The Urban Economy during the Early Dominate

Pottery evidence from the Palatine Hill

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INTRODUCTION

This monograph presents an in-depth analysis of a deposit of pottery recovered on the Palatine Hill that is composed primarily of materials used and discarded during the period ca. A.D. 290-315. This span of time corresponds to the early years of the new imperial system formalized through the set of administrative, fiscal, and military reforms introduced by Diocletian. It also presumably marked the beginning of the transition from the forms of economic organization characteristic of the early and middle empire to those representative of the late empire. There are exceedingly few studies in print concerned with groups of pottery dating to this period - here referred to for the sake of convenience as the Early Dominate - and the presentation of the materials that are the focus of this monograph thus represents an important addition to our evidence regarding the nature of this transition, particularly as expressed in the supply of foodstuffs and craft goods to the historic center of the empire.

The deposit of pottery that is the subject of this study was recovered in the course of the joint Soprintendenza Archeologica di Roma/American Academy in Rome excavations on the northeast slope of the Palatine Hill. This project (henceforth referred to as the Palatine East excavations) was carried out in a series of six annual campaigns between 1989 and 1994 under the direction of E. Hostetter, with the author serving as chief ceramics specialist. The study presented here is a pilot project undertaken for the purpose of developing a set of procedures for the analysis and publication of the site pottery assemblage. The set of materials selected for this purpose was the ca. 512 kilograms of pottery recovered in context (i.e., stratigraphic unit) A (105). This group of materials was chosen for two reasons. First, it was evident at the time of its excavation that context A (105) contained materials used and discarded primarily during the historically important, yet archaeologically little-known period of the Early Dominate. Second, it was evident from the unusually large number of complete or nearly complete vessels recovered in A (105) that the materials in this context had been subjected to substantially less post-depositional disturbance than those in the several other large, late imperial deposits that had been excavated elsewhere on the site. The potential significance of the deposit thus appeared sufficiently great to justify its separate publication, while the condition of the materials suggested that it would be possible to experiment with certain analytical techniques that might prove difficult to apply to groups of highly fragmentary and/or relatively incomplete vessels.

This study should prove to be both of general interest to students of the Roman economy and of methodological interest to specialists in the study of Roman pottery. The aspects that may prove to be of methodological interest include the following:

1. The study begins with a detailed discussion of the urban economy during the period of the context's deposition, employing this as a background against which to interpret the materials. This section, which is based primarily on a close reading of the textual evidence, provides an unusually rich context for the evaluation of the deposit, permitting the ceramic evidence to be linked to specific economic institutions to an extent that is not generally possible in Roman pottery studies.

2. The primary classification of the materials was carried out on the basis of fabric rather than form or surface finish. This approach allows for the more effective grouping of the materials by provenience.

3. The various fabrics represented have been arranged in a hierarchical scheme based on their salient compositional characteristics. This approach highlights the relationships between different fabrics and pottery classes at the materials level, while facilitating the use of the fabric classification as an identification key.

4. The definition of forms and form variants has been carried out on the basis of both vessel morphology and the forming/ finishing operations involved in vessel manufacture. This approach yields a form classification more closely related to the production process, hence one more likely to express variability deriving from archaeologically significant factors, such as differences in manufacturing technique from one workshop to the next, diachronic change in forming technique, etc.

5. The materials in the deposit have been quantified using a wide array of standard measures, including sherd counts, sherd weights, and minimum vessel counts. This yields quantitative data that offer a high degree of intercomparability with data sets derived for other pottery groups, while also generating information that can be used to evaluate some of the empirical characteristics of these measures.

6. The materials in the deposit have been quantified using two measures developed specifically for this study that are designed to characterize the economic value of archaeological pottery. The first of these, which is applied to the amphora component of the deposit, draws on figures for the mean capacity of the various amphora classes represented in order to derive an estimate for the amount of content that they held. The second, which is applied to the tablewares, utilitarian wares, and cookwares, characterizes the value of vessels in terms of the amount of raw materials and labor involved in their manufacture. These approaches permit the generation

of quantitative assemblage data more closely related to considerations of economic significance than do standard pottery quantification measures.

Chapter 1 presents discussions of various aspects of the urban economy during the period of the Early Dominate that are relevant to the interpretation of the A (105) material. Appendix 1, which is linked to this chapter, discusses state involvement in the urban wine supply during the second half of the 4th c. Chapter 2 consists of a detailed description of the A (105) materials.

Linked to this chapter are Appendix 2, which presents the fabric classification, and Appendix 3, which discusses the two techniques referred to above for measuring the economic value of the assemblage pottery. Chapter 3 then presents the interpretation of the A (105) materials, considering their implications for our understanding of the urban economy during the Early Dominate and for certain aspects of the methods employed for their quantification. Chapter 4, which concludes the study, presents a brief summary of its principal results.

CHAPTER 1:

THE URBAN ECONOMY DURING THE EARLY DOMINATE

Introduction

This chapter presents a selective overview of the economy of the city of Rome during the period of the formation of the A (105) pottery deposit (ca. A.D. 290-312/15). Since the aim is to formulate a background that can be employed for the interpretation of the pottery data, the discussion focuses on those aspects of economic activity most directly related to the ceramic record.

The chapter is divided into five sections. The first examines various aspects of the urban economy in general during the period in question. The second, third, and fourth discuss the supply and consumption of the three principal foodstuffs regularly distributed to Rome in ceramic containers, namely wine, olive oil, and fish products. The fifth, in turn, discusses the supply and consumption of pottery as a craft good in its own right. It must be acknowledged at the outset that in each case the effort to reconstruct a coherent picture is severely constrained by the paucity of both textual and material evidence pertaining specifically to the period of the Early Dominate.

1.1 General Aspects of the Economy

While it would be desirable to begin with a comprehensive discussion of economic life in the *urbs* during the Early Dominate, such an undertaking lies beyond the scope of the present study.[1] Instead, a topical approach will be employed, touching on a limited number or points relevant to the interpretation of the A (105) pottery.

Administration: Under the new administrative arrangement introduced under Diocletian the city of Rome constituted (together with Ostia/Portus) an autonomous district within the diocese of Italia.[2] This district, bordered on the south and east by the province of Campania and on the east and north by the province of Tuscia et Umbria, was under the charge of the *praefectus urbi*, an official of senatorial rank, whose administration was known as the *officium urbanum*. The diocese of Italia was administered by an official known as the *vicarius Italiae*.[3] It lay within the prefecture of Italia et Africa, which was administered by an official known as the *praefectus praetorio Italiae et Africae*.

Population: We possess no information regarding the size of the population of Rome during the Early Dominate, and the best that can be done is to develop an intelligent estimate based on the figures available for somewhat earlier and later periods of the city's history. Most recently, Morley has estimated that at the time of Augustus the city's population came to ca. 850,000-1,000,000 individuals.[4] Efforts by both Barnish and Hodges and Whitehouse to evaluate the general scale of they city's population during the late empire concluded that the number of inhabitants underwent substantial contraction from 1st c. levels only during the late 4th or 5th c.[5] For the Early Dominate, it would seem advisable to lower the Augustan figures somewhat in order to allow for the possibility that the population underwent significant decline in connection with the crisis of the 3rd c. In light of this assumption, a range of ca. 700,000-900,000 individuals would seem a plausible estimate.

Transport: During the period that is the focus of this study Rome stood at the center of a highly developed transport system that connected it with its greater regional economic catchment area in west-central Italy and with the wider empire.[6] The main elements of this system were the constellation of paved, all-weather routes that radiated outward from the city,[7] and the Tiber River. Goods moved overland were transported by porter, pack mule, and wagon at speeds probably on the order of 4-6 km per hour.[8] The Tiber provided connections with areas lying outside the region through the port facilities at Ostia and Portus. Goods brought to Ostia/Portus by *naves onerariae* (merchant ships) were transferred to *naves caudicariae* (river-boats out-fitted for towing), which were then dragged up a tow path that ran along the bank of the river, the ca. 35 km trip to Rome normally requiring three days.[9] The trip back, drifting with the current, presumably required the better part of a day. While there was presumably some degree of seasonal variation in the availability and price of goods brought to Rome by sea due to the restrictions on sailing during the period from October to March,[10] fluctuations of this kind may have been smoothed out to some extent by the stockpiling of non-perishable goods in warehouses against the slack supply season.[11] Upstream of Rome, the remains of port facilities indicate that practical commercial navigation extended into the interior of the peninsula as far as the confluence of the Tiber with the Pallia (the modern Fiume Paglia), near Orvieto, and, on the lower course of the Nar (the modern Fiume Nera), the most important tributary of the Tiber, as far as Narnia (modern Narni).[12] While we possess no information regarding the speeds that could be managed by boats headed downstream to Rome in antiquity, in early modern times river-boats propelled by a

CHAPTER 2:

THE A (105) POTTERY DEPOSIT

Introduction

This chapter presents a detailed description of the pottery from Context A (105). Sections 2.1-2.3 first consider various kinds of background information. Sections 2.4-2.6 then present the materials.

