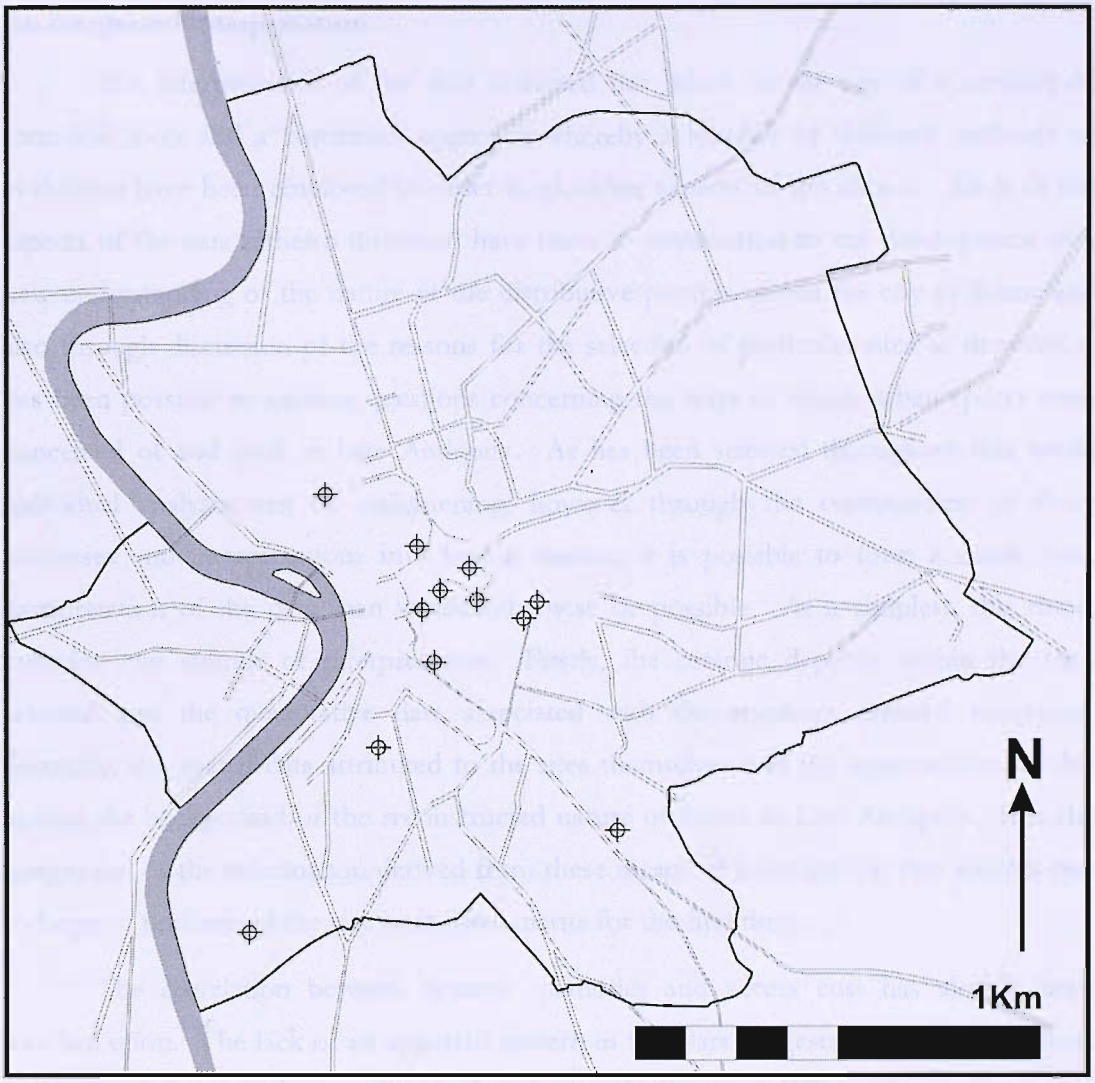


Fig. 29: Locations of the sites investigated in relation to the network of major Late Antique roads

An examination of the system of major intra-urban roads as they are known, reveals no clear association with the sites of the assemblages considered here. Despite some superficial proximity at a large scale it is clear upon detailed examination that none of the deposits are located within 15m of the likely line of the road. Although there is no reason to suppose that a network of subsidiary streets would not have enabled access beyond the main thoroughfares, the lack of deposition immediately adjacent to them can be seen as significant. As has previously been discussed the locations and natures of a number of deposits argue for the continued existence of planning in the disposal of waste. The distance of these deposits from the main routes of circulation within the city would bolster this argument. As such, it seems unlikely that their locations were chosen as a direct consequence of the ability to dispose of a great number of amphorae in a single trip, directly from the back of a cart.

An integrated interpretation

The interpretation of the data collected has relied on the use of a number of statistical tools and a contextual approach whereby a number of different methods of evaluation have been employed in order to elucidate aspects of the dataset. Each of the aspects of the data hitherto discussed have made a contribution to the development of a new understanding of the nature of the distributive process within the city of Rome and also through discussion of the reasons for the selection of particular sites as deposits, it has been possible to address questions concerning the ways in which urban spaces were conceived of and used in Late Antiquity. As has been stressed throughout this work, individual analyses can be enlightening, however through the combination of these processes and interpretations in a logical manner it is possible to form a much finer interpretation of the data than would otherwise be possible. At it simplest, this thesis contains two strands of interpretation. Firstly, the ceramic deposits within the sites selected and the quantitative data associated with the amphora material recovered. Secondly, the spatial data attributed to the sites themselves and the interrogation of this against the background of the reconstructed nature of Rome in Late Antiquity. It is the integration of the information derived from these means of investigation that enables one to begin to understand the city on its own merits for the first time.

The correlation between ceramic quantities and access cost has already been touched upon. The lack of an apparent pattern in this data suggests that the access costs are not paramount in determining the location of the deposits. What is interesting is that the quantities of material deposited do not appear to be influenced at all by the accessibility of the deposition site. Whilst there is some suggestion that the location of a deposit may be influenced by the ease of access, the quantity of material deposited seems to be restricted only by the available space for dumping. Whereas the economy and distribution of foodstuffs has traditionally been interpreted through a functionalist paradigm, indeed this thesis begins from the supposition that the functional concern of disposing of waste is paramount in the creation and placement of these assemblages, the evidence shows that these were of secondary concern. The lack of significant patterning in the dataset implies that other considerations are likely to have been considered to be more important in determining deposit location. The proximity analyses provide a means of assessing this against spatial distributions of other known site-types and has suggested that there may be a relationship between the location of $4^{th}/5^{th}$ Century churches and the deposits studied. The limitation of this type of analysis is that it is only valid for known categories of site and cannot really account for the nuance of social creation of space within the urban fabric. Furthermore, this problem is compounded by the limited dataset available for study. As such it leads to necessarily reductive conclusions. Despite the

inability of this analysis to offer an overarching interpretation for the city as a whole, in conjunction with the specific data derived from each deposit it is possible to form an understanding of the way in which that particular space was conceived of within the urban environment. The sites discussed in this manner offer a palimpsest of the possible conceptions of urban space in Rome in Late Antiquity and thereby the possibility to provide an alternative, archaeologically based background against which to interpret new data.

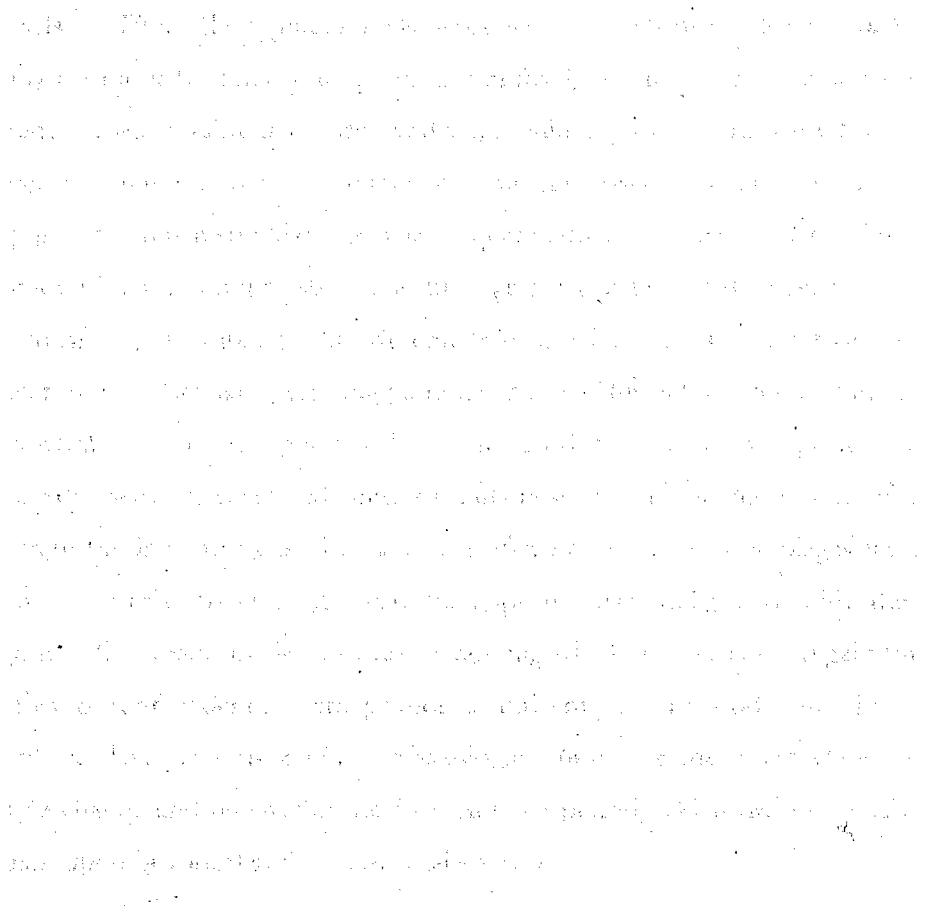
Using the *Schola Praeconum* as a type site, its proximity to the church of S. Anastasia and apparently intentional use as a deposit of waste material offer an opportunity to develop the interpretation of such sites. Lying just under 100m from the church, the *Schola Praeconum* deposits fit the criteria postulated above for the development of ecclesiastical nodes for the distribution of the *frumentationes* in the Late Empire. This hypothesis is however, not supported by a number of the other sites investigated. This is particularly apparent with the other sites for which it has been possible to calculate densities of amphorae within the deposits. Whilst the sites with calculated densities are an arbitrary sub-group within the dataset, this is a significant point. Indeed, the *Schola Praeconum* is the only site within the defined study area which shows this type of patterning. The implication of which must be that whilst it remains a possibility, the evidence for the proximity of deposition in relation to 4th/5th Century ecclesiastical sites does not support the interpretation of these sites as distributive nodes. The distribution of the deposits does however argue for a dispersed pattern of distribution for the goods as a bulk commodity. The disparity between the deposits forming *Monte Testaccio* and the other sites investigated is highly significant. The intentional nature of deposition at *Testaccio* is beyond doubt and must be seen as resulting from the transfer of liquid goods[623] from the amphorae in which they were imported to smaller containers as part of the distributive process within the city. If we accept that decanting of the liquid goods into smaller containers also occurs throughout the period of this study then the deposits investigated must represent the detritus of this intermediary phase of the distributive process. The dispersed nature of the pattern of deposits is highly suggestive that the process itself was conducted on a disaggregated and decentralised basis. Significantly the deposits in and around the *Crypta Balbi* can be used to support the hypothesis that the adjacent *Porticus Minucia Frumentaria* was used as an actual distributive node as well as being central to the organisation of the *Frumentationes*. The complexity in interpreting the dataset lies in determining what relationship the deposition sites have to the actual distributive processes at work in this period. By association some sites can be seen to have a relationship with adjacent structures associated with the distribution of *Frumentationes* however, the main

[623] Primarily the oil from the Baetican Dressel 20s

means of investigating the spatial relationships of these sites has produced mainly negative correlations. The insignificance of general topographical factors in determining location as demonstrated through the GIS ensures that a more subtle reasoning and interpretation is necessary to elucidate the decision making process behind the selection of deposition sites. The utilisation of high status locations for these waste deposits remains a significant occurrence and does require explanation. As the access cost analyses have shown functional considerations for the location of the deposits do not seem to have been paramount except in the case of *Monte Testaccio*. The majority of the other deposition sites do not make sense purely from the perspective of providing a simple means of disposing of waste material. Whilst this is particularly pertinent to the *Palatine* deposits it is also relevant in the other incidences of deposition. Given that the ecclesiastical adoption of the role of providing food to the poor cannot be supported by the data we must accept that it is the civic government which is making the decisions as to the location of deposits within the city during the 4th to 6th Centuries and that the structuring of power within the urban landscape has altered significantly from the High Empire. Whilst even revisionist interpretations of the nature of the Late Antique city would stress transformation rather than decline their basis is largely in historical sources rather than through the use of archaeological material to inform the understanding of this period.