2.1 Context A (105): Characteristics, Dating, and Deposition

The pottery deposit that is the subject of this study was recovered during the course of the 1991 field season of the Palatine East excavations. These excavation were concerned with the investigation of the historical topography of the lower slopes of the northeast sector of the Palatine Hill, in an area immediately to the southwest of the Arch of Constantine.[1] Much of the work focused on the exploration of a large, late-Roman building complex, interpreted as a *domus*, that dominates this part of the hill.

The context within which the pottery deposit was recovered, Sector A, Context (105) (henceforth A (105)), was a large fill recovered inside one of the chambers belonging to this late-Roman building complex. This room, known as the Northeast Room (3150 easting/6108 northing), has a rectangular shape, with its long and short sides measuring approximately 3.6 x 1.1 m, respectively.[2] Its walls were constructed in three separate stages during a phase of Late Severan to Diocletianic construction activity that saw the development of much of the southern portion of the site.[3] While the complicated sequence of small chambers and apses that make up this building phase is of problematic interpretation, it seems likely that these structures were laid out within an open area. There appear to have been several changes of design during the course of this activity, and the development of this part of the complex may never have been brought to completion.[4]

When the excavation of the Northeast Room was initiated during the 1990 field season the upper preserved surfaces of the chamber's walls stood varyingly above, at, or immediately below ground level. The emptying of the interior of the room continued into the 1991 field season, with excavation carried downward a distance of approximately 6.4 m.[5] At this point work was discontinued due to the practical difficulties involved in excavating at such great depth in a confined space, and the bottom of the sequence was not reached. The small size of the room, the lack of any provision for access to it, the absence of any flooring or surfaces, and the fact that the walls were not finished, combine to suggest that the Northeast Room was an incidental by-product of the succession of Late Severan-Diocletianic constructions in the southern part of the complex.

Fig. 5: Harris Matrix of the stratigraphic sequence in the North-east Room.

The partial emptying of the room revealed a sequence of nine discrete stratigraphic units deposited over a period of time extending from the last decade of the 3rd c. to the second or third quarter of the 4th c. (see fig. 5). The three contexts at the bot-tom of the excavated sequence, A (124), (118), and (117), were deposited during the last decade of the 3rd c., in all likelihood shortly after the construction of the chamber's final (north) wall, perhaps with the intent of stabilizing the resulting structure. The remaining contexts, A (113), (105), (103), (102), (67), and (62), belong to the group of massive 4th-5th c. dumps that extended over most of the southern part of the building complex.[6]

THE A (105) POTTERY

A (105) consisted of a loose fill of soil and refuse - animal bone, pottery, and building debris, for the most part - extending over the entire interior of the Northeast Room. The upper surface dipped from 22.46 m a.s.l. at the west to 22.22 m a.s.l. at the east, suggesting that it had been dumped into the chamber from the west. The lower surface was more or less level at 21.51 m a.s.l. By averaging the figures for the upper elevations at the east and west of the context its volume can be calculated at approximately 3.3 cubic m. A (105) overlay a small context of similar date, A (113), distinguished from it by a significantly greater ratio of building debris to pottery. After the completion of this study three cross-joins were identified between pottery from A (113) and A (105), and it now appears likely that both may, in fact, represent a single depositional unit. A (105) was overlain, in turn, by a lens of sand, A (103), a patch of burned material, A (102), and then two fill layers similar to it in composition, A (67) and (62), both dating to the second or third quarter of the 4th c.

In contrast to the other dump contexts excavated to the south of the Apsidal Building, the structure that forms the most conspicuous element of the *domus*, A (105) contained a number of substantially complete pots, and its entire content was subjected to dry sieving in order to insure the recovery of all artifacts and bone. Studies of the lamps, coins, glass, bone, and plant remains will appear in the Palatine East final reports.[7]

The lamps, coins, and pottery from A (105) can be used to develop an unusually precise estimate for its closing date. This material, along with the bone, can also be used to infer both the duration and manner of the context's deposition and the earlier depositional history of its content.

The context contained six coins, all of which were legible. They are as follows:[8]

1. No. 1855: *denarius*, C. Serveilius, C. F., 57 B.C. (*RRC* 1.447.423)

2. No. 1854: *antoninianus*, Claudius II posthumous, A.D. 270 or later. (*RIC* 5,1.233.259)

3. No. 1498: *antoninianus*, Aurelian, A.D. 270-75. (*RIC* 5,1.279.128 (4F))

4. No. 1845: radiate fraction, Maximian, A.D. 295-99. (*RIC* 6.581.15b)

5. No. 1853: radiate fraction, Maximian, A.D. 296-97. (*RIC* 6.667.46b)

6. No. 1890: *nummus*, Constantius I Caesar, A.D. 300-01. (*RIC* 6.620.55a)

Coin 6 provides a *terminus post quem* of A.D. 300 for the context's closing.

The context contained 249 fragments of ceramic lamp, weighing 3.55 kg. Table 1 presents a summary of these by type.[9] The latest dated type, the Bailey Type S, can be assigned a date of ca. A.D. 270 or later.[10]

Table 1. Ceramic lamps: number of fragments and weight in kilograms by class.

TYPE	COUNT	WEIGHT
Deneuve VII/VIII	11	0.09
Bailey S/globule	50	1.16
Pine cone	3	0.20
Buffware, central handle	2	0.11
Buffware, transverse handle	8	0.33
Buffware, slipped	113	1.17
Buffware, unslipped	45	0.36
Unclassified	17	0.13
Total	**249**	**3.55**

The context contained 512.83 kg of pottery. The latest datable sherd is a single rim fragment belonging to a shallow casserole form in West-Central Italian Cookware 1 that probably dates to the second half of the 4th or the 5th c. (see Section 2.6, Class 45). This piece is considerably later than any other pottery in the context, and is almost certainly a contaminant, presumably introduced either from the bottom of the overlying context, A (67), or during pottery processing operations. This sherd aside, the latest datable pottery consists of several examples of the Hayes Form 50 bowl in African Sigillata C^3 (Section 2.6, Form 40.1), several examples of the Hayes Form 32/58 and 58B bowl/dish in African Sigillata D (Section 2.6, Form 39.1), and a single sherd of a Hayes Form 59A bowl/dish, also in African Sigillata D (Section 2.6, Form 39.2). The last of these may also be a contaminant introduced from A (67), although this is by no means certain. The production and export of African Sigillata C^3 is believed to have commenced ca. A.D. 300 (see Section 2.6, Class 41). The Hayes 32/58 and 58B belong to the first phase of production of African Sigillata D, with a beginning date placed at about this same time (see Section 2.6, Class 40). Worth noting in this regard is the fact that while African Sigillata C^3 occurs in A (124), (118), and (117) - the three contexts at the bottom of the excavated sequence in the Northeast Room - African Sigillata D is absent from these layers. It thus seems fairly certain that African Sigillata C^3 began to reach Rome somewhat earlier than did African Sigillata D. While the *Atlante* gives a beginning date for the Hayes Form 59A in the A.D. 320s, examples of this form more recently have been recovered, together with examples of the Hayes Form 58, in the fill of the foundation trenches of the Arch of Constantine, constructed ca. A.D. 312-15.[11] The suite of African Sigillata D forms in A (105) can thus date to a period as early as ca. A.D. 312-15. If the single sherd of the Hayes Form 59A is regarded as a contaminant, then this date range can be lowered by as much as 10-15 years. Even so, there is at present nothing to preclude the possibility that the Hayes Form 59A began to reach Rome as early as the first decade of the 4th c. The pottery thus provides a *terminus post quem* of ca. A.D. 300-15.

Given the large amount of material in A (105) and the general consistency of the artifact groups recovered in the several large fill contexts excavated in the southern portion of the site, it does not seem overly risky to use the absence of specific materials as a criterion for suggesting how much later than this *terminus post quem* the context was, in fact, closed. With regard to pottery and lamps, the absence of the Hayes Forms 60, 61A, 67, and 91A-B in African Sigillata D, the Hayes Forms 53A and 91A in African Sigillata C, hand-built cookwares, African lamps, par-ticularly the *Atlante* Type VIII, and regional copies of African lamp types make it virtually certain that the closing date was not as late as the middle of the 4th c. A preliminary analysis of the Palatine East sequence suggests, in fact, that several of these forms and/or pottery classes, including the Hayes Forms 60, 61A in African Sigillata D, and at least one class of handbuilt cookware, were already in use at Rome during the second quarter of the 4th c. If so, then the pottery would appear to indicate a closing date in the first quarter of the 4th c.

This estimate can be further refined on the basis of the numismatic evidence. The distribution of dates for the six coins recovered in this context suggests that the later datable specimens (Nos. 4-6) can be regarded as clustering in the period A.D. 295-301. The possible significance of this point is heightened considerably by the fact that the coin groups recovered in the other large fill contexts dating to the first half of the 4th c. excavated in the southern portion of the site, including some apparently closed in the second decade of the century, each contain several coins dated to the period A.D. 307-21. Taken together, these two observations suggest that A (105) may well have been closed within a short time of its numismatically determined *terminus post quem*, perhaps within just a few years of the opening of the 4th c.

The contexts immediately below A (105) in the sequence allow us to make a fairly precise determination of the beginning date of its deposition. As previously noted, A (105) immediately overlay a small context indistinguishable from it in date, A (113). This, in turn, overlay a series of three contexts, A (124), (118), and (117), containing a combined total of over 200 kg of pottery. These can all be assigned *termini post quem* and probable closing dates in the final decade of the 3rd c. on the basis of the presence of examples of the Hayes Form 50 in African Sigillata C[3] and the absence of African Sigillata D. It would thus appear that the deposition of A (105) can have begun no earlier than the A.D. 290s, and not perhaps until ca. A.D. 300.

In summary, on the basis of the relevant chronological evidence we can conclude that the deposition of A (105) began no earlier than the A.D. 290s, and perhaps no earlier than ca. A.D. 300, and that it concluded no earlier than A.D. 300, possibly as early as the period ca. A.D. 301-05, and probably no later than ca. A.D. 312-15.

We may next consider the evidence regarding the dynamics of the context's deposition. As previously noted, overlying it were two small, undated contexts, A (103) and A (102), which were overlain in turn by a context containing 130 kg of pottery, A (67), that can be assigned a closing date in the second or third quarter of the 4th c. on the basis of the numismatic and pottery evidence. This sequence of fills points to three discrete periods of dumping activity, the first occurring during the A.D. 290s, the second during the first or second decade of the 4th c., and the third during the second or third quarter of the 4th c. One possibility suggested by this sequence is that the Northeast Room was twice "topped up" after the settling of earlier fills, perhaps to eliminate a potential hazard, or simply to take advantage of a convenient space for the discard of refuse.[12] If so, it may well be that A (105) was deposited in the course of a single dumping episode.

As previously noted, the pottery from A (105) differs markedly from that recovered in the several other fills of 4th/5th c. date excavated in the southern portion of the site in that it includes a large number of nearly complete and only moderately broken vessels. While this may be an indication that a substantial portion of the content reached final deposition very shortly after initial discard (or that the creation of A (105) represents its initial discard), this should probably be attributed at least in part to the relatively sheltered nature of the context's depositional basin, which would have served to limit post-depositional disturbance and shifting, with their attendant breakage and scattering. That A (105) is not entirely a primary deposit is evident from the presence of a small amount of unambiguously residual pottery and lamp, which covers a span of time running from the second quarter of the 3rd c. A.D. back at least as far as the 4th c. B.C., as well as from the presence of coin No. 1, which dates to the late Republic.[13] With just a few exceptions, the highly residual pottery consists of small, conspicuously abraded sherds, each from a different vessel. Since the depositional basin for A (105) consisted of four walls in brick-faced concrete that rose to well above the level of the context's upper surface and the upper surfaces of the contemporaneous deposits in the area around the Northeast Room, these materials cannot have been introduced into the context through incidental processes such as the erosion or disturbance of contiguous deposits. These highly residual sherds must therefore have been dumped inside the chamber. That A (105) does not consist entirely of primary materials is also suggested by the wide range of values for vessel completeness and brokenness displayed by the in-phase and possibly in-phase pottery, since this suggests that these vessels were subjected to differing depositional vicissitudes before they reached final deposition.[14] It is thus evident that A (105) consists either entirely of deliberately redeposited secondary materials, or, more likely, is a mixture of primary and deliberately redeposited secondary materials. A more detailed discussion of aspects of residuality with regard to the A (105) pottery is presented in Chapter 3.

The specific source or sources of the refuse contained in A (105) are unclear. Given the likely date of the context's deposition, it seems possible that the dumping of these materials (and the massive dumping of materials elsewhere on the site during the early 4th c.) was undertaken in connection with clean up operations associated with the rebuilding of the nearby Temple of Venus and Roma, carried out beginning in A.D. 307. (*Chron. 354* [146])

2.2 Study Methods

All pottery in the deposit was subjected to a standardized set of classification/quantification procedures. This began with the division of the materials into three general functional groups: transport amphoras, tablewares/utilitarian wares, and cookwares.

The materials assigned to the tableware/utilitarian ware and cookware functional groups were then divided into "pottery classes" - categories roughly equivalent to what are generally thought of as wares. This was carried out on the basis of "fabric," with similar fabrics arranged into "fabric groups." A fabric group was defined as a ceramic body characterized by a distinctive set of raw materials and/or raw materials processing procedures. A fabric was defined as a subclass of a fabric group distinguished either on the basis of a distinctive surface treatment or what was judged to be significant textural variation with respect to the other subclasses in the group. Fabric groups and fabrics were identified and characterized by detaching sample chips from sherds with a pair of snips and examining the fresh break under a binocular microscope offering 20X and 40X magnification. Appendix 2 presents the complete fabric classification, along with an explanatory apparatus that describes in detail the procedures employed for its elaboration. As the identifications of the various aplastic materials present in the fabrics have not been confirmed through a program of petrographic analysis these identifications should be regarded as conjectural. The locations of the various igneous/metamorphic massifs and volcanic provinces/complexes noted in reference to the various fabrics and fabric groups represented are shown in Figure 6.

The sherds assigned to each class belonging to the tableware/ utilitarian ware and cookware functional groups were then subdivided by "form." A form was defined as a distinct vessel shape attained by a specific set of primary forming operations. This definition had to be applied in a fairly flexible manner, as it was frequently impossible to reconstruct the entire shape of a vessel, and many forms were defined on the basis of just the rim area. In practice, this operation was carried out primarily for diagnostic sherds (rims, bases, handles), since for several pottery classes it was difficult to determine with confidence the specific form to which body sherds belonged. In some instances it was possible to recognize recurring minor variations in vessel morphology and/or groups of vessels characterized by a distinctive set of secondary forming operations. Where it was suspected that these were an expression of workshop origin, a distinct function or method of use, or some diachronic morphological changes, the vessels displaying these characteristics were classified as a "variant" of the form to which they belonged. Each form was then characterized with regard to its shape, dimensions, and the forming/finishing operations employed in its manufacture.