Critically the interpretation of the data collected in order to answer the interrelated questions of the means by which goods are moved around the city and the way in which urban spaces are being used and modified is dependent upon the context in which the deposits of material were made and recovered archaeologically. The way in which the deposits fitted into the urban landscape has been discussed in some detail through the GIS analysis. This tool has enabled a series of hypotheses to be tested and through an analysis of these in combination it is possible to begin to construct an overall interpretation which answers the questions set out at the beginning of this work. On the basis of the available evidence the distribution pattern of *Annona* goods in the Late Empire was decentralised in comparison to the earlier situation. The fairly even distribution of waste deposits in the Late Antique period reflects a nodal system of distribution and also a change in the perception of urban spaces through the locating of many deposits in public spaces and buildings. This changing use of urban spaces must be conditioned by the changing political circumstances of the Late Empire but it also would have played a role in reinforcing the perception of these changes among the urban population. Any notion that Late Antique Rome was a declining imitation of its earlier glory is wide of the mark, the nature of urban society was fundamentally different and the role of the city had altered beyond recognition by this point. This perception of the decline of Imperial power in the capital would almost certainly have provided an opportunity for other groups to fill the

power vacuum. It is however unclear whether, as has often been suggested, the Church was the primary beneficiary of this withdrawal of Imperial patronage and prestige. The Christian Church was tightly bound to Roman Imperial ideology and there is little evidence to suggest that any major break with the Orthodox Church was made at such an early stage. The overriding impression is that the deposition process and by association the distributive process was controlled by the urban authorities in such a way as to maintain the effective running of the city in a situation where the Imperial monuments were beginning to lose much of their significance.



Chapter 9: Conclusions

Justifying the methodology

As has been shown through the discussion of the data presented in this research, there are a number of methodological problems with the use of ceramic data in the context of the excavated sites currently available for study in Rome. In order to overcome this, a methodology was devised which could both cope with the specific issues concerned with the data from Rome and which would also allow the continuation of this strand of research into other areas. The principal issue, which has held back the development of a holistic and contextual appreciation of the Late Antique ceramic record in Rome, has been the lack of a means of directly comparing assemblages between sites of widely varying dimensions dug at different times and with different priorities. This has been exacerbated by the predication of many ceramicists working on Roman assemblages to concern themselves with diagnostic pieces in an attempt to generate further typologies of the material and the use of the somewhat limited EVE and MNV methods of quantifying vessels[624]. Whilst the typological classification of vessels provides a useful tool for further study it cannot be considered as an end in itself. Whilst EVE may be suitable for some ceramic types, notably fine wares, and is undoubtedly a useful measure for extrapolating an order of magnitude for the number of complete vessels which may have contributed to a deposit, it is unsuitable for this type of quantitative study of the data. The methodology advocated here set out to show that through a calculation of the density of remains within a deposit it is possible to directly compare data between a number of assemblages and therefore to understand differing patterns of use. Through the discussion of the results of this work it has been suggested that increased density within a depositional context may well represent an increased level of intentionality in the deposition of that material. Despite the limitations of the dataset, sufficient sites and assemblages were available to show that this methodology can be applied successfully and with the potential to significantly expand the level of understanding which it is possible to gain through a study of this form of evidence. Perhaps most significantly this methodology when applied to the amphora data gives us a new, archaeological basis for the interpretation of aspects of urban change and renewal in the Late Antique period, which has previously been heavily reliant upon historical and architectural sources.

None of the methods used in this thesis have been particularly innovative in themselves; the GIS analysis has been of a fairly basic nature and the basic ceramic quantification is just that, basic. The strength of this work lies in its combination of these methods into a single methodology aimed at answering two closely interrelated questions

[624] These methods are discussed in Chapter 5.

pertaining to the nature of life in Late Antique Rome. It has also provided an opportunity to stress how important it is to record and include volumetric information about the deposits excavated in archaeological reports. Whilst this is an issue which has been raised previously[625], it is not one which has received much support in practice. For very little additional effort on the part of the excavators volumetric data opens up significant additional avenues of interpretation both for understanding specific sites and also for relating many sites to each other. Varying densities of material within sites where there are de-facto primary deposits can be used to elucidate patterns of usage and to draw inferences of the practices and processes which went on within them. Between different sites, an appreciation of material densities can show patterns of distribution, specialisation, the availability of resources or the spread of culturally specific artefacts[626].

Whilst the quantity of evidence available upon which it has been possible to apply these processes within this thesis is fairly small, I hope to have shown the potential of this methodology and through this to encourage such an approach to be considered by others undertaking archaeological work both in the field and in post-excavation analysis. The ability of this methodology to provide a framework for interpreting further questions has been demonstrated through this thesis and its particular contribution to understanding the research questions will be discussed below.

Implications for the movement of goods around the Late Antique city

The principal question raised in designing this research project was that of our lack of understanding of the ways in which goods were moved and distributed around the Late Antique city. In particular this concerned the supply of the *Annona* to Rome. The selection of the dataset used for this study has been justified and discussed previously[627]. The choice of Rome also allows one of the key omissions in our understanding of the Roman Empire to be addressed, that of the nature of Rome itself. Whilst much is written about specific sites and other regions of the Late Empire, our understanding of this arguably central city is under-developed and subject to dangerous generalisations and conflations of evidence. Whilst understanding the movement of goods is an ostensibly economic question and hence of apparently limited interest within the wider discipline, there is significant potential to use this understanding as a basis to investigate further questions pertaining to socio-political aspects of Late Roman urban life. The interpretations drawn from the study of the material presented in this thesis suggest that there is a change in the distributive mechanism of these goods during the later Imperial period. The dispersed, multi-nodal system suggested by the archaeological evidence

[625] See Millett 1979a.
[626] This can also be applied to faunal and botanical remains in order to understand patterns of consumption.
[627] See pp 88 – 91.

considered in this thesis has been postulated previously on the basis of other evidence, however little attempt has been made to corroborate this through an examination of the available archaeological material. The specific patterning of the distribution of these goods remains somewhat elusive due to the fragmentary nature of the archaeological record. Whilst it is not possible with any certainty to state that certain locations were in use as distributive nodes, the nature of the deposits is suggestive in some cases of an organised depositional strategy which appears to be contextually related to supposed sites for the distribution of the *frumentationes*. Those sites for which it has been possible to calculate densities of material have furthermore suggested that the primary deposition, which might be expected in proximity to consumption or distributive nodes, is associated with high density deposits. Lower densities can thus be seen to represent a different depositional strategy, the implication of which will be discussed later. Whilst the interpretation of these results can be expected to alter as more data becomes available, this means of interrogating the evidence offers possibilities which have as yet been largely untapped. Furthermore, an increasing corpus of data from which densities can be extrapolated enables a more nuanced interpretation of that element of the archaeological data which through lack of recording cannot be used in this way. Despite the inadequacy of much of the data available from Rome it cannot simply be ignored for want of fitting the ideal characteristics desired. To this end, I hope also to have shown how by treating the evidence in a fully contextual manner and integrating data from a number of deposits it is possible to incorporate all the available material and thereby increase the validity of the conclusions drawn from the work.

Understanding distribution patterns is of course contingent upon an understanding of the location of the deposits from which the material is derived. This work has attempted through looking at other types of site within the city and the topographical layout of the urban environment, to show how it is possible to define the likely reasons for the deposition of material at the sites from which it has been recovered. As with all things gaps in the evidence will mean that the specifics of this are subject to revision as more material becomes available. It has however been possible to eliminate certain functional reasons from the likely possibilities and to suggest that the selection of deposition sites is a more reasoned and intentional process than has perhaps hitherto been supposed. The appreciation of the density of the material within a given deposit has been crucial to this. As previously suggested, high density deposits may well suggest increasingly intentional deposition whilst low density deposits are contextually more likely to be longer term accumulations of waste. Owing to the nature of a number of the deposits it seems that there were a number of depositional strategies being employed within the city and that the targeted deposition of waste in certain areas was in contrast to a general build up of

material in others. The methodology employed for this investigation has by necessity relied upon an abstracted and somewhat arbitrary series of values, particularly for the calculation of access cost. However, whilst these may be refined through further research, the basic tenets of the approach offer a means of significantly advancing our understanding of the rationale and reasons behind the location of urban waste deposits and potentially other forms of archaeological material accumulation. In terms of understanding the overall level of deposition it would be interesting to see data from outside the walls of the city in order to provide a comparison between the centre of the urban zone and areas which might, from a modern viewpoint, be deemed to be peripheral and hence more likely to be considered suitable for dumping waste.

The specific interpretation of the material has essentially answered the question of how goods are moving around inside the city, the analyses undertaken in this research have enabled a significant step to be taken in interpreting the nature of such movements and present an archaeologically focussed means of assessing the nature of food supply within the city. The decentralisation of the supply, increased commoditisation of imports and shift towards a dominance of African products has been well documented in synthetic works and the archaeological reports. Despite this, the research undertaken here has led to a much more nuanced appraisal of these mechanisms and one with a much more robust foundation than had hitherto been possible. Whereas previously individual sites had been understood in detail and synthetic works had largely been reliant upon a few well known case studies, this thesis has brought together much of the available data in order to produce a viable comparative dataset and thereby a meaningful interpretation of the material evidence. The locations of the deposits are seemingly dependent upon the availability of space within the city. The significance of their being no evident, direct replacement for *Monte Testaccio* has been reinforced through this research. Whilst it may seem obvious, the lack of evidence for other dumps consisting solely of amphorae suggests that the disposal system for these containers was completely different even if we ignore the vast discrepancy in scale between *Testaccio* and the later deposits which are the primary focus of this study.

Implications for the re-use of urban spaces in Late Antiquity

The second strand of this research came about as a result of the desire to understand the nature and reasoning behind the depositional process. Many of the Late Antique deposits within the city of Rome are located within high-status or public spaces and as such require explanation. That the urban fabric of the Roman town was in transition during Late Antiquity is beyond doubt. However, traditionally this process has been investigated through architectural and textual or epigraphic means. This research has

shown that archaeological material can be of inestimable value in elucidating these processes and has demonstrated that the changes undergone by the urban fabric may not have been as straightforward, or as dependent upon the influence of the Christian Church as has previously been supposed. The research also offers real evidence for the abandonment and changing significance of key areas of the centre of the city. The interpretation of the dataset has led to the conclusion that whilst these deposits are occurring within high status buildings and as such offer evidence for the abandonment of areas of the city and perhaps a partial breakdown in the relationship between the population and the urban fabric, their nature indicates that they are being made in such a way as to suggest that there is little breakdown in civic authority. Rather, we should see the accumulation of waste deposits within the city as part of a reprioritisation of the urban environment in favour of those areas which are still occupied and hold a significance for the population of the Late Antique city. This interpretation, based on the archaeological evidence is of much finer detail than the traditional paradigm which tends to emphasise the reuse of spolia from monumental architecture in later buildings and a contraction of the urban population. The use of archaeological material from refuse contexts allows an approach to be employed which prioritises an understanding of the use or abandonment of individual spaces in order to produce an interpretation which is valid at a wider scale. This research finds no evidence for such a dramatic contraction as has often been postulated to have occurred in the Late Empire, rather we should see the period as representing perhaps a shift in the way that certain restricted areas were used by the population. Clearly the city is no longer functioning in the Classical mode, it is however functioning in some way and functioning under some form of civic governance.

The re-use of urban space is therefore critical in understanding the changing nature of the socio-political situation within the cities of the Late Empire. The disposal of ceramic waste is one possible form of evidence which can be interrogated in order to challenge the established hypotheses of urban decay and the increasing Christianisation of the urban landscape in the last two centuries of the Western Empire. Most specifically this study has shown that with a contextual approach to the available data it is now possible to move beyond the generalisations about the nature of the city of Rome which have been the prevalent mode of discourse and to form an understanding of the processes of transformation which the city underwent in this period. Whilst there remain significant lacunae in the archaeological record of the city as a result of its history of occupation and excavation, the increasing corpus of archaeological material being excavated and published in a rational and scientific manner offers the potential to truly understand the nature of the city in this and other periods.