Forms were also characterized on two additional counts:

1. Function. Where possible, an effort was made to infer the purpose for which a form was used on the basis of its overall shape and dimensions, any specific features (e.g., gritting in the interior of a *mortarium*, a slot in a coin bank), and/or the presence of surface abrasion, incrustations, or sooting.[15]

2. Phasing. Each form was assigned to one of four phasing categories in order both to differentiate between those vessels which were certainly relevant, possibly relevant, and certainly irrelevant to the supply and consumption of pottery at Rome during the period of the context's deposition and to shed light on the predepositional history of the pottery contained in the context. These categories are: 1) in phase; 2) indeterminable; 3) residual; and 4) unknown. These assignments were made on the basis of the currently accepted production/use dates for the form in question, supplemented, where possible, by evidence obtained through preliminary analyses of the Palatine East sequence. The four phasing categories were defined as follows:[16]

1. in phase: form beginning date later than or equal to beginning date of context's deposition;

2. indeterminable: form beginning date earlier than beginning date of context's deposition and form ending date later than ending date of context's deposition;

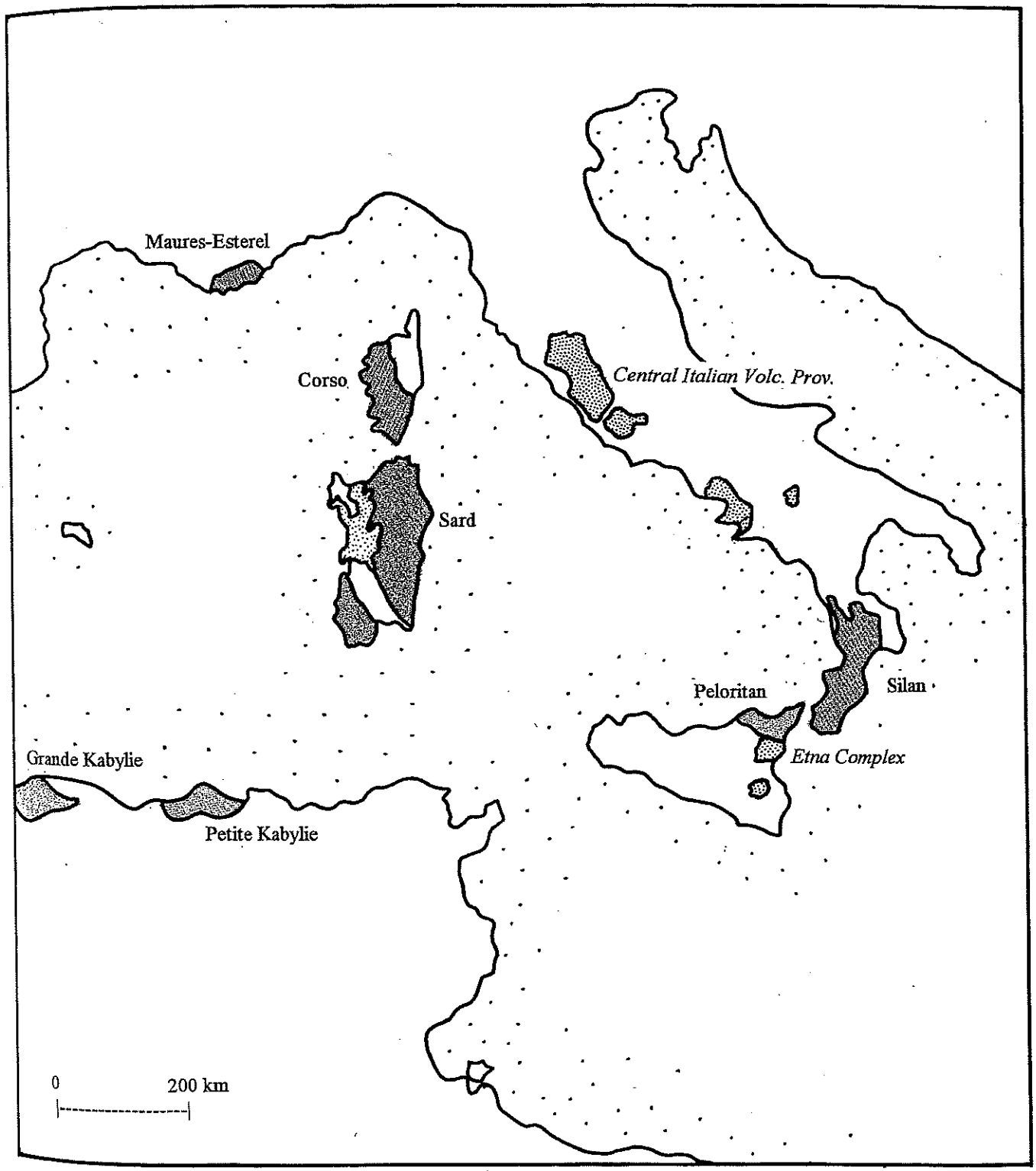
3. residual: form ending date earlier than beginning date of context's deposition;

4. unknown: insufficient information to assign form to any of other three categories.

For the purposes of this operation, A (113), the context immediately underneath A (105) in the sequence in the Northeast Room, was assumed to be coeval with it.

The materials in the transport amphora functional group were treated in a manner substantially different from that accorded the materials in the tableware/utilitarian ware and cookware functional groups. First, as many sherds as possible were assigned to one or another of the several standard amphora classes recognized in the literature. Three previously unrecognized amphora classes were discerned at this stage (Section 2.4, Classes 5, 7, and 8), and the relevant materials assigned to these. In many cases it was possible to assign body sherds only to a group of classes manufactured in the same fabric or in two or more highly similar fabrics rather than to one specific class. The amphora classes linked in this way are here referred to as "amphora groupings." A substantial portion of the material - body sherds again for the most part - could not be assigned to any class or group of classes with a sufficient degree of confidence, and these were relegated to a category termed "unclassified amphora." The materials assigned to each of the amphora classes were then subdivided by fabric, following the same procedures outlined above for the tableware/utilitarian ware and cookware functional groups, with each of the resulting subclasses designated a "variant" of that amphora class. The meaning of the term variant as used in this study is thus different for the transport amphoras functional group than it is for the tableware/utilitarian wares and cookware functional groups.

Fig. 6: Map of the central Mediterranean showing location of major igneous/metamorphic massifs and volcanic provinces/complexes. (after Aguarod Otal [1991] fig. XIX; Sander [1970] fig. 1)



Each amphora class/variant was characterized for its origin and principal content, the assumption being that most classes were employed primarily for the transport of either wine, oil, or fish products.[17] Exceptional in this regard are some classes of African amphoras, which may have been employed for the transport of both olive oil and fish products. While in many instances identifications of a class's origin and principal content were already available in the literature, in several cases these were amplified or modified on the basis of additional considerations, including textual evidence, production site evidence, distributional evidence, fabric composition, and the presence of a pitch lining. With regard to the last of these, the presence of a pitch lining was assumed to indicate a principal content of either wine or fish products.[18]

Each amphora class was also characterized for its capacity on the basis of data collected in connection with the application of the economic value measure developed for the characterization of the amphora functional group (see below).

The materials in all three functional groups were quantified by means of five different measures: sherd weight, sherd count, rim sherd count, number of vessel rims, and estimated number of vessels (henceforth WT, SCT, RSCT, NVR, and ENV, respectively). The aim in employing this large suite of measures was to produce a data set that would offer a high degree of intercomparability with data sets generated by other projects.[19]

For the tableware/utilitarian ware and cookware functional groups the first three measures, WT, SCT and RCT, were applied at the level of the pottery class, save that in one instance three classes of utilitarian ware (Tunisian Utilitarian Ware 1, 2, and 3) and in two instances two classes of cookware (West-Central Italian Cookware 1 and 2; North Tunisian Cookware and Central Tunisian Cookware) were lumped together owing to the difficulty involved in distinguishing between their fabrics. For the transport amphora functional group these measures were applied at the level of amphora groupings. No SCT data were recorded for the African amphora grouping and the unclassified amphoras.

The fourth measure, NVR, was employed as a reasonably rapid and reliable method for estimating the number of vessels represented in the context for each of the tableware/utilitarian ware and cookware forms/variants and for each of the amphoras classes/variants. With a single exception (Section 2.6, Form 29.7), all of the forms/variants had a readily identifiable rim. Again with a single exception, the rim areas on all forms/ variants displayed enough variability in shape, dimensions, fabric color, and/or fabric texture from one example to the next that it was fairly easy to distinguish between individual vessels. In order to accomplish this operation all of the rim sherds assigned to a particular form/variant were laid out on a table, all joins identified, and then each non-joining sherd or group of joining sherds compared with each of the others in order to identify those belonging to the same vessel. The one form for which this could not be done was Form 40.1, the Hayes Form 50 bowl in African Sigillata C. This form, which has a very thin wall, a splintery fabric, and a simple, pointed rim, tends to break into extremely small sherds, and it proved impossible to derive an estimate for the number of vessel rims with a sufficient degree of confidence. Since this form has a distinctive base, however, an alternative NVR figure was obtained using this other part of the vessel.

The fifth measure, ENV, was applied in order to obtain an estimate for the number of different examples of each form/variant present that recognized those forms/variants not represented by rim sherds and that would yield figures closer to the true value than would the NVR measure. The set of procedures employed was similar to that used for the NVR measure, except that in this case all sherds assigned to each form/variant were considered rather than just the rim sherds. As this approach has a number of inherent biases, and the careful scrutiny of all sherds for differences in fabric would have required enormous amounts of time while yielding results of questionable reliability, this procedure was carried out in a fairly cursory fashion, and the resulting data should be viewed as no more than an informative supplement to those obtained by means of the NVR measure.

Table 2 presents a breakdown of the deposit by functional groups for each of the five quantification measures. Table 3 presents the WT, SCT, and RCT data for the transport amphora functional group, while Table 4 presents the NVR and ENV data for this same functional group. Tables 5 and 6 present, in the first instance, the WT, SCT and RCT data and, in the second, the NVR and ENV data for the tableware/utilitarian ware functional group. Tables 7 and 8 provide the WT, SCT, and RCT data and the NVR and ENV data for the cookware functional group.

Two additional measures were developed for the purpose of quantifying the economic value represented by the various classes represented in the amphora functional group and in the combined tableware/utilitarian ware and cookware functional groups. The first of these employs measurements of the capacity of each of the amphora classes represented to estimate the volume of content represented by the examples of that class present in the deposit. The second measures the amount of raw materials and labor employed in the manufacture of the vessels in each of the classes represented in the deposit. Appendix 3 presents a detailed discussion of the formulation and application of these two measures. The data obtained through their application are presented in Tables 14 and 15.

Table 2. A (105) pottery by functional groups. Raw data and percentage figures for sherd weight in kilograms, sherd count, rim sherd count, number of vessel rims, and estimated number of vessels.

FUNCTIONAL GROUP	WEIGHT	%	COUNT	%	RIM COUNT	%	NVR	%	ENV	%
Amphoras	411.30	80.2	*>2,377	-	182	13.6	144	19.3	198	22.4
Table/utilitarian Wares	40.77	8.0	2,622	#41.9	387	28.9	184	24.7	265	29.9
Cookwares	60.76	11.8	3,639	#58.1	771	57.5	417	56.0	422	47.7
TOTAL	**512.83**	**100.0**	***>8,638**	**#100.0**	**1,340**	**100.0**	**745**	100.0	885	100.0

Abbreviations: NVR = number of vessel rims; ENV = estimated number of vessels.
* Figure excludes various African amphoras and unclassified amphoras.
# Value calculated for tablewares/utilitarian wares and cookwares.

Table 3. Amphoras: raw data and percentage figures by class/class groupings for sherd weight in kilograms, sherd count, and rim sherd count. Percentage figures for sherd counts exclude grouping of various African amphoras and unclassified amphoras.

CLASS	WEIGHT	%	COUNT	%	RIM COUNT	%
1. *Ostia I*.279 (Empoli)#	1.59	0.4	33	1.4	1	0.6
2. Mid-Imperial Campanian#	0.70	0.2	3	0.1	2	1.1
3. Keay 52	14.70	3.6	495	20.8	6	3.3
4. Middle Roman 1	13.16	3.2	278	11.7	15	8.2
5. Palatine East 1#	3.78	0.9	45	1.9	8	4.4
6. *Ostia I*.455/456#	1.47	0.4	18	0.8	5	2.8
7. Palatine East 2	9.26	2.3	180	7.6	19	10.4
8. Palatine East 3#	0.39	0.1	3	0.1	2	1.1
9. Cretan 1#	0.85	0.2	18	0.8	8	4.4
10. Late Roman 4 similis	0.30	0.1	1	0.0	0	-
11. Saraçhane 2#	0.26	0.1	3	0.1	1	0.6
12. Late Roman 3	4.04	1.0	364	15.3	5	2.8
13. Kapitän 2 14. Kapitän 1	15.95	3.9	204	8.6	16	8.8
15. Dressel 20 16. Dressel 23	51.66	12.5	294	12.4	2	1.1
17.-24. various African 27.-28.	194.44	47.2	n.a.		59	32.4
25. Almagro 51C 26. Almagro 50	26.07	6.3	396	16.6	13	7.1
unclassified	67.30	16.3	n.a.		9	4.9
residual classes*#	5.38	1.3	42	1.8	11	6.0
TOTAL	**411.30**	**100.0**	**2,377**	**100.0**	**182**	**100.0**

Abbreviation: n.a. = not ascertained.
Some body sherds probably assigned to unclassified amphora.
* Includes Dressel 1, 2/4, 7-11, Beltrán 2A, 2B, 4A, *Ostia 2*.521/*Ostia 3*.369-370, Gauloise 3, 4, Richborough 527, Mau 35, and Rhodian.

2.3 Catalogue Format

The organization of the catalogue recapitulates the organization of the discussion of the urban economy presented in Chapter 1, with the amphora functional group presented first (Section 2.4). The amphora section begins with wine amphoras, followed by oil amphoras, oil/fish products amphoras, fish products amphoras, and then amphoras for which the principal content remains unknown. It concludes with a section devoted to disks fashioned from potsherds that appear to have served for the closing of amphoras. The amphoras section is followed by a section devoted to the tableware/utilitarian ware functional group (Section 2.5) and then a section devoted to the cookware func-tional group (Section 2.6).

Within each of the amphora content groupings, the various classes are presented in geographical order, beginning with Italy and then running around the Mediterranean from Italy in a counter-clockwise direction. The treatment of each amphora class includes the following:

1. brief comments regarding the class's size, shape, principal content, provenience, fabric, and abundance in the A (105) deposit (as measured by the ENV method);

2. a brief characterization of fabric (with a more detailed description provided in Appendix 2);

3. comments regarding manufacture (raw materials, paste preparation practices, and forming/finishing/firing procedures);

4. a catalogue description of one or more representative examples;

5. a discussion of chronology, including both the class's general chronology and/or its chronological representation in the Palatine East sequence;

6. a discussion of provenience and principal content;

7. a brief characterization of capacity and the module or modules to which this might correspond.

Where there is more than one variant represented, each variant is provided a separate section that includes nos. 2-4 in the list given here. Detailed descriptions of shape and forming operations for the previously identified amphora classes/variants have been dispensed with, since many of these have already been described elsewhere in the literature. With regard to chronology, it should be noted that the Palatine East sequence runs fairly continuously from the middle decades of the 1st c. A.D. to the late 5th or early 6th c., with one notable gap extending over the period ca. A.D. 200-90. It thus cannot be excluded that classes that first appear in the sequence in contexts dating to the last third of the 3rd c. began to reach Rome as early as the early 3rd c.

The various classes in the tableware/utilitarian ware and cookware functional groups are presented in geographical order, following a scheme that adheres as closely as possible to the supply zones model developed in Section 1.5, beginning with the classes produced in urban workshops and moving outwards from Rome.

The treatment of each of these classes includes the following:

1. a brief characterization of the abundance of that class in the A (105) deposit (as measured by the ENV method);

2. a brief characterization of fabric (with a more detailed description provided in Appendix 2);

3. comments regarding manufacture (raw materials, paste preparation practices, forming/finishing/firing procedures, forms attested, and paste/surfacing materials labor value);

4. a description of each of the one or more forms represented (shape, dimensions, forming/finishing procedures, function, phasing category, and forming/finishing labor value);

5. one or more catalogue descriptions for representative examples of each form;

6. a discussion of the chronology of both that class and certain of its individual forms;

7. a discussion of provenience.

Since the analysis of the Palatine East pottery assemblage has not reached the stage where it is possible to reconstruct in detail the diachronic representation across the site sequence of most of the individual forms in these two functional groups, the discussion under chronology is concerned primarily with pottery classes.

Each form is assigned a unique number by appending a number to the class number in an ascending series, with the two separated by a period (e.g., African Sigillata C = Class 41; Hayes Form 50 bowl = Form 41.1; Hayes Form 52 bowl = 41.2, and so forth). Form variants are indicated by appending a second such number (e.g., West-Central Italian Cookware 1, Form 4, Variant 1 = 45.4.1). For some classes there are also descriptions for bases that cannot be associated with one specific form. These are designated by appending a letter to the class number rather than a number (e.g., 29.A, 29.B, 29.C).

With but a few exceptions, all of the catalogued vessels are represented in a profile drawing, with these rendered at the scale of 1:4. Catalogue entries are numbered consecutively throughout the chapter, from 1 to 180. Following the catalogue number, the Palatine East accession number appears inside a set of parentheses along with the figure number assigned to the drawing of that piece. The following abbreviations are employed in catalogue entries:

approx.: approximately
bs.: base
d.: diameter
ht.: height
n.a.: not ascertainable
r.: rim

All measurements are given in centimeters. Color characterizations are given using both the verbal and alphanumeric equivalents from the *Munsell Soil Color Charts*, interpolating between color chips where appropriate.