This research set out to explore the issues of the supply of staple foodstuffs within the city following the foundation of Constantinople and the changing nature of the socio-political systems which led to the transformation of the urban landscape in the 4th/5th Centuries A.D. Whilst the available data was insufficient in many cases for the methodology to be fully applied, this thesis has demonstrated both the potential of the full methodology to allow comparison between different assemblages and the implications of this for creating an interpretation which accounts for all this data. Furthermore, the thesis has shown that inadequate data need not be excluded from the creation of such an interpretation and can be incorporated into the dataset in a number of ways. The GIS based interrogation of the data has also allowed the extrapolation of the detailed interpretation derived from the individual sites studied into the spatial context of the city as a whole. This thesis has demonstrated the applicability of using this primarily economic form of archaeological evidence to answer questions of an essentially socio-political character. It is to be hoped that this re-positioning of amphorae and waste deposits within the social sphere will begin a rehabilitation of economic studies as part of the mainstream historical and archaeological debate as regards the urban centres of antiquity, a debate which hopefully can finally move beyond a reliance on the dubious application of Weber's ideal types. Critically, this thesis has demonstrated that it is possible to discuss the city of Rome on the basis of solid archaeological evidence and that the generalisations, which have previously been applied to the city, are no longer necessary or indeed supportable given the currently available data and the likely increase of this corpus of material in the coming years. Rome must be understood on its own merits, as this has been impracticable in the past this process must necessarily be a bottom-up one, reliant upon detailed examination of the available sources. This thesis has demonstrated one possible means of doing this through the amphorae derived from Late Antique waste deposits. Studies of other material will undoubtedly reveal different patterns, although the more complex nature of their presence within the archaeological record may render their interpretation somewhat more complicated. This thesis has produced a new, archaeologically focussed interpretation of the city in Late Antiquity and provides a platform upon which further study and interpretation can be undertaken.

Appendix A: Typological provenance of amphorae

Typological Classification	Provenance	Function
Africana 1	Africa Proconsularis	Transport Amphorae
Africana 2	Africa Proconsularis	Transport Amphorae
Africana 2a	Africa Proconsularis	Transport Amphorae
Africana 2b	Africa Proconsularis	Transport Amphorae
Africana 2c	Africa Proconsularis	Transport Amphorae
Africana 2d	Africa Proconsularis	Transport Amphorae
Africana 3	Africa Proconsularis	Transport Amphorae
Africana 3a	Africa Proconsularis	Transport Amphorae
Africana 3b	Africa Proconsularis	Transport Amphorae
Africana 3c	Africa Byzacena	Transport Amphorae
Agora M230	Eastern Mediterranean	Transport Amphorae
Agora M254	Africa Proconsularis	Transport Amphorae
Almagro 50	Hispania Lusitania	Transport Amphorae
Almagro 51a	Hispania Lusitania	Transport Amphorae
Almagro 51b	Hispania Lusitania	Transport Amphorae
Almagro 51c	Hispania Lusitania	Transport Amphorae
Almagro 54	Palestina	Transport Amphorae
Anfore a fondo piatto	Africa Proconsularis	Transport Amphorae
Beltran 1	Hispania Baetica	Transport Amphorae
Beltran 4	Hispania Baetica	Transport Amphorae
Beltran 56	Africa Proconsularis	Transport Amphorae
Beltran 57	Africa Proconsularis	Transport Amphorae
Benghazi MR 1	Unknown	Transport Amphorae
Byzantine Globular Amphora	Africa Proconsularis	Transport Amphorae
Camulodunum 184	Unknown	Transport Amphorae
Castrum Perti	Africa Proconsularis	Transport Amphorae
Cilindriche Grandi Dimensione	Africa Proconsularis	Transport Amphorae
Crypta Balbi 1	Palestina	Transport Amphorae
Crypta Balbi 2	Sicilia	Transport Amphorae
Dressel 1	Italia	Transport Amphorae
Dressel 2/4	Italia	Transport Amphorae
Dressel 20	Hispania Baetica	Transport Amphorae
Dressel 30	Mauretania	Transport Amphorae
Dressel 43	Crete	Transport Amphorae
Dressel 7/11	Hispania Baetica	Transport Amphorae
Empoli	Italia	Transport Amphorae
Gauloise 4	Gaul	Transport Amphorae
Gaza	Palestina	Transport Amphorae
Globular Amphora (micaceous)	Eastern Mediterranean	Transport Amphorae
Globular Amphora (non-micaceous)	Eastern Mediterranean	Transport Amphorae
Hammamet 1	Africa Proconsularis	Transport Amphorae
Hammamet 2	Africa Proconsularis	Transport Amphorae
Hammamet 3	Africa Proconsularis	Transport Amphorae
Kapitan 1	Aegean	Transport Amphorae
Kapitan II	Aegean	Transport Amphorae
Keay I	Mauretania	Transport Amphorae
Keay I a	Mauretania	Transport Amphorae
Keay I b	Africa Proconsularis	Transport Amphorae
Keay II	Unknown	Transport Amphorae
Keay III	Africa Proconsularis	Transport Amphorae
Keay III a	Africa Proconsularis	Transport Amphorae

Keay III b	Africa Proconsularis	Transport Amphorae
Keay IV	Africa Byzacena	Transport Amphorae
Keay IX	Africa Tripolitania	Transport Amphorae
Keay L	Africa Proconsularis	Transport Amphorae
Keay LI	Africa Proconsularis	Transport Amphorae
Keay LII	Italia	Transport Amphorae
Keay LIII	Eastern Mediterranean	Transport Amphorae
Keay LIV	Palestina	Transport Amphorae
Keay LIX	Africa Proconsularis	Transport Amphorae
Keay LV	Africa Proconsularis	Transport Amphorae
Keay LVI	Africa Proconsularis	Transport Amphorae
Keay LVII	Africa Proconsularis	Transport Amphorae
Keay LVIII	Africa Proconsularis	Transport Amphorae
Keay LX	Africa Proconsularis	Transport Amphorae
Keay LXI	Africa Proconsularis	Transport Amphorae
Keay LXII	Africa Proconsularis	Transport Amphorae
Keay LXIII	Africa Proconsularis	Transport Amphorae
Keay LXIV	Africa Proconsularis	Transport Amphorae
Keay LXIX	Hispania Baetica	Transport Amphorae
Keay LXV	Eastern Mediterranean	Transport Amphorae
Keay LXVI	Palestina	Transport Amphorae
Keay LXVII	Eastern Mediterranean	Transport Amphorae
Keay LXVIII	Hispania Taraconnensis	Transport Amphorae
Keay LXX	Unknown	Transport Amphorae
Keay LXXI	Africa Proconsularis	Transport Amphorae
Keay LXXII	Unknown	Transport Amphorae
Keay LXXIII	Unknown	Transport Amphorae
Keay LXXIV	Unknown	Transport Amphorae
Keay LXXIX	Africa Proconsularis	Transport Amphorae
Keay LXXV	Africa Proconsularis	Transport Amphorae
Keay LXXVI	Eastern Mediterranean	Transport Amphorae
Keay LXXVII	Africa Proconsularis	Transport Amphorae
Keay LXXVIII	Africa Proconsularis	Transport Amphorae
Keay LXXX	Unknown	Transport Amphorae
Keay LXXXI	Africa Proconsularis	Transport Amphorae
Keay LXXXII	Unknown	Transport Amphorae
Keay LXXXIII	Unknown	Transport Amphorae
Keay LXXXIV	Africa Proconsularis	Transport Amphorae
Keay LXXXIX	Africa Tripolitania	Transport Amphorae
Keay LXXXV	Africa Proconsularis	Transport Amphorae
Keay LXXXVI	Hispania Taraconnensis	Transport Amphorae
Keay LXXXVII	Unknown	Transport Amphorae
Keay LXXXVIII	Unknown	Transport Amphorae
Keay V	Africa Byzacena	Transport Amphorae
Keay V Bis	Africa Byzacena	Transport Amphorae
Keay VI	Africa Proconsularis	Transport Amphorae
Keay VII	Africa Byzacena	Transport Amphorae
Keay VIII	Africa Proconsularis	Transport Amphorae
Keay VIIIa	Africa Proconsularis	Transport Amphorae
Keay VIIIb	Africa Proconsularis	Transport Amphorae
Keay X	Africa Tripolitania	Transport Amphorae
Keay XC	Africa Proconsularis	Transport Amphorae
Keay XCI	Hispania Taraconnensis	Transport Amphorae
Keay XCII	Africa Proconsularis	Transport Amphorae

Keay XCIII	Unknown	Transport Amphorae
Keay XI	Africa Tripolitania	Transport Amphorae
Keay XI a	Africa Tripolitania	Transport Amphorae
Keay XI b	Africa Tripolitania	Transport Amphorae
Keay XI c	Africa Tripolitania	Transport Amphorae
Keay XII	Aegean	Transport Amphorae
Keay XIII	Hispania Baetica	Transport Amphorae
Keay XIII a	Hispania Baetica	Transport Amphorae
Keay XIII b	Hispania Baetica	Transport Amphorae
Keay XIII Bis	Hispania Baetica	Transport Amphorae
Keay XIII c	Hispania Baetica	Transport Amphorae
Keay XIII d	Hispania Baetica	Transport Amphorae
Keay XIII e	Hispania Baetica	Transport Amphorae
Keay XIV	Hispania Baetica	Transport Amphorae
Keay XIX	Hispania Baetica	Transport Amphorae
Keay XIX a	Hispania Baetica	Transport Amphorae
Keay XIX b	Hispania Baetica	Transport Amphorae
Keay XIX c	Hispania Baetica	Transport Amphorae
Keay XL	Africa Proconsularis	Transport Amphorae
Keay XLI	Africa Proconsularis	Transport Amphorae
Keay XLII	Africa Proconsularis	Transport Amphorae
Keay XLIII	Africa Proconsularis	Transport Amphorae
Keay XLIV	Africa Proconsularis	Transport Amphorae
Keay XLIX	Unknown	Transport Amphorae
Keay XLV	Africa Proconsularis	Transport Amphorae
Keay XLVI	Africa Proconsularis	Transport Amphorae
Keay XLVII	Unknown	Transport Amphorae
Keay XLVIII	Unknown	Transport Amphorae
Keay XV	Hispania Baetica	Transport Amphorae
Keay XVI	Hispania Baetica	Transport Amphorae
Keay XVI a	Hispania Baetica	Transport Amphorae
Keay XVI b	Hispania Baetica	Transport Amphorae
Keay XVI c	Hispania Baetica	Transport Amphorae
Keay XVII	Hispania Baetica	Transport Amphorae
Keay XVIII	Hispania Baetica	Transport Amphorae
Keay XX	Hispania Baetica	Transport Amphorae
Keay XXI	Africa Proconsularis	Transport Amphorae
Keay XXII	Hispania Lusitania	Transport Amphorae
Keay XXIII	Hispania Baetica	Transport Amphorae
Keay XXIV	Mauretania	Transport Amphorae
Keay XXIX	Africa Proconsularis	Transport Amphorae
Keay XXV	Africa Byzacena	Transport Amphorae
Keay XXV/XXVI	Africa Proconsularis	Transport Amphorae
Keay XXVI	Africa Proconsularis	Transport Amphorae
Keay XXVII	Africa Proconsularis	Transport Amphorae
Keay XXVIII	Africa Proconsularis	Transport Amphorae
Keay XXX	Africa Proconsularis	Transport Amphorae
Keay XXXI	Africa Proconsularis	Transport Amphorae
Keay XXXII	Africa Proconsularis	Transport Amphorae
Keay XXXIII	Africa Proconsularis	Transport Amphorae
Keay XXXIV	Africa Proconsularis	Transport Amphorae
Keay XXXIX	Africa Proconsularis	Transport Amphorae
Keay XXXV	Africa Proconsularis	Transport Amphorae
Keay XXXVI	Africa Proconsularis	Transport Amphorae

Keay XXXVII	Africa Proconsularis	Transport Amphorae
Keay XXXVIII	Africa Proconsularis	Transport Amphorae
Late Roman 1	Asia Minor	Transport Amphorae
Late Roman 2	Aegean	Transport Amphorae
Late Roman 3	Asia Minor	Transport Amphorae
Late Roman 4	Palestina	Transport Amphorae
Late Roman 5	Palestina	Transport Amphorae
Late Roman 5/Gaza	Palestina	Transport Amphorae
Late Roman 6	Palestina	Transport Amphorae
Late Roman 7	Aegyptus	Transport Amphorae
Mau XXXV	Africa Proconsularis	Transport Amphorae
Mid Roman 1	Unknown	Transport Amphorae
Orli a Fascia	Africa Proconsularis	Transport Amphorae
Ostia 1	Hispania Baetica	Transport Amphorae
Ostia 4	Africa Proconsularis	Transport Amphorae
Ostia 7	Hispania Lusitania	Transport Amphorae
Peacock & Williams 22	Hispania Lusitania	Transport Amphorae
Peacock & Williams 23	Hispania Lusitania	Transport Amphorae
Peacock & Williams 33	Africa Proconsularis	Transport Amphorae
Peacock & Williams 40	Africa Proconsularis	Transport Amphorae
Peacock & Williams 48	Palestina	Transport Amphorae
Peacock & Williams 49	Palestina	Transport Amphorae
Samos Amphora	Aegean	Transport Amphorae
Schone-mau XXXV	Africa Proconsularis	Transport Amphorae
Sidi Jdidi 1	Africa Proconsularis	Transport Amphorae
Sidi Jdidi 2	Africa Proconsularis	Transport Amphorae
Spatheion (small)	Africa Proconsularis	Transport Amphorae
Spello	Italia	Transport Amphorae
Tardo Punica	Africa Proconsularis	Transport Amphorae
Tripolitana 1	Africa Tripolitania	Transport Amphorae
Tripolitana 2	Africa Tripolitania	Transport Amphorae
Tripolitana 3	Africa Tripolitania	Transport Amphorae
Unidentified	Unknown	Transport Amphorae
Unidentified African	Africa Proconsularis	Transport Amphorae
Unidentified Baetican	Hispania Baetica	Transport Amphorae
Unidentified Eastern	Eastern Mediterranean	Transport Amphorae
Unidentified Gaulish	Gaul	Transport Amphorae
Unidentified Italian	Italia	Transport Amphorae
Unidentified Lusitanian	Hispania Lusitania	Transport Amphorae
Unidentified Tarraconesian	Hispania Taraconnensis	Transport Amphorae

Appendix B: Typological comparisons

Classification A	Classification B	Classification C	Classification D Zevi & Tchernia
Keay I	Dressel 30	Ostia V	
Keay Ia			
Keay Ib			
Keay II			
Keay III	Dressel 27		Africana Piccolo
Keay IIIa			
Keay IIIb			
Keay IV			
Keay V			
Keay VBis			
Keay VI			
Keay VII			Africana Grande
Keay VIII			
Keay VIIIa			
Keay VIIIb			
Keay IX			Tripolitana II
Keay X			
Keay XI	Dressel 41		Tripolitana III
Keay XIa			
Keay XIb			
Keay XIc			
Keay XII		Ostia VI	
Keay XIII	Dressel 23		
Keay XIIIa			
Keay XIIIb			
Keay XIIIc			
Keay XIIId			
Keay XIIIBis			
Keay XIV			
Keay XV			
Keay XVI			
Keay XVIa			
Keay XVIb			
Keay XVIc			
Keay XVII			
Keay XVIII			
Keay XIX			
Keay XIX			
Keay XIXa			
Keay XIXb			
Keay XIXc			
Keay XX			
Keay XXI			
Keay XXII			
Keay XXIII			
Keay XXIIIBis			
Keay XXIV			
Keay XXIVa			
Keay XXIVb			
Keay XXV			
Keay XXV			

Keay XXVa			
Keay XXVb			
Keay XXVc			
Keay XXVd			
Keay XXVe			
Keay XXVf			
Keay XXVg			
Keay XXVh			
Keay XXVi			
Keay XXVj			
Keay XXVk			
Keay XXVl			
Keay XXVm			
Keay XXVn			
Keay XXVo			
Keay XXVp			
Keay XXVq			
Keay XXVr			
Keay XXVs			
Keay XXVt			
Keay XXVu			
Keay XXVv			
Keay XXVw			
Keay XXVx			
Keay XXVy			
Keay XXVz			
Keay XXVz.1			
Keay XXVz.2			
Keay XXVz.3			
Keay XXVz.4			
Keay XXVz.5			
Keay XXVl			
Keay XXVla			
Keay XXVlb			
Keay XXVlc			
Keay XXVld			
Keay XXVle			
Keay XXVlf			
Keay XXVlg			
Keay XXVlh			
Keay XXVli			
Keay XXVlj			
Keay XXVlk			
Keay XXVll			
Keay XXVlm			
Keay XXVll			
Keay XXVlla			
Keay XXVllb			
Keay XXVlll			
Keay XXIX			
Keay XXX			
Keay XXXBis			
Keay XXXI			
Keay XXXII			

Keay XXXIII			
Keay XXXIV			
Keay XXXV			
Keay XXXVa			
Keay XXXVb			
Keay XXXVc			
Keay XXXVI			
Keay XXXVIa			
Keay XXXVIb			
Keay XXXVII			
Keay XXXVIII			
Keay XXXIX			
Keay XL			
Keay XLI			
Keay XLII			
Keay XLIII			
Keay XLIV			
Keay XLV			
Keay XLVI			
Keay XLVII			
Keay XLVIII			
Keay XLIX			
Keay L			
Keay LI			
Keay LII			
Keay LIII			
Keay LIIIa			
Keay LIIIb			
Keay LIIIc			
Keay LIIId			
Keay LIV			
Keay LIVa			
Keay LIVb			
Keay LIVc			
Keay LIVd			
Keay LIVe			
Keay LIVf			
Keay LIVBis			
Keay LIVBisa			
Keay LIVBisb			
Keay LIVBisc			
Keay LV			
Keay Lva			
Keay LVb			
Keay LVI			
Keay LVIa			
Keay LVIb			
Keay LVIc			
Keay LVII			
Keay LVIIb			
Keay LVIIc			
Keay LVIII			
Keay LIX			
Keay LX			

Keay LXI			
Keay LXIb			
Keay LXIc			
Keay LXId			
Keay LXIe			
Keay LXII			
Keay LXIIa			
Keay LXIIb			
Keay LXIIc			
Keay LXIId			
Keay LXIIe			
Keay LXIIf			
Keay LXIIg			
Keay LXIIh			
Keay LXIIi			
Keay LXIIj			
Keay LXIIk			
Keay LXIIl			
Keay LXIIm			
Keay LXIIn			
Keay LXIIo			
Keay LXIIp			
Keay LXIIq			
Keay LXIIr			
Keay LXIIs			
Keay LXIIt			
Keay LXIIu			
Keay LXIIv			
Keay LXIII			
Keay LXIV			
Keay LXV			
Keay LXV			
Keay LXVI			
Keay LXVI			
Keay LXVII			
Keay LXVIII			
Keay LXIX			
Keay LXX			
Keay LXXI			
Keay LXXII			
Keay LXXIII			
Keay LXXIV			
Keay LXXV			
Keay LXXVI			
Keay LXXVII			
Keay LXXVIII			
Keay LXXIX			
Keay LXXIXa			
Keay LXXIXb			
Keay LXXX			
Keay LXXXI			
Keay LXXXIV			
Keay LXXXV			
Keay LXXXVI			

Keay LXXXVIII			
Keay LXXXIX			
Keay XC			
Keay XCI			
Keay XCIa			
Keay XCIb			
Keay XCII			
Keay XCIII			
	Dressel 2		
	Dressel 4		
	Dressel 26		
		Ostia XXIII	
		Ostia LIX	
			Tripolitana I

Classification E Panella	Classification F	Classification G	Classification H	Classification I
Africana I	Beltran 57	Vegas 58		
Africana Ia				
Africana Ib				
Africana II	Beltran 56			
Africana IIa				
Africana IIb				
Africana IIc				
Africana IId	Beltran 56			
			Neiderbeiber 77	Kapitan II
	Beltran 52			
	Beltran 52			
	Beltran 51			
	Beltran 64	Vegas 53		
	Beltran 65a	Vegas 53		

	Beltran 65b			
	Beltran 59			

	Beltran 62			
	Beltran 63			
	Beltran 82			
	Beltran 54			
	Beltran 81			
	Beltran 53			
	Beltran 61			

	Beltran 60			
	Beltran 59			
	Beltran 67			
	Beltran 71			
	Beltran 77			
		Vegas 42		

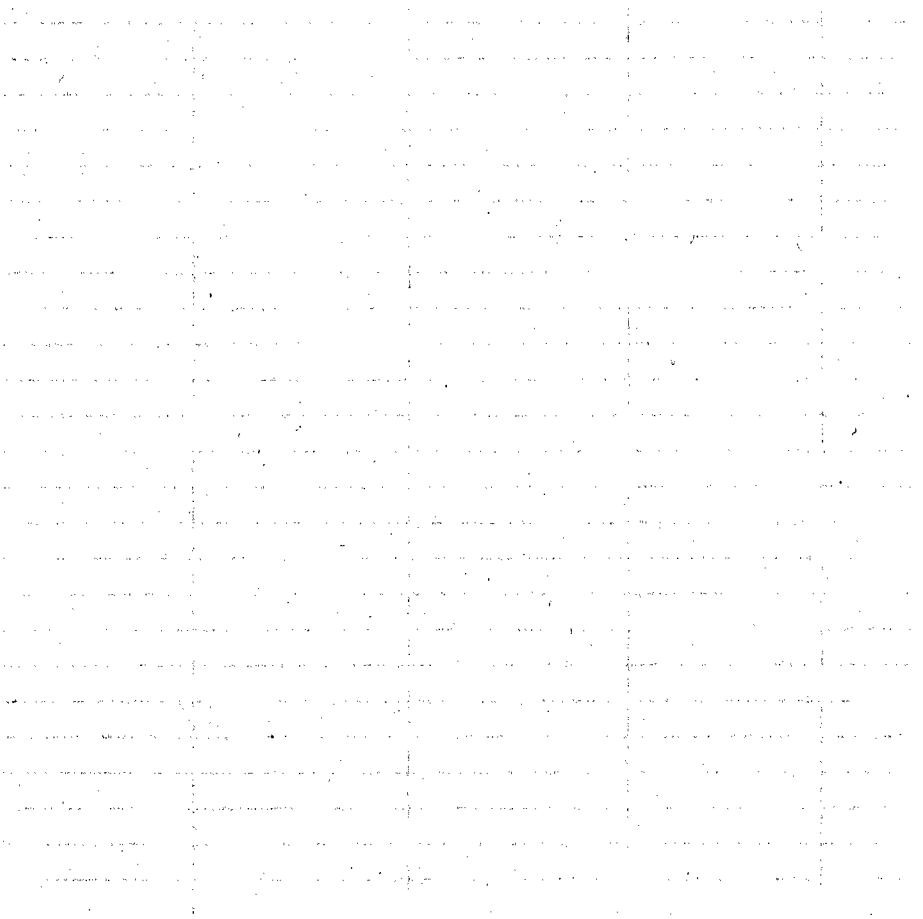
	Beltran 58			
Spatheion				

Classification J	Classification K	Classification L	Classification M	Classification N
Almagro 55				
Almagro 50				
Almagro 51a				
Almagro 51b				
Almagro 50				
Almagro 51c				

	Scorpan XVI			

	Scorpan VIIIb	British Bii	Kuzmanov XIII	Yassi Ada I
Almagro 54	Scorpan XIII			
	Scorpan V	British Biv	Kuzmanov VIII	
Almagro 52	Scorpan II			

	Scorpan VIIa	British Bi	Kuzmanov XIX	
	Scorpan VIIa	British Bi	Kuzmanov XIX	
	Scorpan VIIa		Kuzmanov VI	
	Scorpan VIIa		Kuzmanov VI	
	Scorpan II			

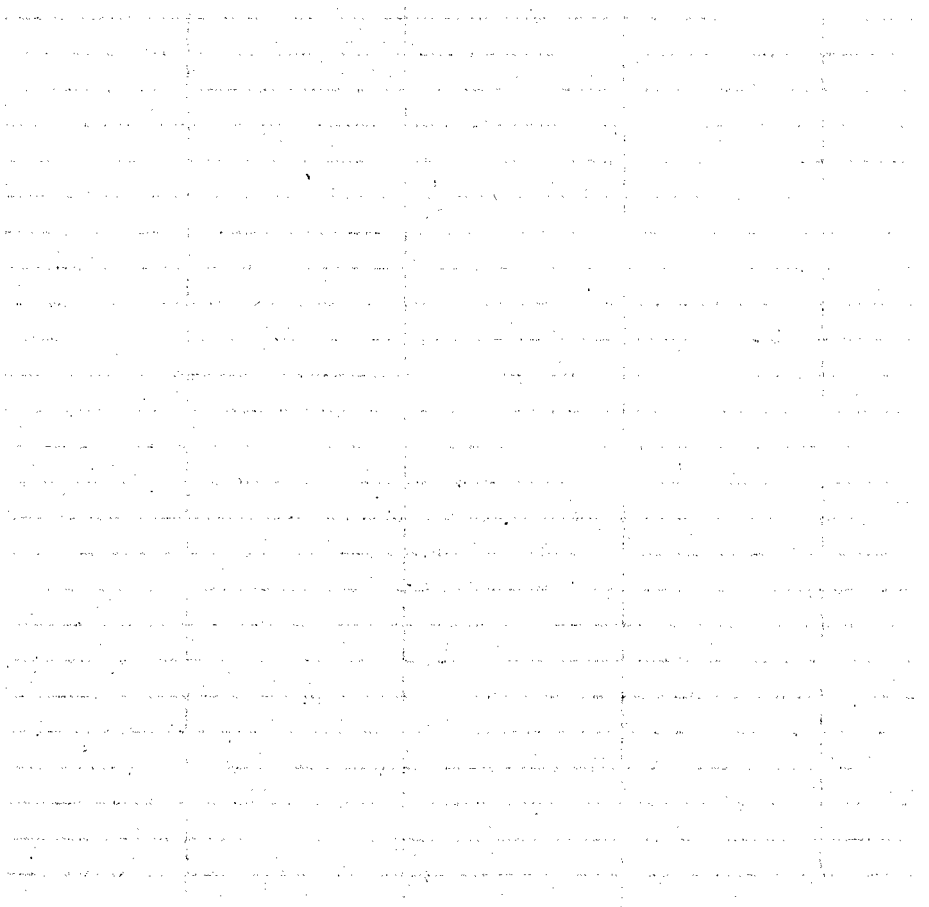


Classification O	Classification P	Classification Q	Classification R	Classification S