While there has been an effort to retain a high degree of consistency throughout the catalogue, this has not always proved either possible or desirable. The treatment of some classes has been compressed or combined with that of others either in the interest of economy (e.g., the four subclasses of the *Africano* 2 Amphora, Classes 20-23) or because it was felt that some of the distinctions observed were insufficiently well understood (e.g., West-Central Italian Cookware 2 Fabrics 5d and 5e [Class 46]). The adducing of specific comparanda has been limited to unusual classes or forms, or to instances where such pieces are useful for establishing either chronology or provenience.

Pottery classes assigned entirely to phasing category 3 (residual) are briefly noted at the beginning of the section devoted to the appropriate functional group. Residual forms belonging to classes that contain some forms assigned to phasing categories 1, 2, or 4 are indicated in the section concerned with manufacturing procedures.

2.4 Amphoras

The deposit contains fragments of at least 198 amphoras. Among these are fragments of at least 21 vessels belonging to 12 different amphora classes that are clearly residual (phasing category 3). These include the following:

Dressel 1 Amphora	2	examples
Dressel 2/4 Amphora	3	
Ostia 2.521/*3*.369-370 (Spello) Amphora	2	
Richborough 527 Amphora	1	
Beltran 1 Amphora	1	
Beltran 2A Amphora	1	
Beltran 2B Amphora	1	
Beltran 4A Amphora	1	
Gauloise 3 Amphora	1	
Gauloise 4 Amphora	3	
Mau 35 Amphora	3	
Rhodian Amphora	2	

In every case but one these containers are represented by a single, small fragment. The one exception is one of the two examples of the *Ostia 2*.521/*3*.369-370 Amphora, which is represented by a complete amphora top.

The remaining 177 vessels belong to 28 distinct amphora classes that are or may be wholly or partially in phase with the deposition of the context.

2.4.1 Wine Amphoras and Probable Wine Amphoras

Class 1: Ostia 4.279 (Empoli) Amphora

Small amphora with short neck, piriform body, short spike, and two curved handles with rectangular section.[20] Probable wine container from northern Tuscany. At least three examples. No examples of this class are included in the catalogue due to their highly fragmentary nature.

Fabric: Hard, fine-grained, red fabric (Fabric 1f).

Chronology: This class first appears in the Palatine East sequence in contexts dating to the last decade of the 3rd c., continuing to occur through the first half of the 5th c. It is never present in abundance, and the point at which it becomes residual is thus unclear. At Pistoia this class is attested in a context dated to the 2nd c., while at Ostia it has been recovered in a context dated to the second quarter of the 3rd c.[21] [phasing cat. 2]

Provenience and Principal Content: Five production sites have been identified for this class in northern Tuscany, including two in the environs of Empoli, in the lower Arno Valley,[22] one at Galafone, and one at Poggio Fiori, both in the lower Fine Valley,[23] and one at Mazzanta, in the lower Cecina Valley.[24] While there is no evidence regarding this container's content, it seems likely that this was wine, perhaps the *Tuscum* referred to in *Expositio* 55.4-5.[25]

Capacity: A digitized capacity measurement was obtained for one example of this class. This figure, 18.0 l, suggests that it was manufactured to a module of 32 *sextarii*/two-thirds *amphora* (17.5 l).

Class 2: Mid-Imperial Campanian Amphora

Medium-sized (?) amphora with tall neck with thickened rim, sloping shoulder, and two slightly bowed handles with an oval section, here termed Mid-Imperial Campanian Amphora.[26] Form of body and bottom uncertain. Probable wine container from Campania. At least two examples.

Fabric: Hard, gritty to coarse, red fabric containing sparse white bodies (calcareous material) and frequent black grains (augite). (Fabric 3c).

001 (#4820; fig. 7) yellowish red (4YR 5/6), with surfaces of same color and faint grayish core in handle; d. r. 15.

Chronology: In the Palatine East sequence examples of this class have been identified only in A (105) and one other context also dating to the early 4th c. While evidence from other sites suggests that it may have gone out of use by ca. A.D. 250,[27] it cannot be ruled out its manufacture continued into the second half of the 3rd c., and the examples in A (105) are not, on this account, classified as residuals. [phasing cat. 4]

Provenience and Principal Content: Augiterich, "black sand" fabrics of this kind have generally been associated with the tracts of the Central Italian Volcanic Province lying within modern Campania (i.e., the Roccamonfina Complex, the Vesuvius Complex, and the Campi Flegrei) (see fig. 6), and this class likely originated in one or another of these areas.[28] These were important wine producing regions during the early and middle empire,[29] and the fact that the section of the *Edictum de Pretiis* concerned with wines includes an entry for *Falernum*

CHAPTER 3:

SYNTHESIS: THE URBAN ECONOMY IN LIGHT OF THE A (105) POTTERY DATA

Introduction

This chapter discusses the A (105) pottery data. Section 3.1 briefly considers the implications of the data for the practical strengths and limitations of the various methods employed for the quantification of the deposit. Section 3.2 then discusses the implications of the data for our understanding of the urban economy during the period of the Early Dominate.

3.1 Aspects of Pottery Quantification

Because it is generally impossible to determine the specific origin of the refuse recovered at Roman urban sites, Roman pottery researchers involved in the study of urban assemblages for the most part have sought to elucidate broad geographical patterns in exchange rather than to investigate more narrowly focused issues, such as site function and the socio-economic status of households. Investigations of this kind have usually involved the use of one or more of a variety of quantitative measures, including sherd weight, sherd count, counts of diagnostic sherds (i.e., rims, bases, and/or handles), and, less often, particularly outside of Britain, counts of either the number of vessels represented or of the quantity of vessel equivalents. Raw figures are generally converted to percentages so that comparisons can be made between two or more different groups of material.

The theoretical strengths and limitations associated with these various quantitative measures have been discussed by Orton and Tyers.[1] They point out that of these methods, the quantity of vessel equivalents technique is preferable in that it is the only measure that is unbiased (where the object of quantification is to measure the proportions of different classes of vessels represented in a group), remaining so despite variation in breakage rate (the average number of sherds into which the vessels in a group of materials have been broken) and completeness (the portion of each of the vessels represented in a group of materials actually present). This technique is thus useful both for measuring proportions of different kinds of pottery within a single group of materials and for comparing proportional data between two or more groups of materials. While the sherd weight measure is biased in favor of heavy vessels, it remains invariant with differences in breakage rate and completeness. Thus, while there are constraints to the utility of this technique for measuring different proportions of pottery within a single of group of materials, it is suitable for comparing proportions of pottery between two or more such groups. Sherd count is biased, overrepresenting large or friable vessels that tend to break into many sherds, with the amount of bias varying with the degree of vessel brokenness. The number of vessels represented measure is also biased, over-representing forms that tend to break into larger numbers of sherds, with the degree of bias increasing as the degree of brokenness increases and/or as the degree of completeness decreases. The use of these latter two measures is thus problematic both for calculating the proportions of different classes of pottery within a group of materials and for comparing pottery proportions between two or more such groups.

There are, of course, practical limitations associated with each of these measures as well. Sherd weight, sherd count, and count of diagnostic sherds are fairly quick and easy to determine. Establishing the number of vessels represented or the quantity of vessel equivalents in a group of materials, on the other hand, requires substantially more time. These two measures also embody a certain degree of imprecision and inaccuracy, both of which presumably increase as the degree of brokenness increases and, in the case of the former technique, as the degree of completeness decreases. For these reasons, in the study of the A (105) material it was decided to perform only one of these two measures in addition to sherd weight, sherd count, and rim sherd count. The technique selected was the number of vessels represented, with the measure taken on the basis of the number of different vessel rims represented (the NVR measure) and again on the basis of the number of different vessels represented on the basis of parts other than the rim (the ENV measure). In retrospect, it would have been preferable to select the quantity of vessel equivalents measure instead, given the bias associated with the number of vessels represented measure.

The quantitative data for A (105) provide a certain degree of insight into some of the limitations associated with these measures. First, certain of the data suggest the scale of the bias inherent in the number of vessels represented measure, which would appear to be appreciable, even when controlling for differences in size and general morphology of vessel form. Thus, if we examine the situation with regard to the various classes of red-slipped tableware, we find that for Central Tiber Red-Slip Ware, one of every 1.6 sherds (92/58) preserves a portion of the vessel's rim, while for African Sigillata C and African Sigillata D these figures stand at one of every 2.9

CHAPTER 4:

CONCLUSIONS

This chapter briefly summarizes the results of the analysis of the A (105) pottery and discusses directions for further research in the analysis of the Palatine East pottery assemblage.

The analysis of this deposit of slightly more than 512 kg of pottery recovered in excavations carried out in the center of Rome provides new insights into the organization of the supply of foodstuffs and craft goods to the *urbs* during the period of the Early Dominate, an important period of transition between the economic forms characteristic of the early/middle empire and those characteristic of the late empire that is poorly documented in the archaeological literature.

The deposit consists of a mix of secondary and probably also primary materials for the most part used and discarded over a period of time running from the last decade of the 3rd c. through at least A.D. 301, and perhaps as late as A.D. 312/15. The presence of a significant though unspecifiable amount of residual material may well produce both qualitative and quantitative distortions to the deposit data, complicating its analysis.

A detailed analysis of the literary sources regarding general aspects of the urban economy during the Early Dominate and the supply of wine, olive oil, fish products, and pottery to the city during this period was undertaken in order to formulate a background against which the deposit could be interpreted. While there is a dearth of literary evidence pertaining directly to the Early Dominate, this analysis nonetheless provided a wealth of information regarding the institutional organization and geography of various facets of the supply of foodstuffs and pottery to the city during the period of the context's deposition.

The study of the pottery deposit involved its division into three functional groups: amphoras, tablewares/utilitarian wares, and cookwares. Within each of these groups the materials were then assigned either to classes, or, in the case of the amphoras, to class variants on the basis of fabric. Fabric identifications were made by means of binocular microscope, with the resulting classification arranged in a hierarchical scheme underscoring the material relations between different fabrics and facilitating its use as an identification key. The tablewares/utilitarian wares and cookwares were then assigned to forms and form variants on the basis of an evaluation of the primary and secondary forming/finishing techniques employed in their manufacture. The materials assigned to each class were quantified by sherd weight, sherd count, and rim sherd count. Those assigned to each form or form variant were quantified by two estimated number of vessel measures, one involving the number of different vessel rims represented, the other the number of different vessels as indicated by all diagnostic pieces and fabric. Finally, in an effort to obtain more economically meaningful quantitative data, two new measures were developed and applied to the deposit. The first, intended to represent the economic value of amphoras, is based on figures for the mean capacity of each of the amphora classes represented in the deposit. The bulk of the amphora capacity data employed for determining these mean capacity figures was obtained by means of a computer algorithm that calculates vessel capacity from a profile drawing by means of a digitizing pad. The measure intended to represent the economic value of the tablewares/utilitarian wares and cookwares is based on a technique for estimating the relative amount of raw material and labor involved in the production process.

The analysis of the deposit showed that it consisted of roughly 80 percent amphoras and 20 percent tablewares/utilitarian wares and cookwares when measured by weight. Excluding the materials of certain residual status, there proved to be 28 different classes of amphoras represented, including 14 classes of certain or probable wine containers, three classes of oil containers, two classes of fish products containers, seven classes of containers that may have served for oil and/or fish products, one class of container that may have served for wine, oil, and/or fish products, and one class of container for which the primary content was entirely uncertain. Again, excluding residual materials, there were 16 different classes of tablewares/utilitarian wares and five different classes of cookwares represented.

The interpretation of the data pertaining to the deposit was complicated by a variety of factors. These include the uncertainty regarding the context's closing date, difficulties in the identification of residual materials, the conjectural nature of the provenience identifications for several classes, uncertainties regarding the primary content of several amphora classes and the specific economic structures that lay behind their distribution to the *urbs*, and the possibility that significant amounts of the wine and oil consumed at Rome were transported there not in amphoras, but in skin containers and/or casks. In addition, the various quantification techniques employed embody certain biases, while the two new techniques for measuring economic value require further refinement. Any evaluation of the data should thus be mindful of the potential for error introduced by these several limitations.

APPENDIX 1:

STATE INVOLVEMENT IN THE URBAN WINE SUPPLY DURING THE SECOND HALF OF THE 4TH C.

From the textual sources it is evident that by the second half of the 4th c. the state had put in place an elaborate system for the provision of wine to the city of Rome under the *canon vinarius*, a special levy subsumed under the *canon urbis Romae*.[1] Our most important source of information regarding this system is *CTh* 11.2.2, a constitution dated October 23, A.D. 365 addressed to the *praefectus urbi*, in this instance the same Phosphorius whose *domus* would be put to the torch by a mob some ten years later. The text of this law is as follows:

Commoda cogitantes urbis aeternae vini speciem ita provinciales statuimus conportare, ut apochandi presumptione damnata vina Romam portentur. In tantumque populi usibus profutura provisionis nostrae emolumenta porreximus, ut etiam pretio laxamenta tribuantur. Sanximus quippe, ut per vini singulas qualitates detracta quarta pretiorum, quae habentur in foro rerum venalium, eadem species a mercantibus conparetur.

In considering the interests of the eternal city, so that wines may be brought to Rome now that the prospect of commuting tax obligations in kind to payments in cash has been censured, we have decreed that the provincials should be responsible for assembling state wine. So greatly have we extended to the uses of the people the beneficial efforts of our forethought, that reductions in sale price should likewise be granted. We have decreed, in fact, that each grade of wine should be made available to buyers at a price one quarter below that which obtains on the market.

The first portion of this law instructs the *praefectus urbi* that under a new arrangement *provinciales* - no doubt meaning *possessores* - should be responsible for assembling the state wine brought to Rome, apparently for provision to the city's inhabitants. The wine in question was presumably that raised under the *canon vinarius*. The institution of the new arrangement to which this law refers is explicitly linked to the abolition of a practice termed *apochandum*. The meaning of this term can be inferred from the previous entry in the *Codex Theodosianus*, *CTh* 11.2.1, a ruling issued to the same *praefectus urbi* on August 12 of the same year. The text of this entry, which apparently preserves only some portion of a more extensive ruling, states: *Scias inhibitam esse apochandi licentiam, ita ut ne ex praesenti aut futuro vel praeterito sub hoc titulo nummus a provincialibus postuletur.* (Be informed that freedom of practicing *apochandum* has been abolished, so that henceforth coin should not be sought from provincials under this *titulus* either for past or future obligations.) While the specific *titulus* (i.e., designation for a specific tax levy) to which this law refers remains unclear, as will be shown below, it was probably either the *canon vinarius* or, more generally, the *canon urbis Romae*. What is of immediate importance, however, is the fact that on the basis of this law we can infer that, as used both here and in *CTh* 11.2.2, the term *apochandum* refers to the practice more often known as *adaeratio*, that is, the commutation of tax obligations calculated in terms of kind to payments in cash.[2] While the *Codex Theodosianus* reveals considerable variability in the terminology employed for tax receipts, it would appear that receipts issued for payments in kind were generally known as *securitates*, while those issued for commutation payments were termed *apochae*,[3] with the term *apochandum* as used in these two laws presumably reflecting this distinction. *CTh* 11.1.8, issued to the same *praefectus urbi* on June 13 of the previous year, would appear to shed light on the abolition of commutation payments to which these two laws refer, declaring *Nemini aurum pro speciebus urbis Romae liceat exigere de futuro* (Henceforth let no one exact gold in the place of payments in kind for the support of the city of Rome.) It would thus appear that in A.D. 364 *adaeratio/apochandum* was banned under the *canon urbis Romae*. A number of other laws promulgated in this year impose modifications on the system employed for the collection of the *canon urbis Romae*, and it would appear that a major reorganization of this initiative was undertaken at this time.[4] *CTh* 11.2.1 and 11.2.2 were presumably issued the following year as part of the effort required for the implementation of these reforms, with the unidentified *titulus* of the former referring either to the *canon urbis Romae* or, perhaps more specifically to the *canon vinarius*.