LRA 1				
LRA 4	Caesarea 2			
LRA 3	Caesarea 4	Agora M.335		
		Agora M.307		
		Agora M.373		
		Agora M.373		

			MRA 17a	
LRA 2		Agora M.272		
LRA 2		Agora M.272		
LRA 5	Caesarea Ib	Agora M. 329		
LRA 5	Caesarea Ib	Agora M. 330		
				Radulescu II
		Agora M.254		

LRA 8				



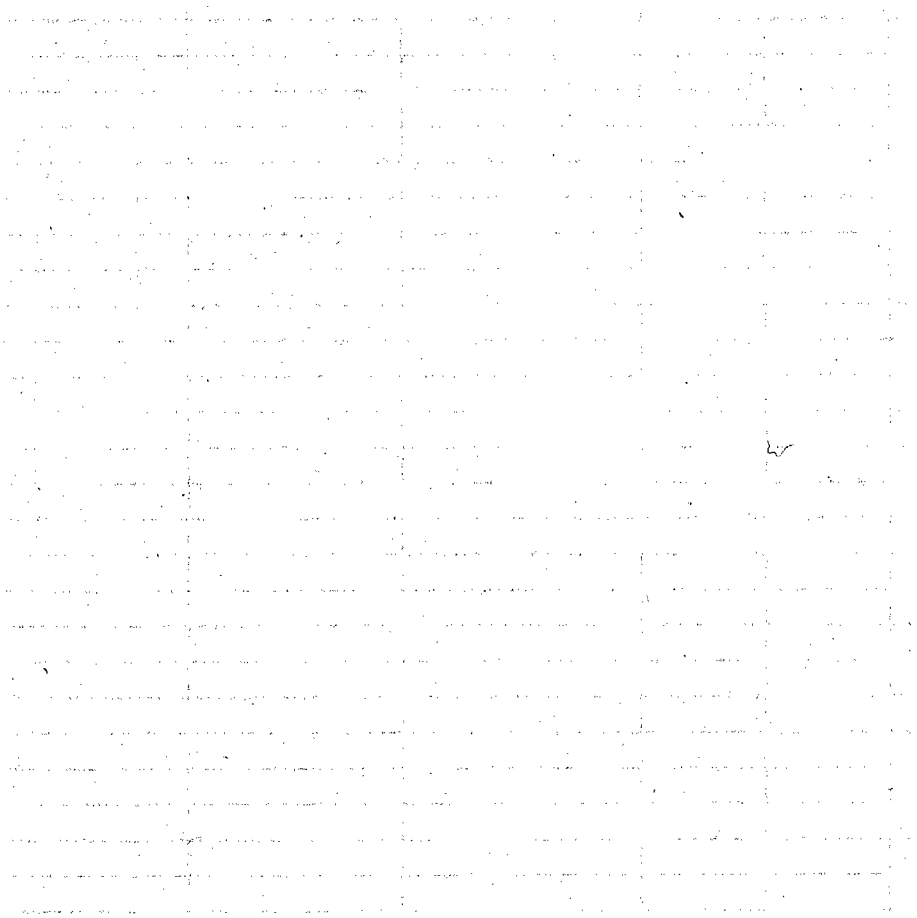
Classification T	Classification U	Classification V	Classification W	Classification X
Bonifay 60				
Bonifay 21				
Bonifay 21				
Bonifay 21				
Bonifay 22				
Bonifay 23				
Bonifay 25				
Bonifay 26				
Bonifay 50				
Bonifay 39				
Bonifay 4				
Bonifay 20				

Bonifay 27				
Bonifay 27				
Bonifay 27				
Bonifay 29				
Bonifay 29				
Bonifay 29				
Bonifay 29				
Bonifay 29				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 28				
Bonifay 35				

Bonifay 53				
Bonifay 40				
Bonifay 41				
Bonifay 36				
Bonifay 34				
Bonifay 51				
Bonifay 44				
Bonifay 43				
Bonifay 42				
Bonifay 37				

Bonifay 49				
Bonifay 48				
Bonifay 46				
Bonifay 45				
Bonifay 45				
Bonifay 41				

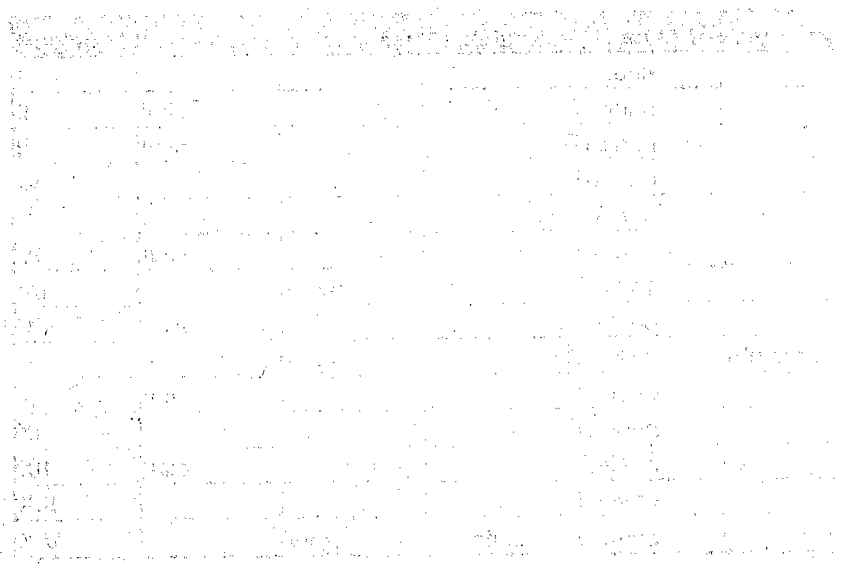
Bonifay 56				
Bonifay 57				
Bonifay 1	Van Der Werf 1			
Bonifay 2	Van Der Werf 2			
Bonifay 3	Van Der Werf 3			
Bonifay 5		Leptiminus 2		
Bonifay 6				
Bonifay 7				
Bonifay 8			Hammamet 1	
Bonifay 9			Hammamet 2	
Bonifay 10			Hammamet 3	
Bonifay 11				ERA IV
Bonifay 12		Leptiminus 1		
Bonifay 13				
Bonifay 14				
Bonifay 15				
Bonifay 16				
Bonifay 17				
Bonifay 18				
Bonifay 19				
Bonifay 54				
Bonifay 55				

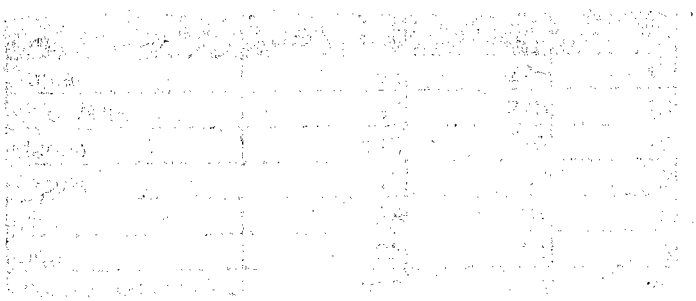


Classification Y	Classification Z	Classification AA			

		Freed A1			
		Freed A1			
		Freed A2			
		Freed A2			
		Freed A2			
		Freed A1			

Pupput T700.4					
Pupput T700.5					
Uzita Pl. 52, 10					
	Sidi Jdidi 1				
	Sidi Jdidi 2				





Appendix C: Aqueduct figures

Region	Aqueduct1	Aqueduct 2	Aqueduct 3	Aqueduct 4	Aqueduct 5	Aqueduct 6
I	Anio Vetus	Marcia			Claudia	Anio Novus
II			Appia		Claudia	Anio Novus
III	Anio Vetus	Marcia			Claudia	Anio Novus
IV	Anio Vetus	Marcia		Tepula	Claudia	Anio Novus
V	Anio Vetus	Marcia		Tepula	Claudia	Anio Novus
VI	Anio Vetus	Marcia		Tepula	Claudia	Anio Novus
VII	Anio Vetus	Marcia		Tepula	Claudia	Anio Novus
VIII	Anio Vetus	Marcia	Appia		Claudia	Anio Novus
IX	Anio Vetus	Marcia	Appia		Claudia	Anio Novus
X		Marcia			Claudia	Anio Novus
XI			Appia		Claudia	Anio Novus
XII	Anio Vetus		Appia		Claudia	Anio Novus
XIII			Appia		Claudia	Anio Novus
XIV	Anio Vetus	Marcia	Appia		Claudia	Anio Novus

Region	Aqueduct 7	Aqueduct 8	Aqueduct 9	Aqueduct 10	Aqueduct 11
I				Traiana	
II	Iulia			Traiana	
III	Iulia			Traiana	
IV				Traiana	
V	Iulia			Traiana	
VI	Iulia			Traiana	
VII		Virgo		Traiana	
VIII	Iulia			Traiana	
IX		Virgo		Traiana	Alexandrina
X	Iulia			Traiana	
XI				Traiana	
XII	Iulia			Traiana	
XIII				Traiana	
XIV		Virgo	Alsietina	Traiana	

Aqueduct	**no. of Lacus**	**Quinariae**	**%**
Appia	92	226	17
Anio Vetus	94	218	16
Marcia	113	256	19
Tepula	13	32	2
Iulia	28	65	5
Virgo	25	51	4
Claudia/Anio Novus	226	485	36
Total	**591**	**1333**	

Aqueduct	m^3 Grimal	Proportional Capacity
Appia	73000	6.48%
Anio Vetus	175920	15.61%
Marcia	187600	16.64%
Tepula	17800	1.58%
Iulia	48240	4.28%
Virgo	100160	8.89%
Alestina	15680	1.39%
Claudia	184280	16.35%
Anio Novus	189520	16.81%
Traiana	113920	10.11%
Alexandrina	21160	1.88%
Total	**1127280**	**100.00%**

Regio	Lacus	
I	LXXXVII	87
II	LXV	65
III	LXV	65
IV	LXXVIII	78
V	LXXIV	74
VI	LXXXIII	83
VII	LXXVI	76
VIII	CXX	120
IX	LXIII	63
X	LXXXIX	89
XI	XX	20
XII	LXXXI	81
XIII	LXXXIII	83
XIV	CLXXX	180
Total		1164

Appendix D: Quantified data

Bastione Farnesiano

US85_110

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001a	Africana 1	0	3	0
BFAR0001a	Africana 2d	0	1	0
BFAR0001a	Almagro 51a	0	2	0
BFAR0001a	Almagro 51c	0	1	0
BFAR0001a	Beltran 1	0	1	0
BFAR0001a	Beltran 4	0	1	0
BFAR0001a	Crypta Balbi 2	0	79	0
BFAR0001a	Dressel 1	0	1	0
BFAR0001a	Dressel 2/4	0	6	0
BFAR0001a	Dressel 20	0	1	0
BFAR0001a	Dressel 7/11	0	5	0
BFAR0001a	Kapitan 1	0	3	0
BFAR0001a	Kapitan II	0	1	0
BFAR0001a	Keay I	0	2	0
BFAR0001a	Keay LII	0	23	0
BFAR0001a	Keay LXII	0	1	0
BFAR0001a	Keay LXXXI	0	2	0
BFAR0001a	Keay XVI a	0	1	0
BFAR0001a	Keay XXV	0	7	0
BFAR0001a	Keay XXV/XXVI	0	6	0
BFAR0001a	Keay XXVI	0	4	0
BFAR0001a	Keay XXXV	0	1	0
BFAR0001a	Late Roman 1	0	16	0
BFAR0001a	Late Roman 2	0	1	0
BFAR0001a	Late Roman 3	0	12	0
BFAR0001a	Late Roman 4	0	26	0
BFAR0001a	Late Roman 5	0	3	0
BFAR0001a	Unidentified	0	74	0
BFAR0001a	Unidentified African	0	152	0
BFAR0001a	Unidentified Baetican	0	45	0
BFAR0001a	Unidentified Eastern	0	1	0
BFAR0001a	Unidentified Gaulish	0	5	0
BFAR0001a	Unidentified Italian	0	158	0