The second portion of *CTh* 11.2.2 instructs the *praefectus urbi* to impose a 25 percent discount below free market prices for wine being sold at Rome. While it is uncertain from the language of the text whether this provision was meant to be applied to state wine raised under the *canon vinarius* or wine being sold on the free market, that it was the latter seems highly unlikely, as we have no other evidence that the state sought to impose price controls on market goods being sold at Rome at this time. This law would thus appear to confirm the assertion by the author of the *SHA Aur.* to the effect that during the later 4th c. the state wine provided to the inhabitants of Rome was sold rather than distributed gratis. If this is the correct interpretation of this passage, then we may also infer that the varieties of state wine then being sold at Rome were also available on the urban market, and that the sale of this wine was the responsibility of the *officium urbanum*. The late 4th/early 5th c. *Notitia Dignitatum* (*Not.Dig.Occ.* 4.9) lists under the administrative supervision of the *praefectus urbi* an official known as the *rationalis vinorum* (wine accountant), and we should probably suppose that it was he who was

APPENDIX 2:

FABRIC CLASSIFICATION

This appendix presents detailed descriptions of the various pottery fabrics attested in the A (105) deposit. Each description includes both a hand specimen and a microscopic characterization of the fabric (abbreviated hsp and mic, respectively). The former represents what the observer sees when examining a fresh fracture surface with the naked eye, while the later represents what the observer sees when examining a fresh fracture surface with the aid of a binocular microscope having a maximum magnification of 40x.

The 51 different fabric descriptions are arranged in eight different fabric groups, each of which represents a distinct type of ceramic body from a mineralogical point of view. Within each fabric group the various fabrics have been arranged (to the extent possible) in an order that runs from finest to most coarse. This approach serves to suggest the relations between the various fabrics at the materials level, while facilitating the use of the classification as an identification key. The symbol * is employed to denote fabric descriptions that are based upon a limited number of examples. For these, readers should keep in mind that the characterization of additional pieces might lead to some significant modification of the description. Equations with other fabrics described in the literature are indicated in cases where these can be made with a fair degree of confidence. In every case, the reader should keep in mind that as the identifications of the various minerals, rock fragments, and other aplastic materials were made without the benefit of petrographic analysis, these should be regarded as no more than informed conjectures.

The system employed for the characterization of fabrics is loosely based on that described in Stienstra (1986). Fabrics are considered to have three components: matrix (transformed clay minerals and aplastics too small to resolve visually using the 40x binocular microscope), macrograins (aplastic materials large enough to resolve visually using the 40x binocular microscope), and voids. The following attribute categories and values are employed:

1. **hardness.** Values: soft (scratched with fingernail), slightly soft, hard (normal range for Roman pottery), very hard (notably hard); friable (crumbly).

2. **touch.** Values: rough, powdery, soapy.

3. **fracture surface.** This refers to the texture of areas freshly exposed by a break. Values: smooth, slightly gritty, gritty, coarse, very coarse; hackly.

4. **break.**. This refers to the condition of the edge of the fracture surface. Values: sharp, regular, irregular.

5. **color.**. Color is characterized using the Munsell Soil Color Charts alphanumeric system, with values interpolated between color chips as appropriate.

5. **surface coating.** Types: slip (presumably made from same clay as paste), color-coat slip (distinct color from body, implying different clay), gloss (distinctly glossy color-coat slip), glaze (a true glaze), salt scum (layer of salt deposited on surface during drying).

7. **surface coverage.**. Values: even, uneven; matte, slightly glossy, glossy.

8. **fabric texture.** Values: fine (slight to no notable macrograin component), porphyritic (sparse macrograins in fine matrix), me-dium-grained (frequent-abundant, small-medium macrograins), coarse (frequent-abundant, small-large macrograins).

9. **macrograin concentration.** Values: absent, rare (ca. 1 percent), sparse (ca. 3-5 percent), frequent (ca. 10 percent), abundant (ca. 20 percent), very abundant (ca. 30 percent).

10. **macrograin size.** Values: minute (<ca. 0.3 mm), small (ca. 0.2-0.4 mm), medium (ca. 0.3-0.6 mm), large (ca. 0.5-1.0 mm), very large (>ca. 1.0 mm).

11. **macrograin shape.** Values: angular, subangular, subround, round; tabular, blocky, irregular, platey, book.

12. **macrograin type.** Values: grain (i.e., mineral grain), rock fragment, plate (for mica), body (type unclear).

The provenience suggestions at the end of each fabric description are based upon the discussions of the various pottery classes presented in Sections 2.4-6.

APPENDIX 3:

TECHNIQUES FOR MEASURING THE ECONOMIC VALUE OF POTTERY

If our object is to shed light on the scale of exchange between different locales, we might with reason call into question the logic of quantifying pottery deposits in terms of numbers of vessels. More appropriate in such an instance would be some measure designed to represent in a more direct fashion the relative economic value, or cost, of the various classes of pottery represented in a deposit. With this end in mind, two additional quantitative measures were applied to the A (105) deposit, one designed to represent the economic value of the various classes of transport amphoras, and the other to represent the economic value of the various classes of tablewares/utilitarian wares and cookwares. It should be emphasized that in both cases the background information on hand permitted the elaboration of only a fairly crude and imperfect instrument, and the discussion of these methods and the data generated through their application are here presented in part as an illustration of how we might seek to construct measures representing the economic value of archaeological pottery. It is anticipated that through the critical discussion of these measures and the collection of additional background information it will be possible to refine and improve both of these techniques.

We may begin with a discussion of the technique employed to measure the economic value of the various classes in the amphora functional group. Since amphoras were manufactured primarily to serve as packaging for foodstuffs and, as discussed in Section 1.5, were assigned a value equal to only a small fraction of the value of their contents, it was assumed that any technique aimed at expressing the economic value of amphoras should be directed at measuring the volume of their content. In theory, a volume measure of this sort might be constructed using either of two approaches. In the first, here termed the capacity method, one first establishes a range of capacity values for each of the classes under consideration by measuring a representative sample of complete vessels. One then uses these values to derive a mean capacity value for each class, and multiplies each of these mean capacity figures by either an estimate of the number of vessels represented or a quantity of vessel equivalents figure for that class, thereby obtaining an estimate for the overall volume of content represented by the examples of each class in the deposit. In the second approach, here termed the efficiency ratio method, one derives an estimate for the range of efficiency ratios (i.e., the ratio of liters of content to kilograms of container) for each amphora class by weighing and measuring the capacity of a representative sample of complete vessels. One then uses these values to derive a mean efficiency ratio for each class, and multiplies each of these mean efficiency ratio figures by the weight of sherds figure for that class, thereby obtaining an estimate for the overall volume of content represented by the examples of each class in the deposit. In theory, the efficiency ratio method is the more attractive of the two, since once one has derived the set of efficiency ratio values the application of this method should be a fairly simple, straightforward operation. Further, the sherd weight measure offers the advantage of remaining invariant with differences in breakage rate and vessel completeness (see Section 3.1). In practice, however, it is frequently the case that two or more of the amphora classes present in a deposit were manufactured in identical or highly similar pastes, and it is on this account impossible to assign a large portion of amphora sherds to a specific class. As a result, the weight of sherds measure generally conflates materials belonging to two or more different amphora classes. The application of the efficiency ratio method is thus highly problematic, and on this account the capacity method was the technique selected for the characterization of the amphora component of the A (105) deposit.[1]

Only a limited amount of capacity data were available in the literature for the amphora classes present in the A (105) deposit, and a substantial amount of additional capacity data was collected by means of a computer program that calculates vessel capacity from a profile drawing using an electronic digitizing pad.[2] The program in question, developed by Senior and Birney, operates by converting a vessel profile into a series of stacked conic sections, calculating the volume of each, and then summing the results.[3] The top and bottom of each conic section are demarcated by marking points along the vessel profile using the digitizing pad. Trials run by Senior and Birney indicate that, supplied with a sufficient number of points, this program yields a highly accurate estimate of a vessel's capacity.[4] For the present study, vessel capacity measurements were taken using profile drawings published in the literature. Measurements were taken using photocopies of the published profile drawings. Each photocopy was first checked to insure that no distortion had occurred in the copying process. The profile was then mounted on the digitizing pad and its capacity measured three times using a minimum of 40 points, beginning at the lip.[5] The results of the three trials were then averaged in order to obtain an estimate of the vessel's capacity. At least one capacity measurement was obtained for 20 of the 27 amphora classes represented in the A (105) deposit. A graffito on an example of one additional class (Class 11) provided evidence for that vessel's effective capacity. The search of the literature was by no means exhaustive, and a more ambitious effort would no doubt yield numerous additional drawings suitable for measurement.