US92_130

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001b	Kapitan 1	0	3	0
BFAR0001b	Keay LII	0	1	0
BFAR0001b	Keay XV	0	2	0
BFAR0001b	Late Roman 4	0	3	0
BFAR0001b	Unidentified African	0	31	0
BFAR0001b	Unidentified Italian	0	14	0

US92_131/159/174

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001c	Africana 1	0	2	0
BFAR0001c	Africana 2a	0	1	0
BFAR0001c	Africana 2d	0	2	0
BFAR0001c	Crypta Balbi 2	0	9	0
BFAR0001c	Dressel 2/4	0	2	0
BFAR0001c	Dressel 20	0	2	0
BFAR0001c	Kapitan 1	0	119	0
BFAR0001c	Kapitan II	0	12	0
BFAR0001c	Keay LII	0	12	0
BFAR0001c	Keay LVII	0	1	0
BFAR0001c	Keay LXXXI	0	1	0
BFAR0001c	Keay XIX	0	7	0
BFAR0001c	Keay XXV	0	7	0
BFAR0001c	Keay XXV/XXVI	0	13	0
BFAR0001c	Keay XXVI	0	3	0
BFAR0001c	Keay XXXV	0	1	0
BFAR0001c	Keay XXXVI	0	1	0
BFAR0001c	Late Roman 1	0	133	0
BFAR0001c	Late Roman 2	0	3	0
BFAR0001c	Late Roman 3	0	301	0
BFAR0001c	Late Roman 4	0	162	0
BFAR0001c	Late Roman 5	0	201	0
BFAR0001c	Late Roman 6	0	58	0
BFAR0001c	Late Roman 7	0	1	0
BFAR0001c	Samos Amphora	0	20	0
BFAR0001c	Schone-mau XXXV	0	1	0
BFAR0001c	Spello	0	2	0
BFAR0001c	Unidentified	0	231	0
BFAR0001c	Unidentified African	0	870	0
BFAR0001c	Unidentified Baetican	0	29	0
BFAR0001c	Unidentified Baetican	0	36	0
BFAR0001c	Unidentified Eastern	0	6	0
BFAR0001c	Unidentified Gaulish	0	8	0
BFAR0001c	Unidentified Italian	0	2	0
BFAR0001c	Unidentified Italian	0	54	0
BFAR0001c	Unidentified Italian	0	189	0
BFAR0001c	Unidentified Lusitanian	0	4	0
BFAR0001c	Unidentified Tarraconesian	0	1	0

US92_164

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001d	Late Roman 1	0	1	0
BFAR0001d	Late Roman 4	0	1	0

US92_167

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001e	Unidentified	0	3	0
BFAR0001e	Unidentified African	0	6	0
BFAR0001e	Unidentified Italian	0	2	0

US92_203

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0001f	Unidentified African	0	7	0
BFAR0001f	Unidentified Italian	0	3	0

US98_50

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0002a	Crypta Balbi 2	0	7	0
BFAR0002a	Kapitan 1	0	1	0
BFAR0002a	Late Roman 1	0	22	0
BFAR0002a	Late Roman 3	0	11	0
BFAR0002a	Late Roman 4	0	30	0
BFAR0002a	Samos Amphora	0	7	0
BFAR0002a	Spatheion (small)	0	1	0
BFAR0002a	Unidentified	0	2	0
BFAR0002a	Unidentified African	0	139	0
BFAR0002a	Unidentified Baetican	0	3	0
BFAR0002a	Unidentified Gaulish	0	1	0
BFAR0002a	Unidentified Italian	0	28	0
BFAR0002a	Unidentified Lusitanian	0	2	0
BFAR0002a	Unidentified Tarraconesian	0	1	0

US98_51

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0002b	Late Roman 1	0	5	0
BFAR0002b	Late Roman 4	0	3	0
BFAR0002b	Samos Amphora	0	2	0
BFAR0002b	Unidentified African	0	9	0
BFAR0002b	Unidentified Italian	0	11	0

US99_87

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BFAR0003a	Late Roman 3	0	1	0
BFAR0003a	Unidentified African	0	1	0
BFAR0003a	Unidentified Lusitanian	0	1	0

Basilica di San Sisto Vecchio

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
BSSV0001a	Africana 1	0	36	0
BSSV0001a	Africana 1	0	42	0
BSSV0001a	Africana 2	0	104	0
BSSV0001a	Agora M230	0	40	0
BSSV0001a	Kapitan 1	0	45	0
BSSV0001a	Late Roman 4	0	22	0
BSSV0001a	Ostia 1	0	19	0
BSSV0001a	Ostia 4	0	51	0
BSSV0001a	Tripolitana 3	0	10	0

Mithraeum

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
CRBA0001a	Africana 2a	0.528	1	0
CRBA0001a	Byzantine Globular Amphora	0.186	2	0
CRBA0001a	Cilindriche Grandi Dimensione	0.178	1	0
CRBA0001a	Keay LII	11.342	563	0
CRBA0001a	Keay LIX	0.58	1	0
CRBA0001a	Keay LVI	0.105	1	0
CRBA0001a	Keay LXI	0.714	5	0
CRBA0001a	Keay XXV	0.128	1	0
CRBA0001a	Keay XXV/XXVI	0.336	5	0
CRBA0001a	Keay XXVI	0.37	3	0
CRBA0001a	Keay XXXV	0.075	1	0
CRBA0001a	Keay XXXVI	0.056	1	0
CRBA0001a	Late Roman 1	0.442	7	0
CRBA0001a	Late Roman 2	0.3	5	0
CRBA0001a	Late Roman 3	0.036	1	0
CRBA0001a	Late Roman 4	14.843	564	0
CRBA0001a	Samos Amphora	0.69	2	0
CRBA0001a	Spatheion (small)	0.553	28	0
CRBA0001a	Unidentified	2.476	90	0
CRBA0001a	Unidentified African	24.379	900	0
CRBA0001a	Unidentified Eastern	3.62	244	0

Exedra

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
CRBA0002a	Castrum Perti	0	809	0
CRBA0002a	Crypta Balbi 1	0	376	0
CRBA0002a	Crypta Balbi 2	0	1428	0
CRBA0002a	Globular Amphora (micaceous)	0	582	0
CRBA0002a	Globular Amphora (non-micaceous)	0	517	0
CRBA0002a	Keay LII	0	2204	0
CRBA0002a	Keay LXI	0	145	0
CRBA0002a	Keay XXV	0	3602	0
CRBA0002a	Late Roman 1	0	638	0
CRBA0002a	Late Roman 3	0	714	0
CRBA0002a	Late Roman 4	0	550	0
CRBA0002a	Late Roman 5	0	2624	0
CRBA0002a	Late Roman 7	0	385	0
CRBA0002a	Orli a Fascia	0	25	0
CRBA0002a	Samos Amphora	0	1194	0
CRBA0002a	Unidentified	0	150	0
CRBA0002a	Unidentified	0	700	0
CRBA0002a	Unidentified	0	1194	0
CRBA0002a	Unidentified	0	11606	0
CRBA0002a	Unidentified African	0	14057	0

Giardino

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
CRBA0003a	Cilindriche Grandi Dimensione	0	43	0
CRBA0003a	Keay I	0	9	0
CRBA0003a	Keay XXV	0	38	0
CRBA0003a	Ostia 4	0	1	0
CRBA0003a	Schone-mau XXXV	0	2	0
CRBA0003a	Tripolitana 1	0	4	0

US28

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001a	Crypta Balbi 2	0.195	8	0
DTIB0001a	Dressel 2/4	0.122	1	0
DTIB0001a	Keay LII	3.282	54	0
DTIB0001a	Keay XXV/XXVI	0.35	6	0
DTIB0001a	Keay XXXVI	0.1	1	0
DTIB0001a	Late Roman 1	1.07	34	0
DTIB0001a	Late Roman 2	0.475	13	0
DTIB0001a	Late Roman 3	0.155	11	0
DTIB0001a	Late Roman 4	1.585	29	0
DTIB0001a	Spatheion (small)	0.03	2	0
DTIB0001a	Unidentified	4.022	104	0
DTIB0001a	Unidentified African	5.154	83	0

US29

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001b	Almagro 50	0.138	1	0
DTIB0001b	Keay LII	1.325	35	0
DTIB0001b	Keay XXV	0.342	2	0
DTIB0001b	Keay XXVI	0.387	2	0
DTIB0001b	Late Roman 1	0.674	26	0
DTIB0001b	Late Roman 2	0.427	11	0
DTIB0001b	Late Roman 3	0.19	12	0
DTIB0001b	Late Roman 4	1.35	30	0
DTIB0001b	Unidentified	1.758	66	0
DTIB0001b	Unidentified African	6.509	116	0

US39

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001c	Africana 1	0.092	1	0
DTIB0001c	Keay LII	0.208	6	0
DTIB0001c	Keay LXI	0.045	1	0
DTIB0001c	Keay XXV	0.092	1	0
DTIB0001c	Late Roman 1	0.278	8	0
DTIB0001c	Late Roman 2	0.06	1	0
DTIB0001c	Late Roman 3	0.112	6	0
DTIB0001c	Late Roman 4	0.485	3	0
DTIB0001c	Samos Amphora	0.052	1	0
DTIB0001c	Unidentified	0.675	12	0
DTIB0001c	Unidentified African	2.266	17	0

US41

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001d	Keay XXV/XXVI	0.154	1	0
DTIB0001d	Unidentified	0.77	15	0

US43

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001e	Keay XXV/XXVI	0.028	1	0
DTIB0001e	Spatheion (small)	0.025	2	0
DTIB0001e	Unidentified	0.306	17	0
DTIB0001e	Unidentified African	0.102	5	0
DTIB0001e	Unidentified Eastern	0.082	3	0

US44

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001f	Keay LII	0.013	1	0
DTIB0001f	Late Roman 1	0.152	3	0
DTIB0001f	Spatheion (small)	0.055	3	0
DTIB0001f	Unidentified	0.321	8	0
DTIB0001f	Unidentified African	0.067	1	0
DTIB0001f	Unidentified Eastern	0.068	1	0

US46

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001g	Crypta Balbi 2	0.245	8	0
DTIB0001g	Dressel 20	0.348	2	0
DTIB0001g	Keay LII	4.695	69	0
DTIB0001g	Keay LXI	0.084	1	0
DTIB0001g	Keay XXV	0.076	1	0
DTIB0001g	Keay XXV/XXVI	1.313	17	0
DTIB0001g	Keay XXVI	0.065	2	0
DTIB0001g	Late Roman 1	0.785	18	0
DTIB0001g	Late Roman 2	0.394	7	0
DTIB0001g	Late Roman 3	0.182	6	0
DTIB0001g	Late Roman 5/Gaza	0.188	2	0
DTIB0001g	Unidentified	0.908	31	0
DTIB0001g	Unidentified African	3.702	38	0

US47

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001h	Africana 1	0.15	1	0
DTIB0001h	Crypta Balbi 2	0.18	2	0
DTIB0001h	Keay LII	1.517	15	0
DTIB0001h	Late Roman 3	0.065	2	0
DTIB0001h	Late Roman 5/Gaza	0.066	1	0
DTIB0001h	Unidentified	0.329	7	0
DTIB0001h	Unidentified African	0.406	2	0

US48

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001i	Cilindriche Grandi Dimensione	1.05	4	0
DTIB0001i	Crypta Balbi 2	0.245	5	0
DTIB0001i	Kapitan II	0.182	2	0
DTIB0001i	Keay LII	5.145	62	0
DTIB0001i	Keay LXI	1.152	8	0
DTIB0001i	Keay XXV/XXVI	2.331	13	0
DTIB0001i	Keay XXXV	1.145	3	0
DTIB0001i	Late Roman 1	0	10	0
DTIB0001i	Late Roman 3	0.074	5	0
DTIB0001i	Late Roman 5/Gaza	1.879	26	0
DTIB0001i	Spatheion (small)	1.148	11	0
DTIB0001i	Unidentified	2.685	33	0
DTIB0001i	Unidentified African	2.067	11	0

US49

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001j	Keay LII	0.025	1	0
DTIB0001j	Keay LXI	0.008	1	0
DTIB0001j	Late Roman 2	0.042	1	0
DTIB0001j	Spatheion (small)	0.016	2	0
DTIB0001j	Unidentified	0.372	12	0
DTIB0001j	Unidentified African	0.168	2	0

US50

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001k	Keay LII	0.094	1	0
DTIB0001k	Late Roman 2	0.067	1	0
DTIB0001k	Unidentified	0.14	2	0

US69

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001l	Dressel 20	4.97	38	0
DTIB0001l	Keay LII	0.095	1	0
DTIB0001l	Keay LXI	0.075	1	0
DTIB0001l	Keay XXV	0.316	1	0
DTIB0001l	Keay XXV/XXVI	0.085	1	0
DTIB0001l	Spatheion (small)	0.059	2	0
DTIB0001l	Unidentified	1.202	24	0
DTIB0001l	Unidentified African	1.362	11	0

US81

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
DTIB0001m	Unidentified	0.049	1	0

Foro Romano area Nord Occidentale

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
FRNW0001a	Cilindriche Grandi Dimensione	14.67	370	0.84
FRNW0001a	Keay LII	7.8	210	0.45
FRNW0001a	Keay LIII	0.097	1	0.01
FRNW0001a	Keay LXII	1.242	2	0.07
FRNW0001a	Keay XXIII	0.264	1	0.02
FRNW0001a	Late Roman 1	0.568	29	0.03
FRNW0001a	Late Roman 2	0.138	12	0.01
FRNW0001a	Late Roman 3	5.679	402	0.32
FRNW0001a	Late Roman 4	7.481	283	0.43
FRNW0001a	Late Roman 5	0.836	48	0.05
FRNW0001a	Late Roman 7	0.01	4	0
FRNW0001a	Samos Amphora	3.301	97	0.19
FRNW0001a	Unidentified	0.482	10	0.03
FRNW0001a	Unidentified	2.235	156	0.13
FRNW0001a	Unidentified African	2.22	51	0.13
FRNW0001a	Unidentified Eastern	2.281	393	0.13

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MMSW0001a	Africana 1	0	54	0
MMSW0001a	Africana 2	0	53	0
MMSW0001a	Africana 2	0	119	0
MMSW0001a	Almagro 51c	0	24	0
MMSW0001a	Cilindriche Grandi Dimensione	0	12	0
MMSW0001a	Dressel 1	0	10	0
MMSW0001a	Dressel 2/4	0	20	0
MMSW0001a	Dressel 20	0	14	0
MMSW0001a	Dressel 7/11	0	14	0
MMSW0001a	Empoli	0	16	0
MMSW0001a	Gauloise 4	0	8	0
MMSW0001a	Kapitan 1	0	4	0
MMSW0001a	Kapitan II	0	10	0
MMSW0001a	Keay I b	0	14	0
MMSW0001a	Keay LII	0	34	0
MMSW0001a	Keay XXV	0	45	0
MMSW0001a	Late Roman 1	0	55	0
MMSW0001a	Late Roman 3	0	7	0
MMSW0001a	Late Roman 4	0	13	0
MMSW0001a	Late Roman 7	0	11	0
MMSW0001a	Mid Roman 1	0	55	0
MMSW0001a	Spatheion (small)	0	12	0
MMSW0001a	Spello	0	55	0
MMSW0001a	Tripolitana 2	0	10	0
MMSW0001a	Unidentified	0	9	0
MMSW0001a	Unidentified African	0	37	0

Quad. S9

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0001a	Dressel 20	51	0	242.857
MTES0001a	Unidentified	0	0	0
MTES0001a	Unidentified African	13.5	0	64.286
MTES0001b	Dressel 20	48.5	0	0
MTES0001b	Unidentified African	16.5	0	0
MTES0001c	Dressel 20	188	0	0
MTES0001c	Unidentified African	33	0	0
MTES0001d	Dressel 20	165.5	0	0
MTES0001d	Unidentified African	14.5	0	0
MTES0001e	Dressel 20	122	0	0
MTES0001e	Unidentified African	7.5	0	0
MTES0001f	Dressel 20	149	0	0
MTES0001f	Unidentified African	6	0	0
MTES0001g	Dressel 20	188.5	0	0
MTES0001g	Unidentified African	5	0	0
MTES0001h	Dressel 20	154.5	0	0
MTES0001h	Unidentified African	20	0	0

Quad S10

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0002a	Dressel 20	31.5	0	0
MTES0002a	Unidentified African	8.5	0	0
MTES0002b	Dressel 20	32	0	0
MTES0002b	Unidentified African	10.5	0	0
MTES0002c	Dressel 20	150	0	0
MTES0002c	Unidentified African	6.5	0	0
MTES0002d	Dressel 20	122.5	0	0
MTES0002d	Unidentified African	20.5	0	0
MTES0002e	Dressel 20	144.5	0	0
MTES0002e	Unidentified African	12.5	0	0
MTES0002f	Dressel 20	100	0	0
MTES0002f	Unidentified African	30.5	0	0
MTES0002g	Dressel 20	108.5	0	0
MTES0002g	Unidentified African	14	0	0
MTES0002h	Dressel 20	298	0	0
MTES0002h	Unidentified African	69	0	0

Quad S11

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0003a	Dressel 20	44.5	0	0
MTES0003a	Unidentified African	18	0	0
MTES0003b	Dressel 20	45.5	0	0
MTES0003b	Unidentified African	21.5	0	0
MTES0003c	Dressel 20	175	0	0
MTES0003c	Unidentified African	11	0	0
MTES0003d	Dressel 20	184	0	0
MTES0003d	Unidentified African	9.5	0	0
MTES0003e	Dressel 20	174	0	0
MTES0003e	Unidentified African	11.5	0	0
MTES0003f	Dressel 20	97.5	0	0
MTES0003f	Unidentified African	41.5	0	0
MTES0003g	Dressel 20	151	0	0
MTES0003g	Unidentified African	26	0	0
MTES0003h	Dressel 20	227	0	0
MTES0003h	Unidentified African	39	0	0
MTES0003i	Dressel 20	230	0	0
MTES0003i	Unidentified African	9	0	0
MTES0003j	Dressel 20	122	0	0
MTES0003j	Unidentified African	25	0	0
MTES0003k	Dressel 20	119	0	0
MTES0003k	Unidentified African	0.5	0	0

Quad N1

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0004a	Dressel 20	0	0	0
MTES0004b	Dressel 20	552	0	0
MTES0004b	Unidentified African	121	0	0
MTES0004c	Dressel 20	144	0	0
MTES0004c	Unidentified African	8	0	0
MTES0004d	Dressel 20	170	0	0
MTES0004d	Unidentified African	44	0	0
MTES0004e	Dressel 20	237.5	0	0
MTES0004e	Unidentified African	12.5	0	0
MTES0004f	Dressel 20	219	0	0
MTES0004f	Unidentified African	6	0	0
MTES0004g	Dressel 20	79	0	0
MTES0004g	Unidentified African	0	0	0
MTES0004h	Dressel 20	361	0	0
MTES0004h	Unidentified African	40	0	0
MTES0004i	Dressel 20	111	0	0
MTES0004i	Unidentified African	25	0	0
MTES0004j	Dressel 20	270	0	0
MTES0004j	Unidentified African	29	0	0
MTES0004k	Dressel 20	146	0	0
MTES0004k	Unidentified African	15	0	0
MTES0004l	Dressel 20	150	0	0
MTES0004l	Unidentified African	13.5	0	0
MTES0004m	Dressel 20	271	0	0
MTES0004m	Unidentified African	19	0	0
MTES0004n	Dressel 20	252.5	0	0
MTES0004n	Unidentified African	14.5	0	0
MTES0004o	Dressel 20	126	0	0
MTES0004o	Unidentified African	4.5	0	0
MTES0004p	Dressel 20	147	0	0
MTES0004p	Unidentified African	4	0	0
MTES0004q	Dressel 20	177	0	0
MTES0004q	Unidentified African	4	0	0
MTES0004r	Dressel 20	145	0	0
MTES0004s	Dressel 20	187	0	0
MTES0004s	Unidentified African	12	0	0
MTES0004t	Dressel 20	152	0	0
MTES0004t	Unidentified African	11	0	0

Quad N2

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0005b	Dressel 20	164	0	0
MTES0005b	Unidentified African	28.5	0	0
MTES0005c	Dressel 20	206	0	0
MTES0005c	Unidentified African	28	0	0
MTES0005d	Dressel 20	221.5	0	0
MTES0005d	Unidentified African	15	0	0
MTES0005e	Dressel 20	267	0	0
MTES0005e	Unidentified African	34	0	0
MTES0005f	Dressel 20	193	0	0
MTES0005f	Unidentified African	15.5	0	0
MTES0005g	Dressel 20	60	0	0
MTES0005g	Unidentified African	0.5	0	0
MTES0005h	Dressel 20	268	0	0
MTES0005h	Unidentified African	1	0	0
MTES0005i	Dressel 20	115	0	0
MTES0005i	Unidentified African	2	0	0
MTES0005j	Dressel 20	172	0	0
MTES0005k	Dressel 20	200	0	0
MTES0005l	Dressel 20	65	0	0
MTES0005m	Dressel 20	266.5	0	0
MTES0005m	Unidentified African	2	0	0
MTES0005n	Dressel 20	250	0	0
MTES0005n	Unidentified African	7	0	0
MTES0005o	Dressel 20	158	0	0
MTES0005o	Unidentified African	15	0	0
MTES0005p	Dressel 20	139	0	0
MTES0005p	Unidentified African	12	0	0
MTES0005q	Dressel 20	118	0	0
MTES0005q	Unidentified African	7	0	0
MTES0005r	Dressel 20	117	0	0
MTES0005r	Unidentified African	5	0	0
MTES0005s	Dressel 20	122	0	0
MTES0005s	Unidentified African	4	0	0
MTES0005t	Dressel 20	160.5	0	0

Quad S1

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0006b	Dressel 20	366.5	0	0
MTES0006b	Unidentified African	60	0	0
MTES0006c	Dressel 20	213	0	0
MTES0006c	Unidentified African	7.5	0	0
MTES0006d	Dressel 20	254	0	0
MTES0006d	Unidentified African	19	0	0
MTES0006e	Dressel 20	287.5	0	0
MTES0006e	Unidentified African	28	0	0
MTES0006f	Dressel 20	188	0	0
MTES0006f	Unidentified African	27	0	0
MTES0006g	Dressel 20	65	0	0
MTES0006g	Unidentified African	26	0	0
MTES0006h	Dressel 20	265	0	0
MTES0006h	Unidentified African	61	0	0
MTES0006i	Dressel 20	99	0	0
MTES0006i	Unidentified African	10	0	0
MTES0006j	Dressel 20	161	0	0
MTES0006j	Unidentified African	11.5	0	0
MTES0006k	Dressel 20	212	0	0
MTES0006k	Unidentified African	10	0	0
MTES0006l	Dressel 20	76	0	0
MTES0006l	Unidentified African	8	0	0
MTES0006m	Dressel 20	154	0	0
MTES0006m	Unidentified African	35	0	0
MTES0006n	Dressel 20	187	0	0
MTES0006n	Unidentified African	27	0	0
MTES0006o	Dressel 20	201	0	0
MTES0006o	Unidentified African	8	0	0
MTES0006p	Dressel 20	172	0	0
MTES0006p	Unidentified African	1	0	0
MTES0006q	Dressel 20	187.5	0	0
MTES0006q	Unidentified African	4	0	0
MTES0006r	Dressel 20	146	0	0
MTES0006r	Unidentified African	0.5	0	0
MTES0006s	Dressel 20	99.5	0	0
MTES0006s	Unidentified African	10	0	0
MTES0006t	Dressel 20	217	0	0

Quad S2

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
MTES0007a	Dressel 20	175	0	0
MTES0007a	Unidentified African	30.5	0	0
MTES0007b	Dressel 20	197	0	0
MTES0007b	Unidentified African	18	0	0
MTES0007c	Dressel 20	197	0	0
MTES0007c	Unidentified African	18	0	0
MTES0007d	Dressel 20	217.5	0	0
MTES0007d	Unidentified African	5.5	0	0
MTES0007e	Dressel 20	285	0	0
MTES0007e	Unidentified African	24	0	0
MTES0007f	Dressel 20	176	0	0
MTES0007f	Unidentified African	31	0	0
MTES0007g	Dressel 20	93	0	0
MTES0007g	Unidentified African	0.5	0	0
MTES0007h	Dressel 20	317	0	0
MTES0007h	Unidentified African	13.5	0	0
MTES0007i	Dressel 20	98.5	0	0
MTES0007i	Unidentified African	1	0	0
MTES0007j	Dressel 20	204	0	0
MTES0007j	Unidentified African	2	0	0
MTES0007k	Dressel 20	149	0	0
MTES0007k	Unidentified African	0.5	0	0
MTES0007l	Dressel 20	120.5	0	0
MTES0007l	Unidentified African	1	0	0
MTES0007m	Dressel 20	238	0	0
MTES0007m	Unidentified African	13	0	0
MTES0007n	Dressel 20	235	0	0
MTES0007n	Unidentified African	10	0	0
MTES0007o	Dressel 20	143	0	0
MTES0007o	Unidentified African	16	0	0
MTES0007p	Dressel 20	146	0	0
MTES0007p	Unidentified African	17	0	0
MTES0007q	Dressel 20	104	0	0
MTES0007q	Unidentified African	6	0	0
MTES0007r	Dressel 20	154	0	0
MTES0007r	Unidentified African	4	0	0
MTES0007s	Dressel 20	138	0	0
MTES0007t	Dressel 20	187	0	0
MTES0007t	Unidentified African	13.5	0	0

Palatine East

Deposit A105

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
PALE0001a	Almagro 50	26.07	396	0
PALE0001a	Dressel 20	51.66	294	0
PALE0001a	Kapitan II	15.95	204	0
PALE0001a	Keay LII	14.7	495	0
PALE0001a	Late Roman 3	4.04	364	0
PALE0001a	Late Roman 4	0.3	1	0
PALE0001a	Ostia 4	1.59	33	0
PALE0001a	Unidentified	0.26	3	0
PALE0001a	Unidentified	0.39	3	0
PALE0001a	Unidentified	1.47	18	0
PALE0001a	Unidentified	3.78	45	0
PALE0001a	Unidentified	5.38	42	0
PALE0001a	Unidentified	9.26	180	0
PALE0001a	Unidentified	13.16	278	0
PALE0001a	Unidentified	67.3	0	0
PALE0001a	Unidentified African	194.44	0	0
PALE0001a	Unidentified Eastern	0.85	18	0
PALE0001a	Unidentified Italian	0.7	3	0

Schola Praeconum

SP1

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
SCHP0001a	Late Roman 3	20	2046	1.54
SCHP0001a	Late Roman 4	10.5	387	0.81
SCHP0001a	Late Roman 5	2.5	275	0.19
SCHP0001a	Late Roman 6	0.25	6	0.02
SCHP0001a	Unidentified	63	3013	4.85
SCHP0001a	Unidentified African	157.22	4223	12.09

SP2

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
SCHP0002a	Late Roman 1	0	1	0
SCHP0002a	Late Roman 2	0.05	1	0
SCHP0002a	Late Roman 3	0.85	95	0
SCHP0002a	Late Roman 4	0.75	31	0
SCHP0002a	Late Roman 5	0.5	5	0
SCHP0002a	Unidentified	1.6	61	0
SCHP0002a	Unidentified African	4.6	133	0

Sector D period IV

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VBAR0001a	Africana 1	0	4	0
VBAR0001a	Africana 2	0	14	0
VBAR0001a	Almagro 50	0	1	0
VBAR0001a	Almagro 51a	0	7	0
VBAR0001a	Anfore a fondo piatto	0	3	0
VBAR0001a	Camulodunum 184	0	1	0
VBAR0001a	Crypta Balbi 2	0	5	0
VBAR0001a	Dressel 2/4	0	1	0
VBAR0001a	Dressel 20	0	1	0
VBAR0001a	Dressel 20	0	1	0
VBAR0001a	Dressel 20	0	23	0
VBAR0001a	Dressel 30	0	1	0
VBAR0001a	Kapitan 1	0	1	0
VBAR0001a	Kapitan II	0	1	0
VBAR0001a	Keay LII	0	182	0
VBAR0001a	Keay LXI	0	3	0
VBAR0001a	Keay XXV	0	5	0
VBAR0001a	Keay XXVI	0	1	0
VBAR0001a	Keay XXVI	0	51	0
VBAR0001a	Keay XXXV	0	1	0
VBAR0001a	Late Roman 1	0	13	0
VBAR0001a	Late Roman 2	0	11	0
VBAR0001a	Late Roman 3	0	40	0
VBAR0001a	Late Roman 4	0	38	0
VBAR0001a	Late Roman 5	0	24	0
VBAR0001a	Late Roman 7	0	4	0
VBAR0001a	Tripolitana 2	0	1	0
VBAR0001a	Tripolitana 3	0	1	0
VBAR0001a	Unidentified	0	219	0
VBAR0001a	Unidentified African	0	235	0
VBAR0001a	Unidentified Eastern	0	8	0

Julio Claudian levelling deposit

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VBAR0002a	Unidentified	0	231	0
VBAR0002a	Unidentified African	0	10	0

3rd Century Severan Remodeling

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VBAR0003a	Africana 1	0	19	0
VBAR0003a	Dressel 1	0	1	0
VBAR0003a	Dressel 2/4	0	2	0
VBAR0003a	Dressel 20	0	202	0
VBAR0003a	Gauloise 4	0	191	0
VBAR0003a	Kapitan 1	0	27	0
VBAR0003a	Kapitan II	0	55	0
VBAR0003a	Keay I	0	2	0
VBAR0003a	Unidentified	0	983	0
VBAR0003a	Unidentified African	0	561	0
VBAR0003a	Unidentified Eastern	0	43	0
VBAR0003a	Unidentified Italian	0	16	0

3rd Century Severan Remodeling

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VBAR0003b	Africana 1	0	203	0
VBAR0003b	Dressel 20	0	273	0
VBAR0003b	Unidentified	0	1203	0
VBAR0003b	Unidentified African	0	657	0

Atrium Vestae

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VEST0001a	Africana 1	0.118	1	0.13
VEST0001a	Keay LII	0.292	9	0.31
VEST0001a	Keay LV	0.17	1	0.18
VEST0001a	Late Roman 1	0.04	2	0.04
VEST0001a	Late Roman 4	0.188	1	0.2
VEST0001a	Unidentified	6.4	225	6.81
VEST0001a	Unidentified African	0.885	29	0.94
VEST0001a	Unidentified Eastern	1.14	46	1.21
VEST0001a	Unidentified Italian	0.756	27	0.8

Via di Sant'Alberto Magno

US9

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001a	Africana 1	0.066	1	0
VSAM0001a	Africana 2a	0.07	1	0
VSAM0001a	Spatheion (small)	0.06	1	0

US10

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001b	Cilindriche Grandi Dimensione	0.175	1	0
VSAM0001b	Keay LII	0.855	1	0
VSAM0001b	Keay LVII	0.04	1	0
VSAM0001b	Keay XXV	0.235	1	0
VSAM0001b	Late Roman 4	0.13	2	0
VSAM0001b	Unidentified	0.09	2	0

US11

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001c	Globular Amphora (non-micaceous)	0.245	1	0
VSAM0001c	Keay LII	0.075	1	0
VSAM0001c	Keay LXI	0.06	2	0
VSAM0001c	Keay LXXIII	0.07	1	0
VSAM0001c	Keay XXVI	0.07	1	0
VSAM0001c	Keay XXXVI	0.074	1	0
VSAM0001c	Late Roman 4	0.12	3	0
VSAM0001c	Late Roman 7	0.19	1	0
VSAM0001c	Orli a Fascia	0.129	2	0
VSAM0001c	Spatheion (small)	0.18	2	0
VSAM0001c	Unidentified	0.24	5	0
VSAM0001c	Unidentified African	0.37	4	0

US12

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001d	Keay XXVI	0	1	0
VSAM0001d	Late Roman 1	0.175	1	0
VSAM0001d	Late Roman 4	0.26	2	0

US13

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001e	Dressel 20	0.325	1	0
VSAM0001e	Dressel 30	0.144	1	0
VSAM0001e	Keay LXI	0.17	1	0
VSAM0001e	Keay XXV/XXVI	0.092	1	0
VSAM0001e	Keay XXVI	0.363	4	0
VSAM0001e	Late Roman 4	1.04	10	0
VSAM0001e	Late Roman 5	0.395	2	0
VSAM0001e	Spatheion (small)	0.32	10	0
VSAM0001e	Unidentified	1.405	20	0
VSAM0001e	Unidentified African	0.26	4	0

US14

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001f	Africana 1	0.438	1	0
VSAM0001f	Africana 2b	0.274	3	0
VSAM0001f	Dressel 30	0.09	1	0
VSAM0001f	Globular Amphora (micaceous)	0.34	5	0
VSAM0001f	Globular Amphora (non-micaceous)	0.018	1	0
VSAM0001f	Keay LII	1.208	14	0
VSAM0001f	Keay LVI	0.092	1	0
VSAM0001f	Keay LVII	0.676	2	0
VSAM0001f	Keay LXI	0.42	3	0
VSAM0001f	Keay XXV	0.18	2	0
VSAM0001f	Keay XXVI	0.064	1	0
VSAM0001f	Keay XXXV	0.496	2	0
VSAM0001f	Late Roman 1	0.382	6	0
VSAM0001f	Late Roman 2	0.08	1	0
VSAM0001f	Late Roman 3	0.199	9	0
VSAM0001f	Late Roman 4	1.707	15	0
VSAM0001f	Late Roman 5	1.178	18	0
VSAM0001f	Late Roman 7	0.111	1	0
VSAM0001f	Samos Amphora	0.356	5	0
VSAM0001f	Spatheion (small)	0.256	5	0
VSAM0001f	Tripolitana 3	0.06	1	0
VSAM0001f	Unidentified	2.627	39	0
VSAM0001f	Unidentified African	1.815	21	0

US15

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001g	Africana 2	0.08	1	0
VSAM0001g	Agora M254	0.095	1	0
VSAM0001g	Dressel 1	0.28	2	0
VSAM0001g	Dressel 2/4	0.18	3	0
VSAM0001g	Dressel 20	0.268	1	0
VSAM0001g	Keay LII	0.5	1	0
VSAM0001g	Keay LXI	0.07	2	0
VSAM0001g	Keay XXV	0.124	1	0
VSAM0001g	Keay XXVI	0.19	3	0
VSAM0001g	Late Roman 4	0.166	2	0
VSAM0001g	Late Roman 5	0.068	1	0
VSAM0001g	Spatheion (small)	0.136	5	0
VSAM0001g	Tripolitana 3	0.13	1	0
VSAM0001g	Unidentified	2.3	34	0
VSAM0001g	Unidentified African	0.28	3	0

US17

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001h	Almagro 50	0.125	1	0
VSAM0001h	Cilindriche Grandi Dimensione	0.136	1	0
VSAM0001h	Keay LII	1.035	5	0
VSAM0001h	Keay LXI	0.09	1	0
VSAM0001h	Keay XXVI	0.055	1	0
VSAM0001h	Late Roman 4	0.445	4	0
VSAM0001h	Unidentified	1.525	19	0

US18

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001i	Keay LII	1.345	6	0
VSAM0001i	Keay LXI	0.11	1	0
VSAM0001i	Keay XXV	0.1	1	0
VSAM0001i	Keay XXVI	0.052	1	0
VSAM0001i	Keay XXXVI	0.215	2	0
VSAM0001i	Late Roman 1	0.816	1	0
VSAM0001i	Late Roman 4	0.846	8	0
VSAM0001i	Late Roman 5	0.461	3	0
VSAM0001i	Orli a Fascia	0.941	2	0
VSAM0001i	Unidentified	2.249	26	0
VSAM0001i	Unidentified African	0.17	2	0

US22

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001j	Africana 2	0.08	1	0
VSAM0001j	Hammamet 2	0.132	1	0
VSAM0001j	Keay LII	0.386	4	0
VSAM0001j	Keay LXI	0.995	4	0
VSAM0001j	Keay XXV	0.1	1	0
VSAM0001j	Keay XXVI	0.144	3	0
VSAM0001j	Keay XXXV	0.165	1	0
VSAM0001j	Late Roman 1	0.034	1	0
VSAM0001j	Late Roman 4	0.618	6	0
VSAM0001j	Late Roman 5	0.182	1	0
VSAM0001j	Spatheion (small)	0.038	1	0
VSAM0001j	Unidentified	2.824	38	0
VSAM0001j	Unidentified African	0.238	3	0

US28

Ceramic Deposit Code	Typological Classification	Weight	Sherd count	Density
VSAM0001k	Africana 1	0.17	2	0
VSAM0001k	Africana 2	0.146	1	0
VSAM0001k	Cilindriche Grandi Dimensione	0.53	1	0
VSAM0001k	Keay LII	0.135	1	0
VSAM0001k	Keay LXI	0.167	1	0
VSAM0001k	Keay VIIIb	0.056	1	0
VSAM0001k	Keay XXVI	0.058	1	0
VSAM0001k	Late Roman 4	0.24	2	0
VSAM0001k	Spatheion (small)	0.65	1	0
VSAM0001k	Unidentified	2.25	24	0

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